

Seagate Crystal Reports™ 7 User's Guide

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1992-1998

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Welcome

Welcome to Seagate Crystal Reports, the most powerful Windows reporting tool available today.

- If you are new to the product, you will soon understand why more than one million users worldwide turn to Seagate Crystal Reports for all their reporting needs.
- If you are upgrading, thanks for your vote of confidence. Every effort has been made to make this release the best ever, offering major improvements over earlier versions.

This manual has been designed to fit the way users say they work. The emphasis is on getting the job done in the easiest way possible. To eliminate confusion, a show-as-you-go style that uses pictures liberally to demonstrate procedures has been adopted.

This manual contains instructions for most of the typical reporting tasks and for some very sophisticated tasks as well. It also contains a great deal of conceptual information to help you better understand databases, reporting, and the program itself.

There are many topics in this manual that deal with general areas of interest such as placing fields, formatting your report, and sorting records, as well as, topics that deal with more specific areas of interest such as advanced formula creation and accessing different types of data.

In most chapters, the Hands-On topics flow from general to more specific areas of interest. Consult *What you will find in this chapter...* (found on the first page of each chapter) to target the information you need in a hurry.

Two kinds of Hands-On tutorials

Hands-On sections in this manual contain two types of tutorials:

1. Overview, and
2. Procedural.

Overview tutorials

Overview tutorials present an overall view of a process. They are designed to provide an understanding of the concepts involved and are cross-referenced to procedural tutorials for step-by-step instructions on completing core procedures contained within them. For example, a typical overview tutorial might discuss how to place three unrelated reports in a single report. One of the process steps is, "Create the first

subreport”. No details on how to do this are provided in the overview tutorial; a cross-reference is included to the procedural tutorial that will explain in a detailed fashion how to create a subreport.

Procedural tutorials

Procedural tutorials demonstrate core procedures that are used again and again. For example, even though you may use subreports in many different situations, the two detailed procedures you need to understand are:

1. how to insert a subreport, and
2. how to link a subreport to the data in the primary report.

Each of these is explained in a step-by-step fashion using detailed process tutorials.

Command, button, key, and control conventions

This manual uses the following conventions:

Commands and buttons

For easy recognition, command names and button names from the Standard, Supplementary, Analyzer, and Formatting toolbars are displayed in small caps. For example: **NEW** command, **PRINT** button, etc.

Key combinations

Keyboard shortcuts appear in the following forms:

- Delete means the Del key (either the Delete key, or the Del key on your numeric keypad).
- Enter means the Enter, Return, CR, or ↵ key, depending on which of these keys appears on your keyboard.
- Ctrl-Key, Shift-Key, and Alt-Key are examples of the notation for two-key combinations. Press the first key in the combination (Control, Shift, or Alt), and, at the same time, press the second key in the combination (designated above as Key). For example: Ctrl-C means to hold the Control key down and then press the letter C on your keyboard (Ctrl-C is the Windows Copy command).

Dialog box controls

Buttons, lists, check boxes, and other dialog box elements are displayed in italics. For example, *Suppress* check box, *OK* button, etc.

Other conventions

- Text enclosed in double brackets (for example, «information») is intended to expand or explain the information that it follows.
- Computer type indicates data that you are to enter using the computer keyboard. It is also used to show example formulas.

- Field names appear in the following format:

{file.FIELD}

- *file* represents the alias of the table the field comes from.
 - *FIELD* represents the name of the field in that table.
- Portions of underlined text within normal text require special attention.
 - **NOTES** are used to provide extra or special information regarding the preceding topic.
 - \WINDOWS\SYSTEM refers to the System subdirectory of the Windows directory on your computer or network server. By default, this directory is C:\WINDOWS\SYSTEM in Windows 3.1, Windows 95, and Windows 98 and C:\WINNT\SYSTEM32 in Windows NT 3.51 or later. This directory may be different on your system. If you are unsure, contact your network administrator, or refer to your Windows documentation.
 - *Related Topics* lists point to other topics in this manual and online Help systems that deal with related procedures, additional uses for the same command or dialog box, or alternative methods for accomplishing the same task.
 - Not all of the pictures used in the Hands-On tutorial sections reflect exactly what you will see on-screen.
 - Some of the example reports have been designed to illustrate concepts only, not the actual look of a finished report.
 - Some menus have been shortened by removing commands that are unrelated to the current discussion.
 - The data in some lists has been abbreviated to focus attention on specific items of interest.
 - In some cases, an individual screenshot illustrates both a before and after picture of a dialog box when such an illustration can be done without confusion.
 - In the Hands-On tutorial sections, be sure to pay attention to the callout text accompanying all screenshots and graphics. Often the callouts are steps necessary to complete the tutorial and to pass by one inadvertently may cause undesirable or incorrect results.

Using Seagate Crystal Reports documentation

In addition to this User's Guide, the product includes a comprehensive set of online and printed learning tools to help you when you are getting started with the program and when you need answers fast in your day-to-day reporting.

Whether you are a beginner or an expert, this documentation will provide a clear and easy path to productivity. For a complete description of learning tools and suggested learning paths, see *Learning Seagate Crystal Reports*, Page 27.



PROFESSIONAL EDITION FEATURES

This User's Guide is distributed with both the Standard and Professional Editions of the program. The following list identifies features and capabilities discussed in the User's Guide but available only in the Professional Edition:

- Crystal Web Report Server
- Crystal Report Engine Automation Server
- Crystal Report Engine Object Library
- Active Data Driver
- Crystal Data Object (CDO)
- Crystal Dictionaries
- Crystal Query Designer
- Crystal SQL Designer
- Reading SQL databases
- Reading Microsoft Exchange data files
- Exporting to ODBC data sources

Seagate Crystal Reports online Help features

The online Help systems included with this program are full of useful information.

- **Seagate Crystal Reports online Help (CRW.HLP)**
Seagate Crystal Reports online Help includes all the information included in the Seagate Crystal Reports User's Guide, with special emphasis on helping the user understand the interface with hundreds of "How to" tutorials.

- **Crystal Query Designer online Help (CRQUERY.HLP)**
Crystal Query Designer online Help provides information about the Crystal Query Designer, a new tool that allows you to design and preview reports and queries from any Java enabled web browser.
- **Crystal SQL Designer online Help (CRSQL.HLP)**
Crystal SQL Designer online Help includes all the information you need in order to create and edit SQL queries for use in creating reports.
- **Developer's online Help (DEVELOPR.HLP)**
Developer's online Help includes descriptions of all functions and structures, conceptual information, and sample code for:
 - ActiveX
 - Crystal Report Engine Automation Server
 - Active Data Driver
 - NewEra
 - PEPlus
 - Report Designer Component
 - Report Engine API
 - Visual Basic API
 - VBX
 - VCL
 - Web Report Server
- **Dictionary online Help (DICTN.HLP)**
Dictionary online Help includes all the information you need in order to create, modify, and work with dictionaries.
- **Document Import Tool online Help (CRDIT.HLP)**
Document Import Tool online Help includes all the information you need in order to convert text reports to Seagate Crystal Reports with the Document Import Tool.
- **Mapping online Help (CRMAPP.HLP)**
Mapping online Help includes all the information you need in order to place complex geographic maps in reports, for better data analysis and trend identification.
- **ReadMe online Help (README.HLP)**
ReadMe Help includes topics such as the following:
 - Installation Topics
 - Configuration and Setup Topics

- Quick Start
- Worldwide Office Directory
- **Report Designer Component online Help (CRRDC.HLP)**
This help file contains descriptions of all the functions and structures, conceptual information, and sample code for the Report Designer Component.
- **Reports at a Glance online Help (RPTGLANC.HLP)**
Reports at a Glance online Help is a complete online help system for the Reports at a Glance application.
- **Runtime File Requirements online Help (RUNTIME.HLP)**
Runtime Help including all the distributed DLLs and UFLs, including:
 - the exact name,
 - location, and
 - description.
- **Web Report Server online Help (CRWEB.HLP)**
Web Report Server online Help includes all the information you need to set up and view reports over an intranet or extranet.

Here is just a sampling of topics you will find in these help files:

- Explanations of error messages and formula compiler errors.
Search for *Error Messages and Formula Compiler Warnings* in Seagate Crystal Reports online Help.
- Runtime information so you will know which files to include when using the Crystal Report Engine with your application. See *Runtime File Requirements* in Seagate Crystal Reports online Help.
- Tips and Tricks
Dozens of helpful hints for working with Seagate Crystal Reports. Search for *Tips and Tricks* in Seagate Crystal Reports online Help.
- Formulas for study
A series of complex formulas that showcase the use of Seagate Crystal Reports functions, operators, and the formatting language in solving a number of real-world reporting problems. Search for *Formulas in Action Index* in Seagate Crystal Reports online Help.

- **Specialized formulas**
A collection of formulas that address specific reporting needs. Search for *Specialized Formulas* in Seagate Crystal Reports online Help.
- **Sample formulas**
A number of topics contain sample formulas that can be cut and pasted directly into the Formula Editor to save you time. Search for *Copying formulas from online Help* in Seagate Crystal Reports online Help.
- **Formula functions and operators**
A complete and detailed list of all functions and operators you can use when creating formulas including specialized financial functions used to design sample reports. Search for *Functions* or *Operators*, or for an individual function or operator by name in Seagate Crystal Reports online Help.
- **Full documentation of the Report Engine API.** Search for *Report Engine Functions* in Developer's online Help.
- **Sample code for making calls to the Report Engine from your C, Visual Basic, or Delphi application.** Use the Copy (Ctrl-C) and Paste (Ctrl-V) commands built into Windows Help to copy this code and paste it as ASCII text into any editor that supports Windows Copy and Paste procedures. Search for *Copying code from online Help* in Developer's online Help.
- **Full documentation of the Report Engine Class Library, a C++ class library addition to the Microsoft Foundation Class Library.** Use the class definition in the Report Engine Class Library to access the Crystal Report Engine from your C++ application. Search for *Class Library Index* in Developer's online Help.
- **Full documentation for the Crystal Custom Control, the Crystal ActiveX control, and the Crystal VCL you can use when working with development environments that support them.** Search for *The Crystal Custom Control*, *The Crystal ActiveX Control*, or *The Crystal VCL* in Developer's online Help.
- **Breakdown of sample applications included with the program.** Search for *Sample Applications* in Developer's online Help.

Online Help is a warehouse of information that can make reporting more productive and enjoyable. A comprehensive indexing system and hundreds of search terms provide a variety of avenues for finding the help you need, right from your computer. Once you see what is in the help system, you will most definitely return to it often.

If you need more help...

WEB SITE

<http://www.seagatesoftware.com/>

E-MAIL

E-mail address: support@webacd.seagatesoftware.com.

Send a blank e-mail first to obtain a support template and follow the instructions in the e-mail, or submit your questions by web browser at:

<http://webacd.seagatesoftware.com>.

E-MAIL NOTIFICATION SERVICE

<http://maillist.seagatesoftware.com/subscribe.asp>

FAX SUPPORT

Fax Support (604) 681-7163

TELEPHONE SUPPORT

Telephone Number (604) 669-8379

For more information on these services, please see Product Support, Page 625.

1

Installation and Quick Start

What you will find in this chapter...

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Windows 3.1 or NT 3.51, Page 12

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Installation Requirements

16-bit version

The 16-bit version of the program has the following installation requirements:

- Microsoft Windows 3.1 or higher
- Minimum RAM: 16 MB (32 MB for Windows NT 3.51 or higher)
- Minimum hard drive space required: 10 MB (Full Install 120 MB)
- Maximum hard drive space required:
 - 75 MB for the Standard Edition
 - 108 MB for the Professional Edition

32-bit version

The 32-bit version of the program has the following installation requirements:

- Microsoft Windows 95, Windows 98 or Microsoft Windows NT 3.51 or higher
- Minimum RAM: 16 MB (32 MB for Windows NT)
- Recommended RAM: 32 MB
- Minimum hard drive space required: 24 MB (Full Install 172 MB)
- Maximum hard drive space required:
 - 90 MB for the Standard Edition
 - 148 MB for the Professional Edition

If your system does not meet these requirements, the program may not run correctly.

Installation

Insert the CD or diskette into the appropriate disk drive.

Windows 3.1 or NT 3.51

- 1 Choose the RUN command from the File Menu.
- 2 When the Run dialog box appears, type:

`x:\setup`

«x represents the appropriate drive letter.»

For example, if the CD is in drive D:, type:

D:\setup

- 3 Click *OK* or press Enter to activate the installation program. The Installation dialog box appears.
- 4 Follow the directions on the screen to set up the program.

During the installation procedure, you can choose a Typical or Custom installation.

- If you select *Typical*, the program will be installed with the most common options.
- If you select *Custom*, you will be given the opportunity to select which program files are installed to the hard drive.

Windows 95, Windows 98 or NT 4.0

- 1 Choose RUN from the Start Menu.
- 2 When the Run dialog box appears, type:

x:\setup

«x represents the appropriate drive letter.»

For example, if the CD is in drive D:, type:

D:\setup

- 3 Click *OK* or press Enter to activate the installation program. The Installation dialog box appears.
- 4 Follow the directions on the screen to set up the program.

During the installation procedure, you can choose a Typical or Custom installation.

- If you select *Typical*, the program will be installed with the most common options.
- If you select *Custom*, you will be given the opportunity to select which program files are installed on your hard drive.

Installing on a network

To run Seagate Crystal Reports from a server you will need to install it to the server and then run a workstation setup application on each workstation that will run Seagate Crystal Reports.

The workstation setup application is installed in the \CRW16\CLIENT16 (16-bit) or \Program Files\Seagate Software\Crystal Reports (32-bit) directory on the network drive.

To install on the server:

- 1 Choose a Custom install.
- 2 When the Custom Installation Options dialog box appears, verify that the Workstation Setup option is checked.

To set up a workstation:

- 1 From the Program Manager, choose Run from the File Menu (Windows 3.x or NT 3.51), or choose Run from the Start Menu (Windows 95 and 98 or NT 4.0). The Run dialog box appears.
- 2 In the Run dialog box, highlight the network drive and directory in which the Workstation Setup resides and run the SETUP.EXE application.
- 3 Follow the directions on the screen to set up your workstation.

Upgrading from a previous version

If you are upgrading from a previous version, the installation routine ensures that there will be no conflict between different versions of the program running on the same machine. When the setup application finds a previous version of the program on a system, it:

- installs the program to the specified directory,
- installs the new CRPE.DLL into the \WINDOWS\SYSTEM directory,
- renames DLLs installed by the previous version in the WINDOWS\CRYSTAL directory, with *.OLD extensions (if, for some reason, you need to use the older versions of the files later on, you only need to rename them back to a *.DLL extension),
- installs the PD*.DLLs and UX*.DLLs (16-bit) or the P2*.DLLs and U2*.DLLs (32-bit), and several other DLL files required by the program into the WINDOWS\CRYSTAL and WINDOWS\SYSTEM directory and changes their extensions from *.DLL to *.OLD, and
- installs any common third party DLLs such as CTL3DV2.DLL or WBTRCALL.DLL to the WINDOWS\SYSTEM directory.

Quick Start

If you are an experienced Windows user who wants to get right into the program, follow these steps to set up a report for the first time.

NOTE: *If you are not an experienced user, please refer to Learning Seagate Crystal Reports, Page 27.*

- 1 In Windows 3.1 and NT 3.51, start the program by double-clicking the Seagate Crystal Reports icon in the Program Manager.
 - In Windows 95, Windows 98 and NT 4.0, click Start, then select Seagate Crystal Reports from the Seagate Crystal Reports program folder.



- 2 Click the NEW button on the Standard toolbar. The Report Gallery appears.
- 3 To build the report:
 - select one of the eight Experts,
 - click *Another Report* to use a template, or
 - click *Custom* to build a custom report. If you click *Custom*, the Report Gallery expands, and you can then select a *Report Type* and *Data Type* for a custom report.
- 4 If you choose *Custom* and select:
 - *Data File*, the Choose Database File dialog box appears. Select the first database you want to activate for the report.
 - *SQL/ODBC*, the Log On Server dialog box appears. Highlight the data source you want, click *OK*, and when the Choose SQL Table dialog box appears, highlight the first table you want to use.
 - *Dictionary*, the File Open dialog box appears. Highlight the dictionary you want to use for the report.

The Design Tab appears with Report Header, Page Header, Details, Page Footer, and Report Footer areas. A report is created by inserting and formatting items in each of these areas.



NOTE: *To use additional database tables for a report and match them up on a record-by-record basis, click the LINK EXPERT button on the Supplementary toolbar, select the table(s), and then set up the links in the Visual Linking Expert when it appears. Search for Visual Linking Expert in Seagate Crystal Reports online Help.*



- 5 Each of the default report areas contains a single section. To add additional sections, click the **SECTION EXPERT** button on the Standard toolbar and use the Section Expert to add the desired sections.

Once you have added sections to an area, you can move, merge, and delete them in the Section Expert. See *How to add, delete, and move guidelines*, Page 72.

- 6 To toggle the grid on and off, choose the **OPTIONS** command on the File Menu and make your changes in the Options dialog box when it appears. See *How to turn the grid on/off*, Page 76.
- 7 If you are working with the grid off and you want to use snap-to guidelines for positioning objects, click the top or left ruler wherever you want guidelines to appear.

- Drag a field to a guideline until it snaps to the guideline.
- Drag the guideline arrow to move the guideline (and any objects that are snapped to it).
- Drag the guideline arrow away from the ruler to remove the guideline. See *How to add, delete, and move guidelines*, Page 72, and *How to move and position objects using guidelines*, Page 73.



- 8 If the Insert Fields dialog box is not visible, click the **INSERT FIELDS** button on the Standard toolbar. The Insert Fields dialog box appears with the Database Tab active, and displays a list of the fields in the active database table(s). To speed the entry of multiple fields, the box remains on-screen until you click *Close*. This dialog box can be moved to a new location or resized, if you wish. See *How to insert database fields*, Page 105.
- 9 Select the field(s) you want to appear on the report. You can select and place them one at a time, or you can use the Shift-click combination to select a number of contiguous fields, or the Ctrl-click combination to select fields from the list at random. Drag and drop is also active. Place the fields in the Details section where you want them to appear.
- 10 When you place multiple fields, they will appear in the same order that they appear in the Insert Fields dialog box. The program marks the position of each field with a rectangular frame. The characters in the frame indicate whether the field is text (xxx...), number (555...), currency (\$555...), date (12/31/99), time (00:00:00), dateTime (12/31/99 00:00:00), or Boolean (T/F).

NOTE: The field names and field types can be viewed by toggling the **Show Field Names** check box on in the **Options** dialog box (**Layout** Tab). Search for *Setting up Seagate Crystal Reports in Seagate Crystal Reports online Help*.

NOTE: The program automatically places field titles in the Page Header section unless the Insert Detail Field Titles check box is toggled off in the Options dialog box (Layout Tab). Search for Configuring Seagate Crystal Reports in Seagate Crystal Reports online Help.

NOTE: If additional Details sections are added to the report, please note that field titles will only be placed in the Page Header section for fields in the Details A (the original) section of your report.

- 11 Once the objects are in place, you may want to adjust the report sections somewhat. To do this, right-click the shaded area to the left of the section ruler and use the shortcut menu that appears.
 - To expand a section to accommodate an additional line, choose the INSERT LINE command.
 - To have the program automatically align the objects in the section horizontally, choose the ARRANGE LINES command.
 - To reduce the size of a section to eliminate unnecessary white space above and below objects, choose the FIT SECTION command. See *How to add/delete white space between rows*, Page 218.
- 12 To create a report title, you must first enter the title in the Document Properties dialog box. Choose the SUMMARY INFO command from the File Menu. Enter a title in the *Title* text box of the Document Properties dialog box. Click OK.
- 13 Choose the REPORT TITLE command from the Insert | Special Fields Menu. A rectangular placement frame appears when you move the cursor over your report. Click once in the Report Header (RH) section to place the report title. The report title field contains the text that you typed in the *Title* text box of the Document Properties dialog box. See *How to add a title page to the report*, Page 117.



- 14 To see how the results will print, click the PRINT PREVIEW button on the Standard toolbar.

To speed processing time while building a report, you can preview the report using only a small subset of the available data. To do this, choose the PREVIEW SAMPLE command from the File | Print Menu. See *Preview Tab*, Page 61.

In either case, the program takes you to the Preview Tab. You can fine-tune a report in the Preview Tab while viewing the results as actual report data. You can also close the Preview Tab and continue working on the report in the Design Tab.

15 If you want to:

- format a field,
- change the placement or width of a field, or
- insert a subtotal or grand total,

click the field to select it. Handles appear on the top, bottom, and sides of each selected field.

- To change the placement of the field(s), use the mouse to drag the field placement frame to its new position.
- To change the width of the field, use the mouse to drag the right or left handle.
- Right-click the field to format font, alignment within field, number, currency, date display, border, color, indentation, or to summarize the field. A shortcut menu appears listing various commands for formatting and summarizing the field.



NOTE: To apply formatting only under certain conditions, click *Conditional Formula* next to the formatting property in the *Format Editor*, and create a formula that defines those conditions. See *Conditional formatting*, Page 212.

NOTE: Many of the font and formatting options are available on the formatting toolbar. See *Status bar*, Page 51, for more information on the options available.



16 To create a formula that makes data calculations or comparisons, click the **INSERT FIELDS** button on the Standard toolbar. When the Insert Fields dialog box appears, click the **Formula** Tab to activate it.

17 Click **New**. The Formula Name dialog box appears. Enter a name for the formula and click **OK**. The Formula Editor appears.

18 Enter the formula in the Formula Editor. Enter fields, operators, and functions by selecting them from their respective scroll lists or by typing them in. You can check the formula syntax by clicking **Check**.

19 When you are finished editing, click **Close** to return to the Insert Fields dialog box. Click **Insert** to place the formula just like you would a database field. See *Introduction to Formulas*, Page 291, and *Advanced Formulas*, Page 315, or search for *Functions* and *Operators and Variables* in Seagate Crystal Reports online Help.



20 To insert a subreport (a report within a report), click the **INSERT SUBREPORT** button on the Supplementary toolbar and choose an existing report to import as a subreport or use the **Create Report Expert** to create a new subreport. See *How to insert a subreport*, Page 419.

- If you want the records in a subreport to match up with the records in a primary report, click the **Link** Tab of the Insert

Subreport dialog box and specify the link in the Subreport Links dialog box when it appears. See *How to link a subreport to the data in the primary report*, Page 421.



- 21 To insert a cross-tab object in a report, click the INSERT CROSS-TAB button on the Supplementary toolbar and set up the cross-tab in the Cross-Tab dialog box when it appears. See *Cross-Tab Objects*, Page 443.



- 22 To create a parameter field (a field that prompts you for a value whenever you retrieve data for a report), click the INSERT FIELDS button on the Standard toolbar, then click the Parameter Tab in the Insert Fields dialog box when it appears. Click *New* to set up a parameter field. Once created, you can insert the parameter field in a report like a database field or select it from the *Fields* list in the Formula Editor.

Parameter fields can be used in reports (as title or label prompts), in selection formulas (as selection criteria prompts), and in formulas (for a variety of purposes including specifying sort fields). See *Parameter Fields*, Page 351.



- 23 To add a chart, click the INSERT CHART button on the Standard toolbar. See *Charting*, Page 369.

- 24 To insert a spreadsheet, picture, or other OLE object that you can edit from within Seagate Crystal Reports using the tools from the object's native application, choose the OBJECT command from the Insert menu. See *OLE*, Page 403, and *How to insert a graphic/picture as an OLE object*, Page 414.



- 25 To change the record sort order, click the SORT ORDER button on the Standard toolbar. The Record Sort Order dialog box appears. Select the field(s) you want to use for sorting the report data and the sort direction. See *How to do a single field sort*, Page 253.



- 26 To limit the report to specific records (for example, the records of California customers who have year-to-date sales greater than \$10,000), click the first field on which you want your selection to be based and then click the SELECT RECORDS button on the Standard toolbar. When the Select Expert appears, set up the record selection criteria.



- 27 To print the report, click the PRINT button on the Standard toolbar.

That's it! It is that easy to build a report. To practice concepts introduced in this Quick Start, proceed to *Tutorial - Customer List*, Page 147.

2

What's New

What you will find in this chapter...

New Crystal Query Designer provides greater power and speed, Page 22

Report Designer Component, Page 22

Map Expert helps identify trends, Page 22

Enhanced charting capabilities help you analyze data, Page 23

Enhanced cross-tab features make cross-tab reports more powerful than ever, Page 23

Server-side processing saves time and memory, Page 23

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Entering SQL expressions directly helps you create reports faster, Page 24

Highlighting Expert makes formatting faster and easier, Page 25

Field Mapping provides more database control, Page 25

Enhanced Formula Editor makes creating formulas easy, Page 25

Enhanced exporting capabilities, Page 26

New and better parameter fields provide greater flexibility, Page 26

On-Demand subreports increase report organization, Page 26

New Crystal Query Designer provides greater power and speed

With an easy-to-use interface and web-enabled design capabilities, Seagate Crystal Reports new Crystal Query Designer allows you to quickly design and preview ad hoc reports. The Query Designer gives you the basic formatting and charting capabilities of Seagate Crystal Reports, but does not burden you with the more advanced features. Plus, the tool uses page-on-demand technology. Now you can create ad hoc reports quickly and easily, letting the program do most of the work for you. The Crystal Query Designer is a 100% Java client. You don't need any plug-ins to install and maintain it. For more information, see Crystal Query Designer online Help (CRQUERY.HLP).

Report Designer Component

Seagate Crystal Reports now includes the Report Designer Component, a powerful ActiveX designer for Visual Basic. The Report Designer Component allows you to design reports using all of the advanced reporting features of Seagate Crystal Reports all within the Visual Basic development environment. The Report Designer Component also provides a complete object model, allowing you to design custom interfaces for user input that controls report data. For more information, see the Report Designer Component online Help (CRRDC.HLP).

Map Expert helps identify trends

This version of Seagate Crystal Reports provides a new Map Expert that allows you to insert geographic maps into your reports. A map is a powerful analysis tool. You can map on summary fields, subtotal fields, and cross-tab summaries, then drill-down on the map to view organized sets of data (such as sales by state). Seagate Crystal Reports provides four map layouts and five map types. The program also offers a new view called the Analyzer Tab, which allows you to set the properties for an individual instance of a map, independently of the rest of the report. This new mapping feature makes it easier than ever to identify trends in data. For more information about the Map Expert, see *Mapping, Page 385*.

Enhanced charting capabilities help you analyze data

The Chart Expert is now much more powerful, providing maximum charting flexibility by offering 11 chart types and 47 chart templates (as well as an editor for creating custom charts). Now you can create Bubble charts, Radar charts, and XYZ Scatter charts, among others. The program also offers a new view called the Analyzer Tab, which allows you to set the properties for an individual instance of a chart, independently of the rest of the report. This new charting feature makes it easier than ever to organize and analyze data. For more information about the Chart Expert, see *Charting*, Page 369.

Enhanced cross-tab features make cross-tab reports more powerful than ever

Many advanced options have been added to cross-tabs in this version. With these advanced options, you can:

- Suppress empty rows and columns,
- Suppress subtotals and grand totals,
- Split wide cross-tabs over page breaks and repeat the row labels,
- Specify separate background colors for row and column grand totals,
- Conditionally format the contents of individual cross-tab cells, and
- Specify order grouping for rows and columns.

For more information about advanced cross-tab options, see *Cross-Tab Objects*, Page 443.

Server-side processing saves time and memory

You can now choose to have the program perform its grouping on the server. In this event, Seagate Crystal Reports pushes as much of the report processing as possible to the server. The benefits of this functionality include:

- less time connected to the server,
- less memory needed to process the report on your computer, and
- lower transfer time from the server to the client.

In short, server-side processing is the newest feature in quick, expedient reporting. For more information, see *Server-side processing*, Page 542.

Running totals -- one field is all you need

You no longer need to bother with cumbersome running total formulas: Seagate Crystal Reports offers an easy-to-use dialog box for creating running totals quickly. The program will take care of all the formulas, all you need to do is tell it which field to total, when to total it, and when to reset. Then simply place the running total on the report and you're set to go. For more information, see *Running Totals*, Page 341.

Document Import Tool converts old text reports

Have you ever wished you could use Seagate Crystal Reports formatting and grouping abilities in old text reports? Well, now you can. With the Document Import Tool, Seagate Crystal Reports offers a powerful new reporting functionality. By simply highlighting the various sections of a report and then compiling, you can easily convert a plain ASCII text report to Seagate Crystal Reports.

With this new tool, you can:

- convert old ASCII text reports into Seagate Crystal Reports,
- map the report fields to the original database, and then
- generate the report whenever you want, from within Seagate Crystal Reports.

Now you can use Seagate Crystal Reports for *all* your reporting needs. For more information, see *Document Import Tool*, Page 433.

Entering SQL expressions directly helps you create reports faster

SQL expressions are a means of querying databases for specific data. These requests are written in Structured Query Language (SQL). Seagate Crystal Reports lets you enter SQL expressions directly from the Insert Fields dialog box. From there, the program provides an editor much like the Formula Editor, allowing you to create new SQL expressions quickly and easily. Then you can insert the SQL expressions into a report just like database fields. For more information, see *How to create an SQL expression field*, Page 107.

Highlighting Expert makes formatting faster and easier

With the Highlighting Expert, Seagate Crystal Reports offers powerful highlighting functionality that allows you to quickly apply conditional formatting to currency and number fields. From just one dialog box, you can apply:

- font color,
- background color, and
- border style.

You can also specify multiple sets of formatting specifications, each one dependent on a separate condition. For more information, see *How to Use the Highlighting Expert*, Page 224.

Field Mapping provides more database control

Seagate Crystal Reports provides a dialog box for mapping altered database fields. If the database is edited or changed, and causes errors in a report, you no longer need to delete and replace the affected fields. Now, you can remap them. This lets you get your reports up and running again in a very short amount of time.

The program will automatically generate the Map Fields dialog box when you need it. For more information about mapping altered database fields, see *Working With Databases*, Page 507.

Enhanced Formula Editor makes creating formulas easy

The Formula Editor has been updated to include advanced features, including bookmarks (which allow you to navigate through long formulas), search and replace (also useful for long formulas), and the ability to edit more than one formula before closing the editor. Plus, you can rearrange the elements of the Formula Editor so that you can work more efficiently. In short, the Formula Editor has an entirely new look, allowing for faster manipulation of your formulas. For more information, see *How formulas are created: an introduction to the Formula Editor*, Page 296.

Enhanced exporting capabilities

This version of Seagate Crystal Reports allows you to export reports to applications, such as MS Word and MS Excel. When a report is exported to an application, Seagate Crystal Reports saves the report as a temp file and will automatically open it in the appropriate application. This new feature extends the range of reporting capabilities. For more information, see *How to export reports*, Page 133.

New and better parameter fields provide greater flexibility

Seagate Crystal Reports includes new functionality that lets you create even more powerful parameter fields than before. With multiple default prompting values, you can allow for a wide range of options when entering parameter values. With range limiting, you can specify a minimum/maximum range for parameter values. With edit masks, you can limit the values entered to certain characters. For more information, see *Parameter Fields*, Page 351.

On-Demand subreports increase report organization

Seagate Crystal Reports now allows you to create on-demand subreports, where the subreport data remains hidden until the user requests it. The subreport is represented on the report by an object frame, but the actual data remains hidden until the user drills-down on the frame. This way, the user will not be burdened with extraneous data. The user can choose when and if they want to drill-down and view the subreport. This feature can be especially useful if you want to include several subreports in the same primary report, but you don't want all the data displayed at once. In this case, you can specify that the subreports are on-demand so that only an object frame will appear for each subreport. This makes the subreports much more manageable. For more information about on-demand subreports, see *Subreports*, Page 415.

3

Learning Seagate Crystal Reports

What you will find in this chapter...

Learning Seagate Crystal Reports, Page 28

User's Guide, Page 28

Online Help, Page 34

Books Online, Page 34

Sample Reports, Page 35

Glossary, Page 35

Sample Data - xtreme.mdb, Page 35

Suggested learning paths, Page 37

Learning Seagate Crystal Reports

Seagate Crystal Reports comes with a wide variety of tools and a comprehensive sample database to help you learn the program and use it efficiently.

The purpose of this chapter is to:

- explore the various learning sections in this manual,
- introduce the other tools that come with the program, and
- suggest learning paths based on your background.

User's Guide

The following is a short description of each chapter in this manual for easy reference. It is recommended that you read through these brief descriptions in order to familiarize yourself with the content and design of the manual. This will make locating information later more efficient.

CHAPTER 1, INSTALLATION AND QUICK START

Installation and Quick Start, Page 11, includes everything you need to get up and running with Seagate Crystal Reports. Intended for experienced users and new users who like to “learn by doing”, the *Quick Start* covers all the key elements of working with the program in a few short pages.

CHAPTER 2, WHAT'S NEW

Seagate Crystal Reports has been enhanced for this release. *What's New, Page 21*, identifies and describes the new features, and points you to those sections of the manual where they are discussed in depth. Users who are familiar with earlier versions of Seagate Crystal Reports will benefit the most from this chapter.

CHAPTER 3, LEARNING SEAGATE CRYSTAL REPORTS

Learning Seagate Crystal Reports, Page 27, introduces you to the various tools available for learning Seagate Crystal Reports. It also suggests learning paths that you might follow based on your background.

CHAPTER 4, GETTING TO KNOW SEAGATE CRYSTAL REPORTS

Getting to Know Seagate Crystal Reports, Page 41, introduces you to Seagate Crystal Reports. In this chapter you will learn about the tools, pointers, and tabs used to design, preview, and analyze reports. This chapter

explains what to do, then shows how to do it. Users at all levels will benefit from reading this chapter.

CHAPTER 5, INTRODUCTION TO REPORTING

Introduction to Reporting, Page 85, concentrates on the basic concepts of report design, and then explains, in simple terms, the concepts you should understand in order to:

- select database tables,
- select fields,
- place objects on a report,
- sort, group, and total data, and
- select records to be included in a report.

This chapter is written for users new to reporting, but also contains background information that users at all skill levels may find useful. Armed with this kind of information, you will be well-prepared to create powerful reports that run efficiently and provide exactly the information you need.

CHAPTER 6, PRINTING, VIEWING, AND EXPORTING

Printing, Viewing, and Exporting, Page 121, details the ways finished reports can be viewed, printed, and exported. It shows how to use report viewers (including the ActiveX and Java viewers that work in web browsers), introduces a number of printing considerations, and explains how to export reports in various formats to a variety of destinations, such as e-mail, Lotus Notes, and Microsoft Exchange.

CHAPTER 7, TUTORIAL - CUSTOMER LIST

Tutorial - Customer List, Page 147, is the primary tutorial for Seagate Crystal Reports. It is a product introduction that leads you step-by-step through the process of creating a report, while at the same time introducing many of the key features of the program. This tutorial has been written for the new user. No prior knowledge of reporting is necessary. By the time you finish this tutorial, you should have enough understanding of the program to feel comfortable getting started on your own report.

CHAPTER 8, REPORTING ON OLAP DATA

Reporting on OLAP data, Page 171, demonstrates how to create reports with OLAP data. Although the procedures are similar to working with PC and SQL data, there are several additional tools in Seagate Crystal Reports for working with multi-dimensional data sources.

CHAPTER 9, MULTIPLE SECTION REPORTS

Multiple Section Reports, Page 195, introduces the various types of sophisticated reporting available when using the multiple section reporting capabilities in Seagate Crystal Reports. These capabilities enable you to create reports that treat individual values differently based on sets of criteria you establish. With multiple-section reports, you can:

- format objects and sections differently based on field values,
- put conditional messages in form letters,
- add blank lines automatically when certain conditions are met, and
- perform many other reporting tasks.

CHAPTER 10, FORMATTING

Formatting, Page 209, leads you through the steps that are necessary to format a report. Formatting refers to those things that are done to change the layout and design of a report, as well as the appearance of text, objects, or entire report sections. Using the formatting tools in Seagate Crystal Reports, you can:

- call attention to certain data,
- change the presentation of dates, numbers, and other values,
- hide unwanted sections, and
- perform a variety of other formatting tasks to give a report a professional appearance.

CHAPTER 11, RECORD AND GROUP SELECTION

Record and Group Selection, Page 227, shows you how to filter which records and groups of records you want to be included in a report. Using the record and group selection tools included in Seagate Crystal Reports, you can do such things as include records for a specific group of customers only, a specific range of account numbers, or records that fall within a particular date range.

CHAPTER 12, SORTING, GROUPING, AND TOTALING

No other program has the sorting, grouping, and totaling capabilities of Seagate Crystal Reports. *Sorting, Grouping, and Totaling, Page 245*, describes and demonstrates the types of sorting, grouping, and totaling you can do within a report. This chapter is an excellent overview for both beginners, who may not understand sorting, grouping, and totaling, and advanced users, who may want to know more about these options.

CHAPTER 13, INTRODUCTION TO FORMULAS

Seagate Crystal Reports is equipped with a powerful formula language. Once you become comfortable working with formulas, your reporting capabilities are virtually endless. *Introduction to Formulas, Page 291*, gets you started creating simple formulas. It familiarizes you with the tools of the Formula Editor and leads you step-by-step through the formula creation process. This chapter has been written for people who are inexperienced with formulas and demonstrates exactly how to perform each step. It is a chapter intended to get you beyond the mystery of formulas and into using them for your everyday reporting needs.

CHAPTER 14, ADVANCED FORMULAS

Advanced Formulas, Page 315, gets into the realm of “what is possible” with Seagate Crystal Reports. It shows you how to create and use variables, how to “tweak” formula evaluation times so the formula is evaluated against the “right” data, and how to perform complex conversions. Written for the advanced user, this chapter shows how to use Seagate Crystal Reports to create customized formulas for all your reporting needs.

CHAPTER 15, RUNNING TOTALS

Running Totals, Page 341, introduces the Running Total field. Seagate Crystal Reports, always a leader in sorting, grouping, and totaling, includes a special Running Total field that enables you to perform sophisticated running total activities with ease. The tutorials included in this chapter demonstrate techniques that use Running Total fields to produce reports that total running amounts in a list, groups, and other special cases.

CHAPTER 16, PARAMETER FIELDS

Parameter Fields, Page 351, shows how to use parameter fields effectively for formulas, record selection formulas, and other reporting needs. Parameter fields are fields that prompt you to specify a value each time the data is refreshed in a report. When a value is supplied, the program runs the report using that value. By using parameter fields in formulas, selection formulas, and in the report itself, you can create one report that can be modified quickly as your needs change.

CHAPTER 17, CHARTING

Seagate Crystal Reports enables you to present summarized data in colorful, easy-to-read charts and graphs. *Charting, Page 369*, demonstrates how to create charts and how to use them in reports to make report data more meaningful and easier to digest quickly. Users can even drill-down to see the details behind the graphical summaries.

CHAPTER 18, MAPPING

Seagate Crystal Reports allows professional geographic maps to be inserted into reports. *Mapping, Page 385*, demonstrates how to create maps and how to use them in reports to make it even easier to view and analyze data. Mapping makes reports more dynamic. You can even drill-down to see the details behind the various geographic areas, or launch the Analyzer Tab to customize and rearrange the appearance of a map.

CHAPTER 19, OLE

Often when a graphic, spreadsheet, or some other object is inserted into a report, it may be necessary later to change that object. Normally, to make any changes, you have to go through a number of steps, including saving files, opening additional applications, etc. All of these steps can be avoided using Object Linking and Embedding (OLE). OLE allows OLE objects to be inserted into a report from other OLE server applications, and then allows those applications to be used from within Seagate Crystal Reports to edit the objects, as needed. *OLE, Page 403*, shows what is possible with OLE in Seagate Crystal Reports and how to implement it.

CHAPTER 20, SUBREPORTS

A subreport is a report within a report. With subreports, unrelated reports can be combined into a single report, coordinate data that can't be otherwise linked, and present different views of the same data in a single report. *Subreports, Page 415*, shows what can be done with subreports in Seagate Crystal Reports, and demonstrates how to create them.

CHAPTER 21, DOCUMENT IMPORT TOOL

The Document Import Tool is a conversion utility that allows old ASCII text reports to be converted into Seagate Crystal Reports. You can accomplish this by highlighting the various report sections (headers, footers, Details section, etc.) from within the Seagate Document Import Tool. You can then generate the report within Seagate Crystal Reports. *Document Import Tool, Page 433*, leads you step-by-step through the conversion process.

CHAPTER 22, CROSS-TAB OBJECTS

A cross-tab is an object that summarizes data and then presents the summaries in a compact row and column format that makes it easy to perform comparisons and identify trends. For reports that use the word "by" in the report description (sales by state, orders by customers, etc.), cross-tabs generally present data in a more compact easier-to-understand form than other reporting methods. *Cross-Tab Objects, Page 443*, introduces the cross-tab reporting tools, and shows how to create cross-tab reports quickly and easily.

CHAPTER 23, QUERIES

The Crystal SQL Designer, Page 465, shows how to create queries that can be used for ad-hoc analysis or result sets for creating reports. The Crystal SQL Designer can be used to create, modify, and optimize complex SQL queries with ease.

CHAPTER 24, DICTIONARIES

Dictionaries are structured and simplified views of data that can be created for some or all of the individuals in an organization. When working with Dictionaries, users see only the information they need and that you want them to see. They reduce support costs and time, increase user productivity, and reduce data misuse, loss, and damage. *Dictionaries, Page 487*, shows how to set up and use Dictionaries to improve organizational efficiency and security.

CHAPTER 25, WORKING WITH DATABASES

Understanding database concepts, relational database design, and performance considerations can help you get the most out of Seagate Crystal Reports. *Working With Databases, Page 507*, leads you through the basics and provides a detailed explanation of the way the program accesses linked data. The information in this chapter will help you optimize reporting for maximum efficiency. This chapter contains information for both the beginner and the advanced user.

CHAPTER 26, DATA SOURCES

Seagate Crystal Reports works with all kinds of data, from simple text files to advanced client-server SQL databases. *Data Sources, Page 579*, shows how the program connects to various data sources and what files have to be in place in order to make the connection. This is an in-depth chapter for advanced users who need to know how Seagate Crystal Reports operates beneath the surface.

APPENDIX A, REPORT PROCESSING MODEL

Seagate Crystal Reports uses a sophisticated multi-pass reporting model for processing reports. Understanding when different parts of the reporting process take place can help you design more efficient reports and solve reporting problems. *Report Processing Model, Page 621*, is written for the advanced user.

APPENDIX B, PRODUCT SUPPORT

Product Support, Page 625, introduces the various methods for obtaining product support.

APPENDIX C, SEAGATE SOFTWARE INTERNATIONAL OFFICE DIRECTORY

Seagate Software International Office Directory, Page 633, lists the contact information for Sales, Product Support, and Product Registration at each Seagate Software office, worldwide.

Online Help

Online Help includes all of the information from the manual, as well as a description of each command, dialog box, formula function, and operator included with the program. Sample formulas, sample records, group selection formulas, and hundreds of topics on virtually anything related to reporting - online Help has it all.

In learning to use menu commands, for example, online Help gives an explanation of what the command does, a thorough explanation of any dialog boxes the menu command activates, and finally, tutorials for performing tasks using the menu command. By working through the topics for any menu command, you can find out why you would use it and become an expert in its use.

The Contents Tab can be used to navigate through online Help, the Search facility can look up topics by keywords, or the full-text Find facility can be used to pinpoint topics that contain the word of interest. It is suggested that you take advantage of the online Help often while learning Seagate Crystal Reports.

For more information on the help systems, see *Using Seagate Crystal Reports documentation, Page 5*.

Books Online

Books Online are hypertext documents with hundreds of jumps that go directly to topics of interest, related topics, and technical information. Books Online contains the full text of this manual and several other documents and can be found on the Crystal Reports CD under the \Docs folder. These documents have been created with Adobe Acrobat. Acrobat Reader has a full text search capability, allowing you to find any topic of interest if you can think of just one unique word it might contain. With electronic search and jump capabilities, Books Online provides the tools needed to find information in a hurry.

Books Online can be set up in a variety of ways to suit your needs. Consult the Acrobat Reader Help System for a complete explanation of the available options.

Sample Reports

Seagate Crystal Reports comes with two kinds of professionally designed sample reports:



1. **General departmental reports** cover a wide range of reporting needs for many of the departments in an organization.
2. **Financial reports** address the specific needs of financial institutions and corporate finance departments. Financial reports are available with the Professional edition only.

The sample reports are valuable learning tools.

- By studying the content of the reports, you can see the kind of information that is needed and how it is presented.
- By studying the layout and design of the reports, you can see how the information is arranged for clarity.

Glossary

This manual comes with a comprehensive glossary explaining basic database and reporting concepts, as well as, issues specific to the program. Unlike some glossaries which offer little substance, this glossary gives in-depth explanations of terms used by Seagate Crystal Reports.

Reading the glossary is an excellent warm-up before you start working with the other training aids.

Sample Data - xtreme.mdb

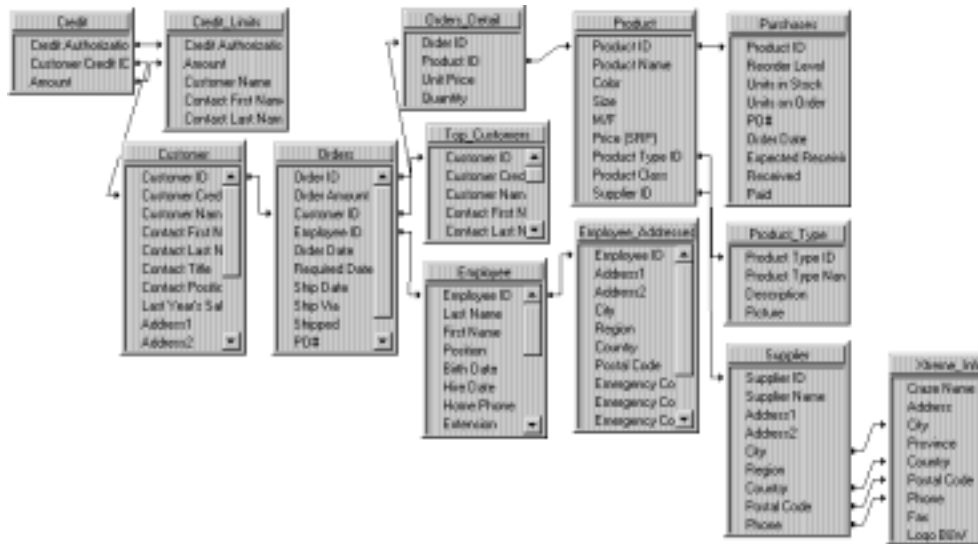
Seagate Crystal Reports comes with xtreme.mdb, a sample database you can use when learning the program. Xtreme.mdb is a Microsoft Access database and all of the necessary drivers are included. You should be able to open the database directly and begin designing reports. Virtually all of the examples in this manual are based on xtreme.mdb data.

Xtreme.mdb is a database that contains data for Xtreme Mountain Bikes, a fictitious manufacturer of mountain bikes and accessories. The database includes the following tables:

- **Xtreme Info**
Company data for the Xtreme Mountain Bike company, including the company logo.

- **Credit**
Information from customer credit memos, such as credit authorization IDs and amounts.
- **Customer**
Data for the customers served by the company.
- **Employee**
Company-oriented data for the employees of Xtreme Mountain Bikes.
- **Employee Addresses**
Personal data for Xtreme Mountain Bikes employees.
- **Financials**
Financial data for Xtreme Mountain Bikes.
- **Orders**
Identifying and tracking data for orders.
- **Orders Detail**
Line item data for orders.
- **Product**
Descriptive data for Xtreme Mountain Bike products.
- **Product Type**
Category data for Xtreme Mountain Bike products, including product pictures.
- **Purchases**
Identifying and tracking data for product purchases.
- **Supplier**
Data for suppliers who serve Xtreme Mountain Bikes.

The links (relationships) between the tables are as follows:



Xtreme.mdb also includes:

- a query (Top Customers),
- a parameter query (Credit_Limits) that you can use to learn how to report on those kinds of data sets, and
- the Xtreme Info table which is not linked to any other table. This table contains company information for Xtreme Mountain Bikes.

NOTE: The sample data has been designed to illustrate various reporting concepts in a training environment, not to teach database design. While there are alternative ways of designing a database, this design was selected to keep the tutorials and examples focused on reporting, not on data manipulation.

Suggested learning paths

There is no correct learning path for everyone; you have your own needs, and will learn in your own way, at your own speed. What follows are simply suggested learning paths for several kinds of users.

The order of the elements in each path is one that has been carefully structured to speed the learning process. To get the best results, locate the category that best describes your reporting experience and follow the path from start to finish.

New user (business)

The following learning path is suggested for new users who expect to use Seagate Crystal Reports on a casual basis.

- Give the *Glossary, Page 647*, a quick read.
- Read *Getting to Know Seagate Crystal Reports, Page 41*.
- Read *Introduction to Reporting, Page 85*.
- Read *Printing, Viewing, and Exporting, Page 121*.
- Work through *Tutorial - Customer List, Page 147*.
- Read *Record and Group Selection, Page 227*.
- Scan *Sorting, Grouping, and Totaling, Page 245*.
- Read *Introduction to Formulas, Page 291*.
- Review *Sample Reports, Page 35*.
- Refer to online Help and the Hands-On tutorials, as needed.

Business user upgrading from an earlier version

The following learning path is suggested for users who are upgrading from an earlier version of Seagate Crystal Reports.

- Scan the *Glossary, Page 647*, for new terms.
- Read *Installation and Quick Start, Page 11*.
- Read *What's New, Page 21*.
- Read *Getting to Know Seagate Crystal Reports, Page 41*.
- Scan *Introduction to Reporting, Page 85*.
- Scan *Printing, Viewing, and Exporting, Page 121*.
- Scan *Multiple Section Reports, Page 195*.
- Scan *Record and Group Selection, Page 227*.
- If you have limited formula experience, read *Introduction to Formulas, Page 291*.
- If you have a working knowledge of formulas, read *Advanced Formulas, Page 315*.
- Scan *Subreports, Page 415*.
- Review *Sample Reports, Page 35*.
- Refer to Hands-On tutorials, as needed.

New power user

The following learning path is suggested for new users who expect to use many of the sophisticated features of Seagate Crystal Reports.

- Read *Installation and Quick Start, Page 11*.

- Read *What's New*, Page 21.
- Read *Getting to Know Seagate Crystal Reports*, Page 41.
- Scan *Introduction to Reporting*, Page 85.
- Scan *Printing, Viewing, and Exporting*, Page 121.
- Read *Multiple Section Reports*, Page 195.
- Scan *Record and Group Selection*, Page 227.
- Scan *Sorting, Grouping, and Totaling*, Page 245.
- Scan *Introduction to Formulas*, Page 291.
- Read *Advanced Formulas*, Page 315.
- Read *Running Totals*, Page 341.
- Read *Parameter Fields*, Page 351.
- Read *Charting*, Page 369.
- Read *Mapping*, Page 385.
- Read *Subreports*, Page 415.
- Read *Performance considerations for all reports*, Page 520.
- Read *Report Processing Model*, Page 621.
- Review *Specialized Formulas* in online Help.
- Refer to the *Glossary*, Page 647, and Hands-On tutorials, as needed.

Power user upgrading from an earlier version

The following learning path is suggested for power users who are upgrading from an earlier version of the program.

- Read *What's New*, Page 21.
- Read *Getting to Know Seagate Crystal Reports*, Page 41.
- Read *Advanced Formulas*, Page 315.
- Read *Charting*, Page 369.
- Read *Mapping*, Page 385.
- Read *Performance considerations for all reports*, Page 520.
- Read *Report Processing Model*, Page 621.
- Review *Power Formulas* in online Help.
- Refer to the *Glossary*, Page 647, and Hands-On tutorials, as needed.

New MIS user

The following learning path is suggested for Management Information Systems (MIS) professionals who are using Seagate Crystal Reports for the first time.

- Read *Installation and Quick Start*, Page 11.
- Read *What's New*, Page 21.
- Read *Getting to Know Seagate Crystal Reports*, Page 41.
- Read *Multiple Section Reports*, Page 195.
- Read *Advanced Formulas*, Page 315.
- Read *Running Totals*, Page 341.
- Read *Parameter Fields*, Page 351.
- Scan *Subreports*, Page 415.
- Read *Performance considerations for all reports*, Page 520.
- Read *Report Processing Model*, Page 621.
- Review *Power Formulas* in online Help.

MIS user upgrading from an earlier version

The following learning path is suggested for MIS users who are upgrading from an earlier version of Seagate Crystal Reports.

- Read *What's New*, Page 21.
- Read *Getting to Know Seagate Crystal Reports*, Page 41.
- Read *Multiple Section Reports*, Page 195.
- Scan *Sorting, Grouping, and Totaling*, Page 245.
- Read *Advanced Formulas*, Page 315.
- Read *Running Totals*, Page 341.
- Read *Parameter Fields*, Page 351.
- Read *Subreports*, Page 415.
- Read *Dictionaries*, Page 487.
- Read *Performance considerations for all reports*, Page 520.
- Read *Data Sources*, Page 579.
- Read *Report Processing Model*, Page 621.

4

Getting to Know Seagate Crystal Reports

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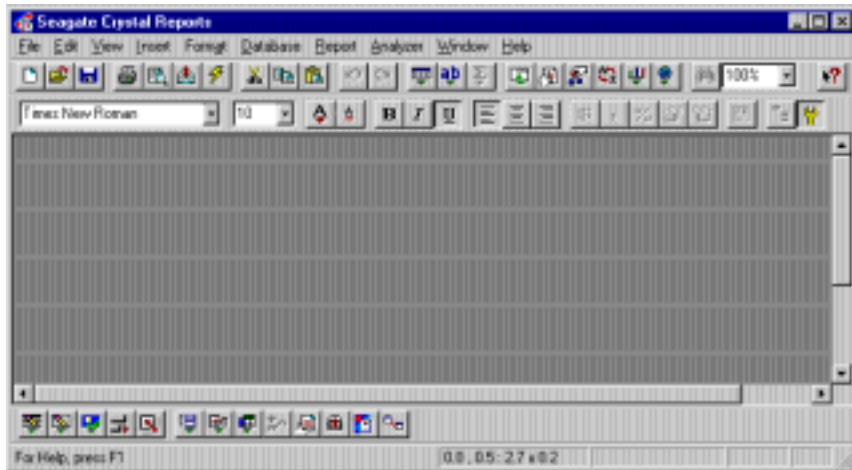
Other fundamentals, Page 66

HANDS-ON (Report Design Environment), Page 70

HANDS-ON (Sections and Areas), Page 79

The application window

The application window is clear and easy to understand.



- The Title bar identifies the current report and contains the standard Windows buttons.
- The Menu bar appears just below the title bar.
- The Standard toolbar appears just below the menu bar.
- The Formatting toolbar appears just below the standard toolbar.
- If toggled on, the Analyzer toolbar appears just below the formatting toolbar.
- If toggled on, the Supplementary toolbar appears just above the status bar.
- The Status bar appears at the bottom of the window.

Menu bar

The Menu bar is the command center of Seagate Crystal Reports. Each option on the menu bar activates a drop-down list of commands used to create, modify, print, and save reports.

The Menu bar contains the following menus:

- File,
- Edit,
- View,
- Insert,
- Format,
- Database,
- Report,
- Analyzer,
- Window, and
- Help Menu.

File Menu

The File Menu includes commands used to open, close, and save files, save files under a different file name, create new reports, mailing labels, and cross-tabs, as well as several other kinds of reports. It also includes a command to exit the program. Additionally, it contains commands that enable you to change page margins, preview a report before printing, send a report to a printer, select a printer if you want the report to print on something other than the default printer, and export a report to a disk file in a variety of formats. You can also add summary information to help you identify a report, as well as, change the default settings so that the program works the way that is the most efficient for you. Search for *File Menu Commands* in online Help.

Edit Menu

The Edit Menu includes commands used to modify aspects of a report. It includes commands to undo and redo actions, edit fields, formulas, summaries, subreport links, OLAP members, OLE objects and OLE links, to view a sample of the data in a selected field, and to cut, copy, and paste report and OLE objects. You can also use the Edit Menu commands to show, hide, move, merge, or delete report sections, delete groups, and convert static OLE objects into editable bitmaps. Search for *Edit menu commands* in online Help.

View Menu

The View Menu includes commands used to modify the user interface of the program. View Menu commands enable you to show or hide the toolbars, zoom in and out on a report to view it at different magnifications, and to turn guidelines, the grid, and the rulers on and off. The Group Tree view can be toggled on and off from the View Menu. Search for *View Menu commands* in online Help.

Insert Menu

The Insert Menu includes commands used to insert database fields, text objects, formula fields, parameter fields, cross-tab objects, subtotals, grand totals, summaries (counts, averages, etc.), groups, and sections. This menu also includes commands that enable you to insert group name fields, subreports, graphics, lines, boxes, charts, and OLE objects into a report. Search for *Insert Menu commands* in online Help.

Format Menu

The Format Menu includes commands used to change the look of the elements in a report. It includes commands for changing fonts and for adding field borders, background color, and drop shadows. The Format Menu has commands for formatting fields that are embedded in text objects, for formatting individual paragraphs in those text objects, and for entire sections of the report as well. There are also commands for formatting charts, as well as, formatting and pivoting cross-tabs. Finally, Format Menu commands can be used to have the program automatically arrange report objects, apply professionally-designed styles to the entire report, and move individual objects within a stack of objects forward and backward. Search for *Format Menu commands* in online Help.

Database Menu

The Database Menu includes commands used to add and delete tables for use with reports, to change the alias used to identify a table, and to link and unlink tables. It has commands for logging on and off SQL and ODBC servers, for showing Essbase report scripts, showing and editing SQL queries, and modifying parameters for stored procedures. The Database Menu also has commands that direct the program to look for tables in new locations, change database drivers used in a report, remove tables from a report, and adapt reports appropriately if there are minor changes in table structure. Search for *Database Menu commands* in online Help.

Report Menu

The Report Menu includes commands used to select the records or groups to be included in a report, select the order in which report data is to be sorted (by record or by group), specify subreport links, and specify a print date for a report. It has commands for updating the data used in a report and for gathering all the files needed for distributing reports. You can also use one of the Report Menu commands to create an executable version of the report, which you can share with others who do not have Seagate Crystal Reports. Search for *Report Menu commands* in online Help.

Analyzer Menu

The Analyzer Menu includes commands used to launch the Analyzer Tab and customize your charts and maps. The menu includes commands for changing the group order, series order, and viewing angles for charts, for zooming, centering, and panning maps, for changing map and chart titles, for drilling-down on maps, and for changing the map style and the organization of the map layers. There is also a command for formatting

the field you are currently charting or mapping, and a command for restoring all the original settings for the modified chart or map. Search for *Analyzer Menu commands* in online Help.

Window Menu

The Window Menu includes commands used to rearrange icons and windows. It also lists the report windows that are open and includes a command that closes all report windows at once, if desired. Search for *Window Menu commands* in online Help.

Help Menu

The Help Menu includes commands used to access Seagate Crystal Reports online Help index and the search facility that provides context sensitive Help. It has commands for registering the program, accessing technical information about your computer system, and creating a technical support request. You can toggle the Welcome dialog box on and off, and if connected to the Internet, you can access several key pages of the Seagate web site using commands on the Help Menu. One other command provides information about the version of the program in use. Search for *Help Menu commands* in online Help.

Standard toolbar

Seagate Crystal Reports groups several commonly used commands on the Standard toolbar, which remains on-screen at all times (unless you decide to toggle it off in the Toolbars dialog box).
















The Standard toolbar eliminates some of the steps needed to activate the commands and can thus greatly speed your work in creating reports. Each command available via the Standard toolbar is discussed in online Help (search for each command by name).



NOTE: *In the 32-bit version of Seagate Crystal Reports, you can move the Standard toolbar to another fixed location within the window or set it up as a floating palette. See How to move and resize toolbars, Page 70.*

If you are not sure about the function of a button on the Standard toolbar, place the pointer over the button and hold it there. A Tool Tip appears, providing a description of the button.

The buttons on the Standard toolbar perform the following functions:

	Creates a new report.
	Opens an existing report.
	Saves the report.
	Sends the report to a printer.
	Previews the report in the Preview Tab.
	Exports the report to a file or e-mail.
	Refreshes report data.
	Cuts selected object/data to the Clipboard.
	Copies the selected object/data to the Clipboard.
	Pastes object/data from Clipboard to the report.
	Undoes an action.
	Repeats an action.
	Inserts database, formula, parameter, running total and other group name fields.
	Inserts a text object.
	Inserts a summary.



Activates the Report Expert.



Formats any section of the report.



Sets record/group selection criteria.



Sets record sort order.



Inserts a chart.



Inserts a Map.



Searches for a specific record.



Sets the magnification factor for viewing your report.

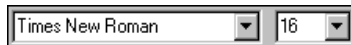


Activates context-sensitive Help.

Formatting toolbar

The Formatting toolbar enables you to access many popular formatting options with the click of a button or a selection from a drop-down list. You simply select the data you want to format, then click the appropriate button or list option to format the data.

Two edit boxes with drop-down lists appear at the left side of the Formatting toolbar.



Use these drop-down lists to select new fonts and font sizes to use something other than the default font and font size.

The buttons on the Formatting toolbar perform the following functions:



Increases the font size of the selected data one point each time the button is clicked.



Decreases the font size of the selected data one point each time the button is clicked.



Changes the selected data to boldface.



Italicizes the selected data.



Underlines the selected data.



Aligns the selected data flush left.



Centers the selected data.



Aligns the selected data flush right.



When a number field is selected, places a currency symbol with the number.¹



When a number field is selected, places a thousands separator in the number.¹



When a number field is selected, places a percentage sign with the number.¹



When a number field is selected, adds one decimal place to the number.¹



When a number field is selected, subtracts one decimal place from the number.¹



Activates the Highlighting Expert. See *Highlighting Expert* in the online Help.



Toggles the Group Tree's Smart Navigation on/off in the Preview Tab. See *Group Tree view*, Page 63.



Toggles the Supplementary toolbar on/off. See *Supplementary toolbar, Page 49*.

¹*The program refers to the settings in the International section of the Control Panel (Windows 3.x, and Windows NT 3.51) or in the Regional Settings section of the Control Panel (Windows 95, Windows 98, and Win NT 4.0).*

Supplementary toolbar



The Supplementary toolbar provides quick access to many advanced, report-enhancing experts and features. Activate the Supplementary toolbar by clicking the SUPPLEMENTARY TOOLBAR button, found on the far-right end of the Formatting toolbar.



NOTE: *The Supplementary toolbar only appears in the 32-bit version of Seagate Crystal Reports.*

The buttons on the Supplementary toolbar perform the following functions:



Inserts a line.



Inserts a box.



Inserts a picture.



Arranges report elements automatically to best fit the page.



Activates Style Expert to apply a professionally-designed style to a report.



Inserts a group.



Inserts a subreport.



Inserts a cross-tab object.



Finds Top/Bottom N records or sorts on summary information.



Activates the Format Editor to modify object properties.



Compiles the report.



Activates the Report Distribution Expert.



Defines links between tables.

Analyzer toolbar

The Analyzer toolbar allows you to quickly view and customize maps and charts on the Analyzer Tab. To activate this toolbar, choose the TOOLBARS command from the View menu and then toggle the *Analyzer* check box on in the Toolbars dialog box.

One drop-down list appears at the left-hand side of the Analyzer toolbar.



Use this drop-down list to change the color of a single data item on a chart (for example, to change the color of one of the bars on a bar chart).

The buttons on the Analyzer toolbar perform the following functions for maps:



Activates the drill-down mode, and changes the cursor to a Drill-down cursor.



Activates the Zoom In mode, and changes the cursor to a Zoom cursor.



Activates the Zoom Out mode, and changes the cursor to a Zoom cursor.



Activates the Pan mode, and changes the cursor to a Panning cursor.



Centers the map on the Analyzer Tab.



Opens the Customize Map dialog box, for changing the style and appearance of the map on the Analyzer Tab.



Opens the Layer Control dialog box, for re-arranging the layers of the map on the Analyzer Tab.

Status bar

The status bar at the bottom of the application window displays valuable information to help users work with the program more efficiently.

TOOLBAR FUNCTIONS

When the cursor is over a toolbar button, the status bar displays a short description of the button's function.

MENU COMMAND DESCRIPTIONS

When a menu command is highlighted, the status bar displays a short description of the command.

CURRENT SELECTIONS

When you highlight or place an object, the status bar displays the name of the object (or its object type) plus its location and sizing information.

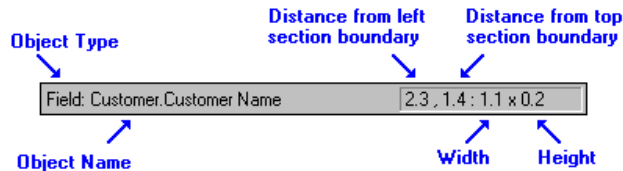
To identify objects, the status bar displays:

- the words OLE Object for a picture or other OLE object,
- the alias and field name for a field,
- the words *Line* for a line, *Box* for a box, and *Text* for a text object,
- the field type for special fields (Print Date, Record Number, and so forth),
- the summary name for a summary or subtotal,
- the formula name for a formula,
- the parameter field name for a parameter field, and
- the running total field name for a running total field.

The status bar also displays:

- how far the object is from the left and top boundaries of a section, and
- how big the object is.

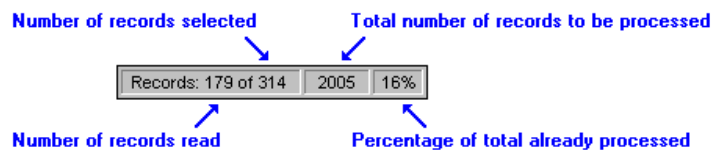
With this information, you can easily move and resize objects with precision.



DATA RETRIEVAL INFORMATION

When you preview a report for the first time or refresh the data in the Preview Tab, the status bar displays four figures that describe the data retrieval processing.

1. The first number displays the number of records selected out of the number of records read.
2. The second number displays the number of records read. If a report:
 - has a selection formula, the records selected figure will typically be smaller than the records read figure.
 - does not have a selection formula, records selected will always be equal to records read.
3. The third number displays the total number of records that will be processed. If the report is based on:
 - a single table, the figure that is displayed should remain constant.
 - linked tables, and if any one-to-many situations exist, the figure will typically increase as the program identifies all the linked records.
4. The final number is the percentage of the total records that have been processed.



Once the report has finished processing, the program displays only the number of records selected and the percentage processed.

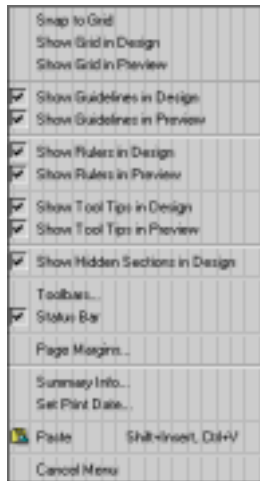
Shortcut menus

When you are working in either the Design or Preview Tab, you can speed up your work considerably by using shortcut menus. When you right-click a report element (a picture, section, field, etc.), the program displays a shortcut menu next to the element. Unlike the program's standard menus that group commands by function (editing, inserting, etc.), shortcut menus are element-specific; they contain only those commands that are available for use with the selected element.

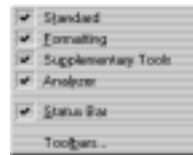
Shortcut menus are useful because they:

- display the name and source (alias) of the element at the top of the menu so you can identify the elements on your report with a single click,
- make it easier to learn the program because they eliminate the need to remember where to find a command,
- make working with the program more efficient because you are dealing with only a compact list of commands, which makes it easier to pick the right one, and
- spotlight the things you can do with an element making the program more intuitive to use.

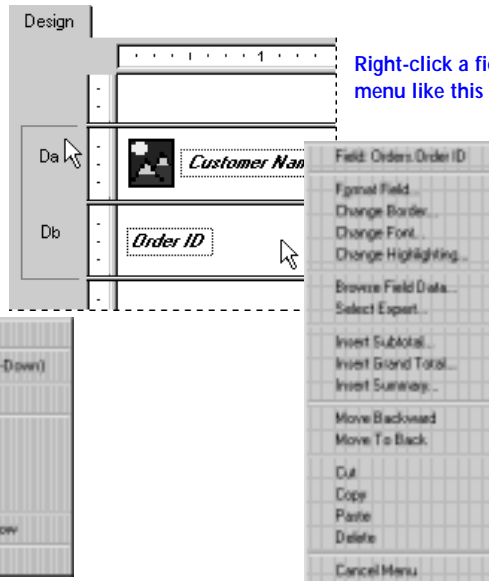
Right-click the Design Tab itself and a menu like this appears.



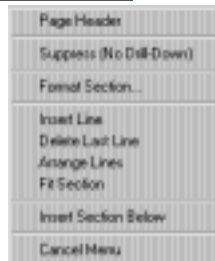
Right-click the gray area of a toolbar and a menu like this appears.



Right-click a field and a menu like this appears.



Right-click the gray area of the Details section and a menu like this appears.



Cursors

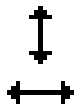
Seagate Crystal Reports uses a number of different cursors at different points in its operation:



The Arrow cursor is the primary cursor, used for making menu choices, selecting options from dialog boxes, working with scroll bars, clicking buttons and objects, and so on.



The Hourglass or Background Processing cursor appears whenever the program is processing a command. Whenever the hourglass is visible, you can not choose any commands or proceed further with the report.



The double-arrow Resizing cursor changes to one of a number of different double-arrow cursors whenever it is placed over a resizing handle on a bit-mapped graphic, graphic box, graphic line, or field.



The Move cursor appears whenever a single object is being dragged to another location in a report.



The single-unit Drag and Drop cursor appears whenever a single item is dragged over an area where it can be dropped.



The multi-unit Drag and Drop cursor appears whenever multiple items are dragged over an area where they can be dropped. It is also used to copy multiple items at one time.



The Stop cursor appears whenever a dragged item is over an area where it can not be dropped.



The Copy cursor appears whenever a single item is being copied.



The Section Sizing cursor changes from the Arrow cursor whenever it is positioned over the boundary of any report section. This cursor is used to drag a section boundary line in order to expand or reduce the size of a section.



The Section Splitting cursor appears when the pointer is positioned over the left boundary of a report section. Click, and a horizontal line appears, to position where the section should be split.



The Link cursor appears when links are manually created in the Visual Linking Expert. Search for *Visual Linking Topics Index* in Seagate Crystal Reports online Help.



The Drill-down cursor appears when the pointer is positioned over a summary value or a chart in the Preview Tab. Double-click a summary value or chart element with the Drill-down cursor, and the program displays the details behind the summary.



The Pencil cursor is a drawing cursor. It appears whenever boxes and lines are inserted. The point of the pencil marks the spot where the drawing begins and is used to define the size and shape of the object drawn.



The Help cursor appears when the HELP button on the Standard toolbar is clicked. Use the Help cursor to access the online Help system. Simply click the report element or dialog box to bring up context-sensitive Help for that item.



The Tiny Hand cursor is available in the online Help system. The Arrow cursor changes to the Tiny Hand cursor whenever it is positioned over text or a graphic that jumps to another topic in online Help.



The 2-Dimensional Panning or Anchor cursor appears as an IntelliMouse feature for scrolling through your report in any direction in the Preview Tab.



The Scroll cursor appears as an Intellimouse feature for scrolling a report up/down in the Preview Tab.



The Pan cursor appears as an Intellimouse feature for panning a report right/left in the Preview Tab.



The North panning cursor appears as an Intellimouse feature for panning North (up) in a document.



The South panning cursor appears as an Intellimouse feature for panning South (down) in a document.



The East panning cursor appears as an Intellimouse feature for panning East (to the right) in a document.



The West panning cursor appears as an Intellimouse feature for panning West (to the left) in a document.



The Northeast panning cursor appears as an Intellimouse feature for panning Northeast (up and to the right) in a document.



The Northwest panning cursor appears as an Intellimouse feature for panning Northwest (up and to the left) in a document.



The Southeast panning cursor appears as an Intellimouse feature for panning Southeast (down and to the right) in a document.



The Southwest panning cursor appears as an Intellimouse feature for panning Southwest (down and to the left) in a document.

Design Tab

When working with Seagate Crystal Reports, you will probably use the Design Tab more than any other part of the program.



The Design Tab is the place you do most of the initial work when creating a report. It designates and labels the various sections of the report. You can place objects in these sections where you want them to appear, specify sorting, grouping, and totaling needs, do the initial formatting, and so forth. See *Area printing characteristics*, Page 59.

The Design Tab provides a very efficient environment for designing a report because you work in the tab with data representations, not with data itself. When a field is placed on the report, the program uses a frame to identify the field on the tab; it does not retrieve the data. Thus, you can add and delete fields and other objects, move them around, set up complex formulas, and more, without tying up the computer or network resources needed to gather the data.

The report created in the Design Tab is a kind of virtual report; it has the structure and instructions for creating the final report, but it is not the report itself. To turn the Design Tab report into a final report or into a report that you can fine-tune, you “just add data.” You do this whenever you preview the report, print it, or output it in any other way. The actual data will now appear in the report.

Design Tab Areas

When you first begin creating a report, Seagate Crystal Reports automatically creates five areas in the Design Tab.

1. Report Header

This section is generally used for the report title and other information you want to appear at the beginning of the report. It can also be used for charts and cross-tabs that include data for the entire report.

2. **Page Header**

This section is generally used for information that you want to appear at the top of each page. This can include such things as chapter names, the name of the document, and other similar information. This section can also be used to display field titles above the fields on a report.

3. **Details**

This section is used for the body of the report, and is printed once per record. The bulk of the report data generally appears in this section.

4. **Report Footer**

This section is used for information you want to appear only once at the end of the report (such as grand totals) and for charts and cross-tabs that include data for the entire report.

5. **Page Footer**

This section usually contains the page number and any other information you want to appear on the bottom of each page.

If a group, summary, or subtotal is added to the report, the program creates two additional sections:

1. **Group Header**

This section typically holds the group name field, and can be used to display charts or cross-tabs that include data specific to the group. It is printed once at the beginning of a group.

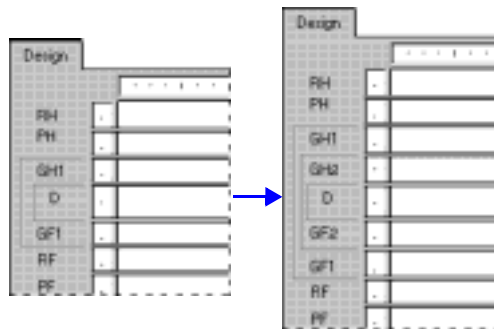
2. **Group Footer**

This section generally holds the summary value, if any, and can be used to display charts or cross-tabs. It is printed once at the end of a group.

When a group, summary, or subtotal is added, the Group Header area appears directly above the Details area and the Group Footer area appears directly below the Details area.



If you set up additional groups, the program creates new group areas between the Details area and the existing Group Header and Group Footer area(s).



Like the original areas, each of these newly added areas can contain one or more sections. By default, they each contain a single section.

Area printing characteristics

Each report area has its own printing characteristics. It is important to understand these characteristics because they affect *when* and *how often* different report objects get printed.

WHEN AREAS PRINT

Areas print in the order they appear on the Design Tab (top to bottom). If there is more than one section in an area, the sections print in the order they appear within the area. Thus, if you have three Report Header sections, all three of those sections will print, in order, before the section(s) in the Page Header area begin to print.

HOW OFTEN OBJECTS PRINT

The decision on where to place objects on the Design Tab is made easier if you understand how often each of the areas prints. Once you understand this, most of your reporting decisions are straightforward. This information becomes most useful, however, when you are trying to decide where to place charts, cross-tabs, and formulas to get specific results.

Objects print in the following ways:

- Objects placed in the Report Header area print once, at the beginning of the report.
 - Charts and cross-tabs placed in this area contain data for the entire report.
 - Formulas placed in this area are evaluated once, at the beginning of the report.

- Objects placed in the Page Header area print at the beginning of each new page.
 - Charts or cross-tabs can not be placed in this section.
 - Formulas placed in this area are evaluated once per page, at the beginning of each new page.
- Objects placed in the Group Header area print at the beginning of each new group.
 - Charts and cross-tabs placed in this area contain data just for the group.
 - Formulas placed in this area are evaluated once for each group, at the beginning of the group.
- Objects placed in the Details area print with each new record.
 - Charts or cross-tabs can not be placed in this area.
 - Formulas placed in this area are evaluated once for each record.
- Objects placed in the Group Footer area print at the end of each group.
 - Charts and cross-tabs placed in this area contain data just for the group.
 - Formulas placed in this area are evaluated once for each group, at the end of the group.
- Objects placed in the Report Footer area print once at the end of the report.
 - Charts and cross-tabs placed in this area contain data for the entire report.
 - Formulas placed in this area are evaluated once, at the end of the report.
- Objects placed in the Page Footer area print at the bottom of each page.
 - Cross-tabs and charts can not be placed in this area.
 - Formulas placed in this area are evaluated once per page, at the beginning of each new page.

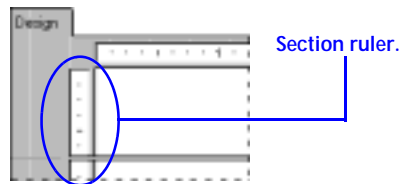
Identifying and working with areas and sections

By default, each area contains only a single section. The name for that section appears directly to the left of the section. If you have multiple sections in an area, the sections are designated as a, b, c, and so forth.

NOTE: Initials, such as RH, PH, D, PF, RF, and so on, are used to identify each section if you have toggled the Show Short Section Names in Design check box on in the Options dialog box. Search for Options dialog box in Seagate Crystal Reports online Help.

NOTE: If you right-click the shaded area containing a section name, a shortcut menu appears with section-specific options. If you right-click the shaded area to the left of the section names, a shortcut menu appears with area-specific options.

The program displays a section ruler immediately to the left of each section. The section ruler is used to add, remove, and move guidelines, and to provide a visual reference when you are placing objects. See *How to add, delete, and move guidelines*, Page 72.



Whenever a new section is added, the program creates a ruler for that section. See *How to add, delete, move, and merge sections*, Page 79.

Other Design Tab capabilities

There are several other capabilities built into the Design Tab. With the Design Tab, you can:

- resize a section by dragging its boundary. See *How to split and resize sections*, Page 82.
- split a section (create two sections from one) by clicking its left boundary. See *How to split and resize sections*, Page 82.
- add horizontal and vertical guidelines by clicking the rulers. See *How to add, delete, and move guidelines*, Page 72.
- zoom in and out on a report at any magnification from 25% to 400% of the original size. See *How to zoom the report in and out*, Page 76.

Preview Tab



To preview a report before printing it, click the PRINT PREVIEW button on the Standard toolbar.

The program gathers the data, makes the necessary calculations, and displays the report in the Preview Tab on electronic “paper.” With the data in place, you can review the spacing and formatting of your report and see the actual results of all your summaries, formula calculations, and record and group selections.

In true WYSIWYG (What You See Is What You Get) fashion, you can work directly on this live data, fine-tuning it until the report has the exact look you want.

The program works with data in the following manner:

- The first time the Preview Tab is used, it retrieves data from your underlying data source(s) and saves it with the report (unless you have set up the program not to save data).
- From that point on, the program uses the saved data whenever you preview the report unless you specifically refresh it or add a field that requires the program to retrieve new data.

Seagate Crystal Reports provides two views for previewing a report:

1. Standard view, and
2. Group Tree view.

Standard view

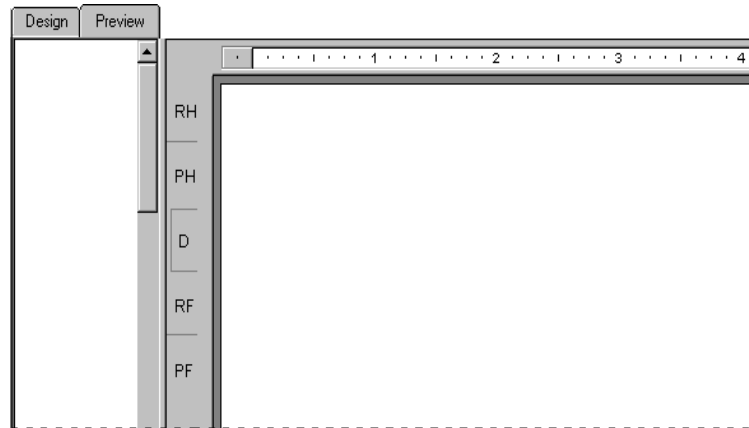


In standard view, the report is displayed a page at a time. Using the navigation buttons in the Preview Tab, you can move to the beginning or end of the report, or you can move backward and forward through the report one page at a time. For shorter reports or reports in which you're primarily interested in seeing the “bottom line” totals, standard view provides all of the functionality that you need.

THE DATA AGE INDICATOR

The Data Age indicator indicates the date the data was last refreshed or initially retrieved, whichever is the most recent. If the data was initially retrieved or refreshed today, it indicates the time it happened. Search for *Save Data with Report command* in Seagate Crystal Reports online Help.

Group Tree view



The Group Tree view can be toggled on/off using the TOGGLE GROUP TREE button on the Formatting toolbar.

The Group Tree view presents a split screen.

- The right pane displays the report.
- The left pane displays a high level outline of the report, showing the hierarchy of groups and subgroups in a familiar tree format.

When you click the tree node for the group that interests you, the program jumps immediately to the part of the report that contains the information for that group. For longer reports or reports in which you wish to jump back and forth between different groups, the Smart Navigation features of the Group Tree view make your work extremely efficient.

Similarities/ differences from Design Tab

You have the same formatting capabilities in the Preview Tab as you do in the Design Tab. Menus (both menu bar and shortcut menus), the standard and supplementary toolbars, rulers, and the Formatting toolbar remain active, giving you essentially the same functionality you have when working with a report in the Design Tab. However, when you are making numerous changes, it is quicker to make the changes in the Design Tab.

- The Design Tab and Preview Tab are tied together internally. Any changes made in one are reflected in the other.
- The Preview Tab has a single vertical ruler at the left of the tab rather than the individual section rulers seen in the Design Tab. The functionality of the ruler is the same.
- The Preview Tab identifies report sections in the shaded area to the left of the data. With a quick look you can tell which report section the data is printing from. While section names appear only once in the Design Tab, they print each time a section prints in the Preview Tab.
- The Record counter (see *DATA RETRIEVAL INFORMATION, Page 52*, the Data Age indicator (see *THE DATA AGE INDICATOR, Page 63*, and the Page Forward/Page Back controls (see *Preview Tab, Page 61*), are all active in the Preview Tab.
- The Preview Tab highlights every value when you select a field; whereas, only the field frame is highlighted in the Design Tab.

A DIFFERENT FEEL

Working in the Preview Tab has a different feel from working in the Design Tab.

Each field in a database contains dozens, hundreds, or even thousands of values, depending on the number of records in the database. When you place a field in the Design Tab, a single field frame represents all those values. When you highlight the field, sizing handles appear on the frame and the frame changes color.

In the Preview Tab, however, you are working with the actual data. Instead of a field frame representing many field values, the values themselves appear.

- When you highlight a field or formula field value, you are actually selecting every value in the field.
 - The program places a sizing frame around the specific value you select.
 - It highlights every other value in the field.
- Likewise, when you select a summary value, you are actually selecting all the related summary values.
 - The program places a sizing frame around the specific value you select.
 - It highlights all the related summary values.

Aside from the differences in appearance, the process of building and modifying a report is the same in both the Design Tab and the Preview Tab. You should find it easy to work with your reports in both places.

Analyzer Tab

The program provides a separate Analyzer Tab that allows you to examine your charts and maps independently of the main report. You can use this tab to rearrange chart and map elements, and to customize the appearance of the chart or map for more efficient analysis and trend identification.

To analyze a chart object or a map object in-depth, right-click the object in question and choose LAUNCH ANALYZER from the shortcut menu.

Working with charts

When viewing a chart on the Analyzer Tab, you can perform the following operations by using the commands on the shortcut menu:

- change the title of the chart,
- change the X-Axis title, Y-Axis title, and Z-Axis title,
- reverse the order in which the series appear on the chart,
- reverse the order in which the groups appear on the chart, as well as
- any additional operations specific to the specific chart type.

Working with maps

When viewing a map on the Analyzer Tab, the shortcut menu can be used to perform the following operations:

- center the map,
- zoom in, zoom out, and pan the map,
- change the map type and set options for the overall style of the map,
- reorganize the layers of report elements (for example, you can display the major cities layer above the highways layer), and
- change the map title.

NOTE: *The Analyzer Tab's centering, zooming, and panning capabilities are also available as commands on the shortcut menu of the Preview Tab (if you right-click the map object in the Preview Tab).*

Similarities/ differences from Preview Tab

The Analyzer Tab is similar to the Preview Tab in some ways, but it is much more focused. When you view a chart or map in the Analyzer Tab, you are looking at the actual chart or map and its features without viewing any of the underlying data. The purpose of the tab is simply to arrange and rearrange the appearance of the chart or map in such a way that you will be able to identify trends quickly and easily.

A DIFFERENT FEEL

While the Analyzer Tab and Preview Tab share some capabilities, the Analyzer Tab offers a much more focused and hands-on approach. It removes irrelevant data from the picture, showing you only the maps and charts you are analyzing. It provides commands for reversing series and groups on charts, and for zooming, panning, and centering maps, so that they can easily be adjusted.

With the Analyzer Tab, up to two objects can be viewed simultaneously. In this case, the Analyzer Tab becomes a split-screen tab, with each chart or map appearing in a separate section. To resize a section, move the cursor over the section boundary until the cursor becomes a Section Sizing cursor, and then drag the boundary line to expand or reduce the size of the section, as needed.

When two charts or maps are active in the Analyzer Tab, and you want to work with a third, right-click that third chart or map, and choose ANALYZER from the shortcut menu. A dialog box appears, reminding you that the Analyzer Tab is full, and asking whether you would like to replace one of the sections currently active in the Tab.

The Analyzer Tab can also be used to work with map and chart objects that have been placed within a subreport. The program opens a separate Analyzer Tab for each subreport that contains a map or chart object you are analyzing. You can view up to two objects from the same subreport simultaneously in an Analyzer Tab.

NOTE: *You can also resize the map key displayed to the right of each map.*

Other fundamentals

Seagate Crystal Reports' reporting environment is extremely flexible.

- You can turn on grid snap, set the grid to a maximum of one inch, and make the grid visible or invisible in the Design Tab, the Preview Tab, or both (see *How to turn the grid on/off*, Page 76).

- You can also work without a grid, placing objects wherever you want them in a report (see *Free form*, Page 67 and *Free form with guidelines*, Page 67).
- Finally, the guidelines can be used to align and resize objects (see *How to move and position objects using guidelines*, Page 73).

Set up the working environment so it works the way you work best.

Grid

The grid is a series of row and column coordinates. When the grid is active, the program enables you to place objects only at these coordinates, not between them. In this way it makes it very easy for you to place and space data on your report and to align objects as needed. If you attempt to place an object between grid coordinates, the program “snaps” the object to the grid, that is, it moves the object automatically to the nearest set of row/column coordinates.

You activate the grid and specify its size and visibility properties using the Layout Tab in the Options dialog box. By default, the grid is not active. See *How to turn the grid on/off*, Page 76.

Free form

You may also want to use Seagate Crystal Reports without a grid, in a free form environment similar to that of a drawing program. Free form means simply that you can place objects anywhere you want them to appear on your report. Your only restriction is that the program will not allow you to place chart and cross-tab objects in the Page Header, Page Footer, or Details sections. See *Area printing characteristics*, Page 59.

To work in a free form environment, toggle the *Snap To Grid* check box off using the Layout Tab of the Options dialog box. For more information, search for *Options dialog box* in Seagate Crystal Reports online Help.

Free form with guidelines

You may want to work in a free form environment while retaining the ability to align objects, or to move or resize them as a group. You can do this using guidelines.

Guidelines are lines that extend vertically or horizontally from the Design and Preview Tab rulers. Guidelines have a snap property; when you move an object within a guideline’s magnetic range, the object snaps, or attaches itself, to the guideline.

- Once an object is snapped to a guideline, if the guideline is moved, the object moves too.
- If you have several objects snapped to a guideline, they all move when the guideline is moved.
- If you have several objects snapped to a guideline on two sides (right and left, or top and bottom) and one of the guidelines is moved, all of the objects resize similarly.

Using guidelines in a free form environment provides flexibility with control. See *How to add, delete, and move guidelines*, Page 72, and *How to move and position objects using guidelines*, Page 73.

Overflow Field Representations

Seagate Crystal Reports uses Overflow Field Representation to assist users when working with numeric or currency values in report cells. Normally, if a numeric or currency value is larger than the field containing it, that value is truncated, or “clipped.” For example, values like 100,000,000 might appear on the report as 1,000, or as 000 (depending on the properties you have set). This could potentially cause confusion when the report is read.

When field clipping is disabled (activate Overflow Field Representation), numeric/currency field values that exceed the field size will be represented by number signs (#####) in the Preview Tab, letting you know immediately when the field is too small. See *How to disable field clipping*, Page 78.

Sections and objects

Seagate Crystal Reports enables you to insert a variety of objects in a report:

- **Field objects**
Fields from database tables and from the result sets returned by formulas, parameters, group names, queries, and stored procedures. See *How to insert database fields*, Page 105.
- **Text objects**
Characters, words, even entire documents. See *How to insert text objects*, Page 108.
- **Picture objects**
Bitmaps (*.bmp, *.pcx, *.tif, *.tga, *.jpeg). See *How to insert a picture*, Page 109.
- **Chart objects**
Charts that display summarized data. See *Charting*, Page 369.
- **Subreport objects**
Reports within reports, freestanding or bound to the data in the primary report. See *How to insert a subreport*, Page 419.
- **Cross-tab objects**
Spreadsheet-like reports that help identify trends. See *Cross-Tab Objects*, Page 443.
- **OLE objects**
Pictures, spreadsheets, text, and other objects created in OLE server applications. See *OLE Objects Overview*, Page 404.

- **Map objects**

Geographic maps that can present data from groups, detail fields, cross-tab data, and OLAP grids. See *Mapping*, Page 385.

Objects are containers. They can hold data and, in some cases, other objects (for example, a text object can contain field objects as well as text, and labels in a cross-tab object are actually text objects). Each object has properties that define the way the object acts in a report.

For objects, fixed properties, conditional properties, or a combination of the two can be set.

- Dialog box options are used to set fixed properties.
- Special formulas are used to set conditional properties.

See *Absolute formatting*, Page 211 and *Conditional formatting*, Page 212.

Most objects can be inserted into most report sections, but the program restricts placement of some objects in some sections because it does not make sense to place them there. For example, since a Details section prints with each record, a cross-tab object placed in a Details section would produce a cross-tab report for each record, not something that would be very useful. The program thus excludes cross-tab objects from the Details section. See *Area printing characteristics*, Page 59, for a summary of section/object restrictions.

NOTE: See *How to make an object underlay a following section(s)*, Page 111 for information on printing objects in sections where they can not be physically placed.

You never have to worry about putting an object where it doesn't belong; the program takes care of that for you. However, each situation requires some judgement on your part. For example, if you place a picture object in a:

- Report Header section, it prints once at the beginning of the report.
- Group Header section, it prints once with every group.
- Details section, it prints once with every record.

Based on what you are trying to accomplish in the report, it clearly makes sense to place the object in one of the sections and not in the others. It is up to you to decide what is best for your report. For more information, see *Area printing characteristics*, Page 59.

You can also set fixed and conditional properties for sections, just as you can for objects. See *Conditional formatting*, Page 212.

Underlaying objects

By default, when an object is placed in a section:

- the section expands to accommodate the object, if necessary, and
- the object prints in the section where it is placed, whenever that section prints.

However, when an object is placed in a section that has been set to underlay the following sections:

- the object still prints when the section in which it is placed prints, but
- it underlays the following section(s) as well.

NOTE: Objects placed in a section can underlay all sections up to (but not including) its "sister" section. For example, the Page Header section can underlay all sections up to (but not including) the Page Footer section.

This enables you to produce a number of interesting report effects. For example you can:

- print an object so that it appears one time in the Details section beside a number of details (for example, a chart that compares sales figures by region alongside the details for the regions),
- print a company watermark that is centered on the page, flowing through multiple sections, and
- use a scanned bitmap of a form as a guide in setting up a report to print on preprinted forms.

Using the Underlay facility, you can produce stunning visual effects. For more information, see *How to make an object underlay a following section(s)*, Page 111.

HANDS-ON (Report Design Environment)

How to move and resize toolbars

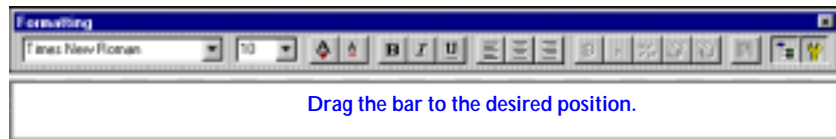


The 32-bit version of Seagate Crystal Reports includes several movable, resizeable toolbars.

You can move these toolbars into fixed positions or you can turn them into floating pallets if you wish. You move and resize these toolbars in the following ways:

Moving

To move the toolbars, click on the bar in a space where there is no button and drag the bar to a new position.



Resizing

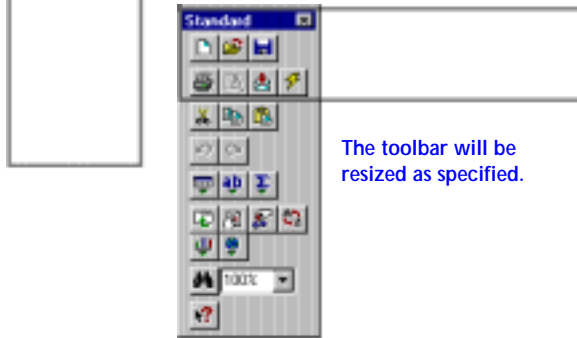
To resize the toolbars, position the pointer over an edge or a corner of the bar. When the resizing pointer appears, drag it inward or outward to resize the bar.

To go from this...



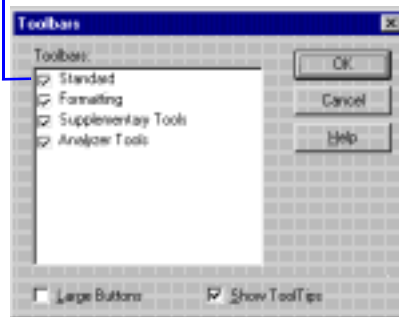
Drag the cursor to create the desired size.

to this...



You can toggle the toolbars on and off using the Toolbars dialog box. You can also open the Toolbars dialog box from the View Menu (TOOLBARS command).

Toggle the check boxes on for the desired toolbars.



How to add, delete, and move guidelines

Seagate Crystal Reports provides guidelines to help you accurately place objects on your report. Guidelines are non-printing lines that you can place anywhere in the Design and Preview Tabs to aid in alignment. The visibility of the guidelines can be toggled on and off in two ways:

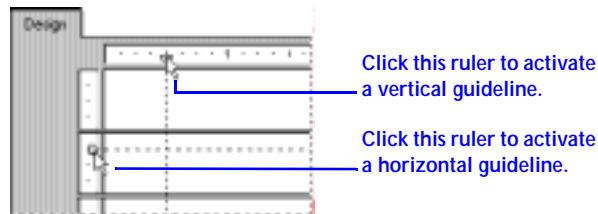
1. Using the two commands on the View Menu, **GUIDELINES IN DESIGN** and **GUIDELINES IN PREVIEW**. Search for *Guidelines in Design command* and *Guidelines in Preview command* in Seagate Crystal Reports online Help.
2. Using the two options, *Show Guidelines in Design* and *Show Guidelines in Preview* on the Layout Tab of the Options dialog box. Search for *Options dialog box* in Seagate Crystal Reports online Help.

Seagate Crystal Reports inserts guidelines automatically in some situations:

- Whenever a field or formula field is inserted in a report, the program automatically creates a guideline at the left edge of the field frame and snaps the field and field title to it.
- When a field is summarized, the program snaps the summary to the same guideline to assure proper alignment.
- When you right-click the shaded areas to the left of a section and choose **ARRANGE LINES** from the shortcut menu, the program automatically creates one or more horizontal guidelines in the section and snaps the fields to them.

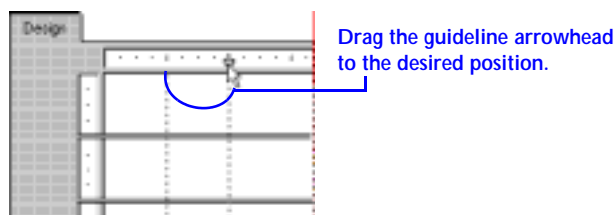
Adding guidelines

There may be times when you want to insert guidelines manually.



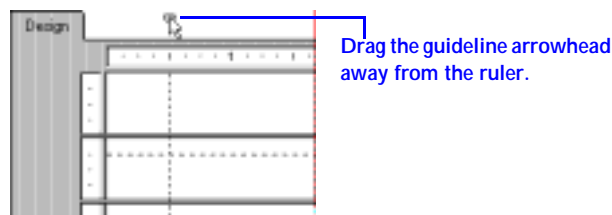
Moving guidelines

Each guideline is attached to an arrowhead on its originating ruler.



Deleting guidelines

Each guideline is attached to an arrowhead on its originating ruler.



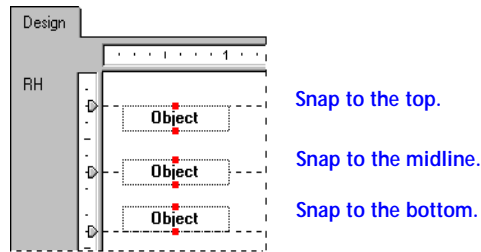
NOTE: With the *Snap to Grid* option toggled on you will only be able to insert or move guidelines in grid increments. To get the full power of movement with guidelines, toggle the *Snap to Grid* option off using the *Layout Tab* in the *Options dialog box*. Search for *Options dialog box* in *Seagate Crystal Reports online Help*.

How to move and position objects using guidelines

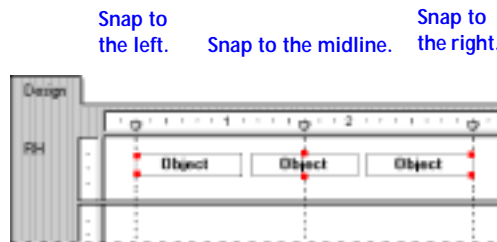
Positioning objects with guidelines

Guidelines have a snap property that automatically snaps objects to them. That is, objects will connect to the guidelines as positioning devices.

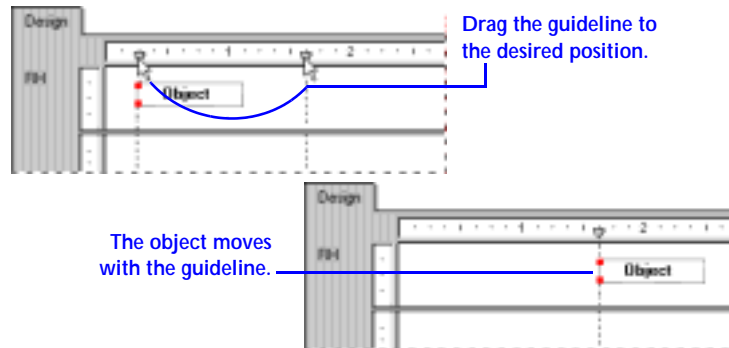
An object can snap to a horizontal guideline on its top, bottom, or horizontal midline (the invisible line that bisects the object horizontally).



An object can snap to a vertical guideline on its right or left side or on its vertical midline (the invisible line that bisects the object vertically).



When a guideline has its snap property toggled on and the guideline is moved, all objects snapped to the guideline are moved. The snap property can be toggled on/off from the Layout Tab of the Options dialog box, which can be opened from the File Menu (OPTIONS command).



NOTE: When a guideline is moved, any object that is snapped to it is moved as well. But if you move an object that is snapped to a guideline, the program does not to move the guideline.

Resizing objects using guidelines

When one or more objects are snapped to guidelines on two sides (top and bottom, or right and left), the object(s) can be resized by dragging either or both of the guidelines. This can be especially helpful if you need to resize a number of objects similarly at the same time.

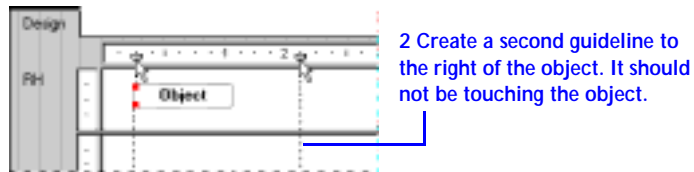
This is a two step process.

- 1 First, you have to snap the object(s) to two guidelines.
- 2 Then you have to drag a guideline to resize the object(s).

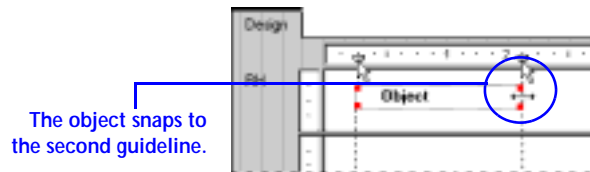
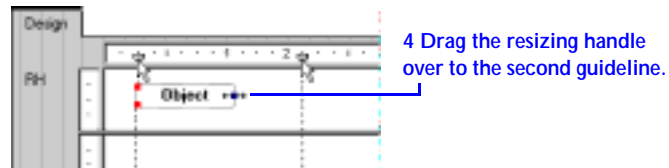
Snapping objects with two guidelines

You may have two or more objects that you want to resize and they are either the same size (height or width) or different sizes. The process for resizing with two guidelines is the same for either case.

- 1 Begin by creating a guideline and snapping one side of the object to that guideline.



- 3 Now click the object to activate the sizing handles.



- 5 Repeat Steps 2 through 4 for every additional object you want to snap to both guidelines.
- 6 If the objects are not yet the desired size, drag one or both of the guidelines until the objects are the correct size.

How to turn the grid on/off

The Design and Preview Tabs have an underlying grid structure that you can activate and resize in the Options dialog box.

- 1 Choose the OPTIONS command from the File Menu. The Options dialog box appears with the Layout Tab active.

2 Set the Grid Size, Grid Options, and View Options in this dialog box.



NOTE: By default, all of the grid options are toggled off.

How to zoom the report in and out

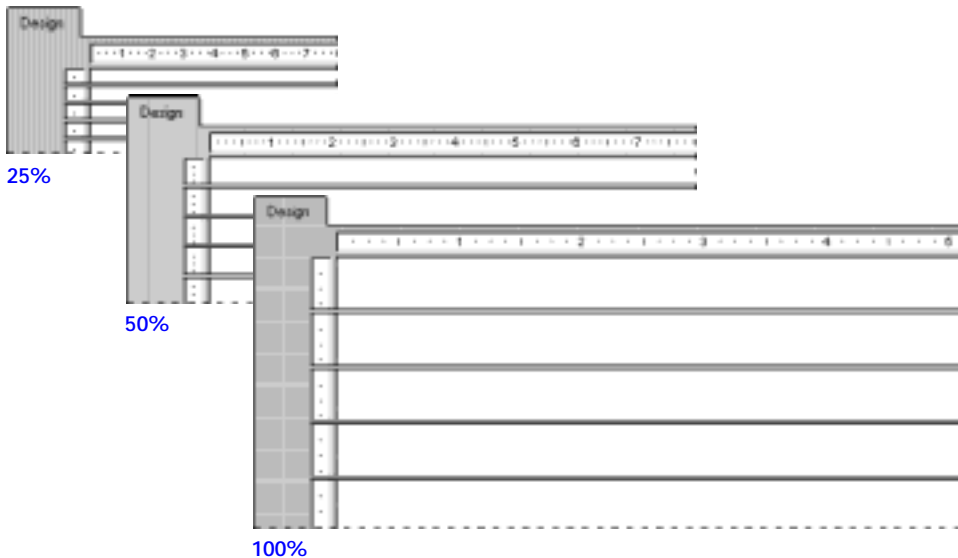


You can easily zoom in on a report. You can choose any magnification from 25% to 400%. This feature is active in both the Design and Preview Tabs.



To zoom the report in or out, set the zoom level in the MAGNIFICATION FACTOR edit box found on the Standard toolbar.

Set the desired magnification factor and click OK when finished.



It is helpful to view reports at low magnifications in order to get an overall picture of the layout of your report. Views at higher magnifications work well for attention to the details of the report.

How to undo/redo activities

Seagate Crystal Reports includes multiple levels of undo. With multiple levels of undo, you can undo several changes, a step at a time, until you have your report in the condition you want it.

The program also has a redo feature that reverses an undo. If you move an object, for example, and do not like its new position, you can click UNDO to move it back to its original position. If you then change your mind, you can click REDO to restore it to the place where you moved it.



- To undo an action, click the UNDO button on the Standard toolbar. The first time the button is clicked, it reverses the most recent change made to the report. Each additional time the button is clicked, it reverses the next most recent change.



- To redo a change after you have undone it, click the REDO button on the Standard toolbar.

The program disables the UNDO button and the UNDO/REDO commands whenever there is nothing to undo/redo or when you have made a change that can not be reversed.

NOTE: *If you undo an action (Action A) and then perform some new action, you will no longer be able to redo action A.*

How to drill-down on summarized data

Drill-down cursor



You can drill-down on your data using the Drill-down cursor (to show the data behind individual groups). See *Sorting, Grouping, and Totaling*, Page 245.

Seagate Crystal Reports allows you to drill-down on group or summary information in the Preview Tab in both the Standard and the Group Tree view (See *Standard view*, Page 62 and *Group Tree view*, Page 63). When you position the cursor over any summary value that you can drill-down on, the program displays a Drill-down cursor.

If you then double-click, the program reveals the details behind that specific summary value. For example, if the Drill-down cursor becomes active over the city summary, you can double-click to see the details behind that summary. See *Cursors*, Page 54.

- If you have only a single summary, you can look at the summary or at the data from the individual records that are summarized.
- If you have multiple summaries, you can look at the summaries behind summaries (the city summaries that make up the region summaries, for example), or at the data from the individual records that are summarized.

How to disable field clipping

To disable field clipping:

- 1 Select the field and click the OBJECT PROPERTIES button on the Supplementary toolbar. The Format Editor appears with the Number Tab active.
- 2 Click the Number Tab.
- 3 To allow overflow field representation, toggle the *Allow Field Clipping* check box on.

NOTE: You also have the option to click the *Conditional Formula* button to enter a formula in the *Format Formula Editor*. In the *Format Formula Editor* you can specifying that field clipping will be disabled only when certain conditions are met.

4 Click *OK*.

To view the results, refresh the report. If you disabled field clipping, any numeric/currency field values that are larger than the fields containing them will be represented by number signs (#####).

HANDS-ON (Sections and Areas)

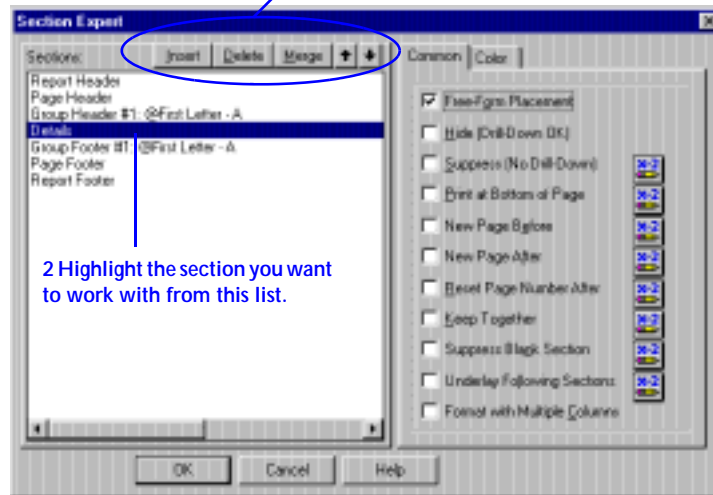
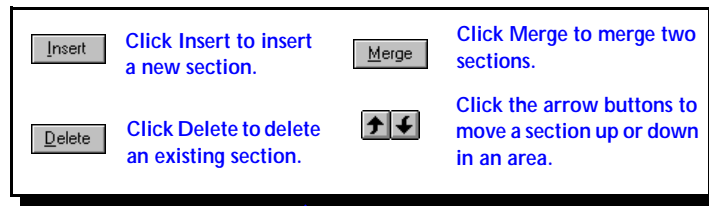
How to add, delete, move, and merge sections

The Design Tab opens originally with a standard set of report sections, each in a standard size (see *Design Tab Areas, Page 57*). You can not delete any of these original sections but you can add to them. Once you have added sections, you can delete them, move them in relation to other similar sections, or merge related sections together.

While there are different ways to do this, the easiest way is to use the **SECTION EXPERT** button.



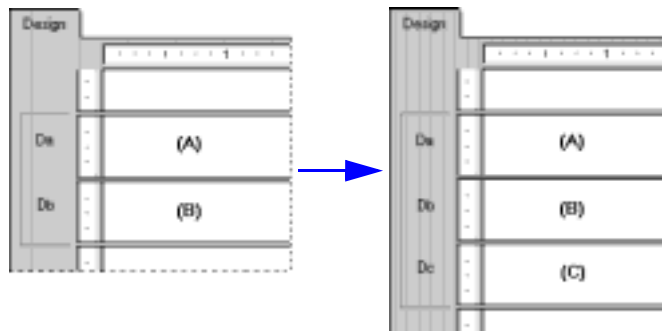
- 1 Click the **SECTION EXPERT** button on the Standard toolbar. The Section Expert appears with a list of all the sections in the report. When there are more than one of any kind of section, the sections are lettered A, B, C, and so on.



Inserting a section

Click the *Insert* button. The program adds a new section immediately below the highlighted section.

NOTE: Sections can also be inserted by right-clicking the shaded area to the left of any section in the Design or Preview Tabs and choosing INSERT SECTION BELOW command from the shortcut menu.

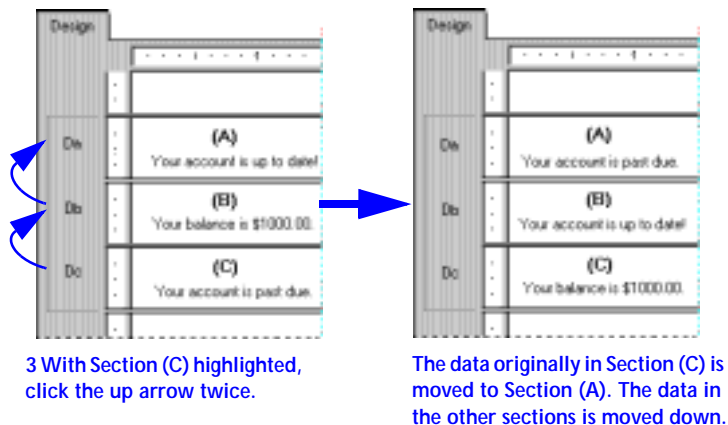


Deleting a section

Click the *Delete* button. The program removes the highlighted section from the report.

Moving a section

- 1 Highlight the section you want to move.
- 2 Click the *Up* or *Down* arrow to move the section.



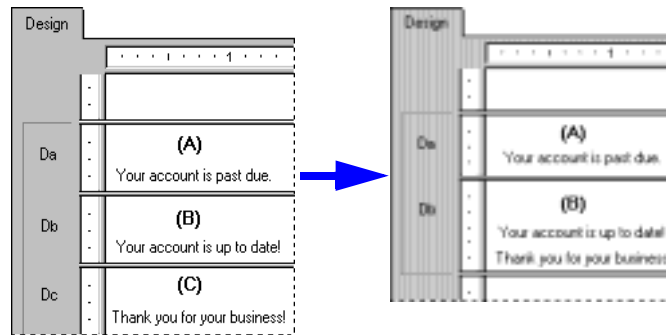
NOTE: You can only move a section up or down within an area.

NOTE: The letters that identify the sections describe their relative (as opposed to original) position. Thus, if you move a "C" section up, it becomes a "B" section. It loses its original "C" designation.

Merging two related sections

There may be times when you have placed objects in two sections (where they print sequentially) and you want to put them all in a single section (where they print simultaneously). You can merge the two sections and then rearrange the objects as needed in the new section.

- 1 Move the sections so the two sections you want to merge follow each other in the list.
- 2 Highlight the top section.



3 With Section (B) highlighted, click the Merge button. Section (C) is merged with Section (B) into one.

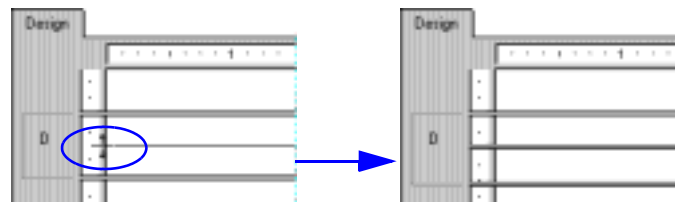
- 4 Rearrange the objects as needed.

How to split and resize sections

A section can be split into two or more sections and/or resized easily in the Design Tab.

Splitting a section

- 1 Move the pointer over the left boundary of the section you want to split.
- 2 When the pointer becomes a Section Splitting cursor, click the boundary. See *Cursors, Page 54*.
- 3 When a horizontal line appears, drag it up or down to split the section the way you want it.



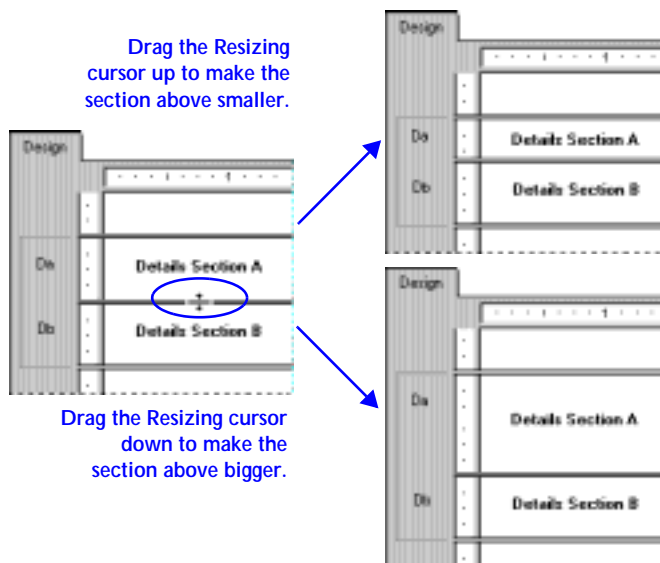
4 When the Section Splitting cursor appears, drag the horizontal line to the desired position.

The section will split at the line.

Resizing a section

Move the pointer over the bottom boundary of the section you want to resize and, when the pointer becomes a Resizing cursor, drag the boundary to make the section bigger or smaller as you wish.

If you have one or more objects in a section and you want to resize the section to remove unnecessary white space, right-click in the shaded area to the left of the section in the Design and Preview Tabs and choose FIT SECTION from the shortcut menu. The program automatically resizes the section, moving the bottom boundary of the section to the baseline of the bottom object in the section.



A section will automatically expand vertically in two instances:

1. when you place an object and the object is bigger (vertically) than the section you put it in, or
2. when you expand an object (vertically) so it becomes bigger than the section it resides in.

NOTE: You can not resize a section smaller than an object in the section.

5

Introduction to Reporting

What you will find in this chapter...

Basic report design, Page 86

How to design a paper prototype, Page 93

Concepts in reporting, Page 93

Beyond basic reports, Page 100

HANDS-ON (Report Creation and Design), Page 101

HANDS-ON (Finishing Your Report), Page 117

Basic report design

The purpose of this chapter is to suggest a structured approach to preparing reports with Seagate Crystal Reports. This approach includes the following elements:

- deciding on the content of a report,
- developing a prototype on paper,
- using Seagate Crystal Reports to set up a prototype,
- specifying the records/groups to be included in the report,
- manipulating the data with formulas and functions,
- grouping, summarizing, and sorting the data,
- editing and formatting the data,
- adding graphic enhancements and OLE objects, and
- printing the finished report.

This section has been designed to provide a conceptual understanding of the reporting process.

Deciding on the content of the report

Before you do anything else, you should outline the information you want the report to provide. Use the following list of questions as a guide in making that outline:

- What is the overall purpose of the report?
- Who is going to read the report?
- What is the report title going to be?
- What information do you need besides the title to identify the report?
 - Where is that information to come from?
 - If the information exists in a database table, what type of fields is the data stored in: number, text, etc.?
- What identifying information do you want to appear at the bottom of each page? At the top of each page?
 - Where will this information come from?
 - If the information exists in a database table, what type of fields is the data stored in: number, text, etc.?

- What specific data should appear in the body of the report?
 - Where will this data come from?
 - Does this data exist in data fields, or does it need to be calculated from data field values?
 - What type of fields is the data stored in: number, text, etc.?
 - Do you want the data sorted?
 - How?
 - Do you want the data broken into groups?
 - What kind of groups?
 - Do you want the data summarized?
 - Subtotaled? Averaged? Counted? or some other kind of summary value?
 - What do you want to total?
 - Do you want to show summaries for all the groups or just the top or bottom groups?
 - Do you want the group summaries sorted in any special order?
 - Do you want to add text labels to the summaries?
- What information, if any, do you want flagged on the report?
 - How do you want it flagged?
 - By color?
 - By a text flag?
- Do you want any other information highlighted in some way so that it really stands out?
 - How do you want it highlighted?
 - Colored text?
 - Special font or font size?
 - Borders or background color?
 - Do you want to label the highlighted information as well?
- Do you want the report to be based on all records in the database or only on specific records?
 - Which records?

Purpose

What is the overall purpose of the report?

Reports are management tools. Their purpose is to help individuals quickly grasp the essential elements and relationships found in raw data, to help them make effective decisions. For a report to be effective, it has to present the correct data in a logical way. If it presents the wrong data, or if it presents the right data in a haphazard manner, the report may slow the decision making process or may even encourage incorrect decisions.

A good starting place in the development of a report is to write out the purpose of the report in a sentence or two. The purpose statement helps you focus on your primary needs, and it gives the report both a starting point and a goal. Here are some examples of purpose statements:

- The purpose of this report is to show monthly and year-to-date sales by sales representative, compare this year's numbers to last year's, and flag representatives whose sales figures do not meet company standards.
- The purpose of this report is to show sales activity for each item in inventory, and to suggest reorder quantities based on that activity.
- The purpose of this report is to calculate bowling averages and handicaps for each member of the bowling league.

Clarifying the purpose of the report before you start is a critical step in the overall process. A report without a clear purpose is like a meeting without a clear agenda; it rambles and accomplishes little.

Readers

Who is going to read the report?

A single report is often used by many individuals. A detailed, company-wide sales report, for example, may be used by sales representatives, the regional sales manager, the national sales manager, and the Chief Operating Officer (COO).

Each of these individuals will be interested in different aspects of the report.

- A sales representative will use the report to evaluate individual sales performance and compare this performance to that of other representatives in the region.
- The regional sales manager will use the report to evaluate regional representatives and compare the region's performance to that of other regions.
- The national sales manager will use the report to evaluate the performance of regional managers and compare overall sales to the current sales forecasts.

- The COO will use the report to evaluate the performance of the Vice President of Marketing and the sales department as a whole, and to project such things as manufacturing needs, warehouse locations, etc.

Since each user of the report has different interests, it is important to plan the report so it includes the information each of the users is looking for.

Title

What is the report title going to be?

Write out a working title for the report. You may decide to change it later, but at least you will have a title to use when creating the prototype report.

Do you know the data you want to use in the report?

Do you know the type of database you are reporting from? Will you be reporting off a data file, SQL/ODBC, or a dictionary?

If you do not know, ask an internal source for the database type and location of the data and to set you up with access to that database if necessary. See *Data Sources*, Page 579.

Are you familiar enough with the data to find the necessary information? When looking for a Customer Contact name, can the field be found in a database table?

If not, your MIS professional, database administrator, or co-workers will have to help you become familiar with the data.

Header information

What information do you need besides the title to identify the report?

You may wish to include the current date, information on who prepared the report, a block of text to describe the purpose of the report, the range of data covered, or something similar. If you are going to include such information, write it down so you can use it in preparing your prototype.

Header information sources

Where will the header information come from?

The information can come from a variety of sources, depending on the kind of information you plan to use.

- The current date can be inserted using the PRINT DATE FIELD command on the Insert | Special Field Menu.
- Information on who prepared the report might be drawn from individual data fields in the database table(s) used. If it is to be drawn from a database table, what table? Or, what combination of tables?
- A block of text can be created as a text object and placed anywhere on the report.

As you begin to think of where the information is to come from, you begin formally structuring the report.

Data types in the header

If the information exists in a database, what types of fields contain the data: number, text, etc.?

Seagate Crystal Reports uses different rules for working with different types of data. You will find it helpful later if you note the data type of each piece of data you plan to draw from a database.

Footer information

What identifying information do you want to appear at the bottom of each page (page number, page *n* of *N*, report name, author's name, the word "Confidential")?

Footer data sources

Where will the footer information come from?

As with Report Header data, the information for a Report Footer can come from a variety of sources, depending on the kind of information you plan to use.

Data types in the footer

If the footer information exists in a database table, what type of fields is the data stored in: number, text, etc.?

Report body data

What specific data should appear in the body of the report?

When you think of a report, it is probably the body of the report that first comes to mind. The body should contain all the data needed to fulfill the statement of purpose you wrote for the report. It should also contain all of the data needed by the various users that you have identified.

Body data sources

Where will the report body data come from?

This step requires you to look at the available database table(s). Seagate Crystal Reports allows you to combine data from different databases when you create reports, so you have a great deal of flexibility in your work.

- Much of the data in a typical report is taken directly from data fields. Which data fields will be used, and where are they located?
- Other data will be calculated based on data fields. Which data fields will be used in the calculations?
- Still other data will be placed directly into the report using text objects (headings, notes, labels, etc.).

Existing or calculated?

Does the data exist in data fields or does it need to be calculated from data field values?

Some report information can be drawn directly from data fields (sales information, for example); other information will have to be calculated based on data field values (for example, sales commission, based on the

relationship of sales to quota). In your planning, it can be helpful to segregate or flag data that needs to be calculated from that which can be used directly. See *Introduction to Formulas*, Page 291.

Data types in the body

What types of fields contain the data: number, text, etc.?

While it is important to understand data types for all the data you will be using, it is of critical importance that you know the data type for data fields that will be used in calculations. Functions and operators work with specific kinds of data, so it's important to know the data type to know which functions and operators you can use in your calculations. Search for *Functions Index* and *Operators Index*, or for the function or operator by name in Seagate Crystal Reports online Help.

Record or group selection

Do you want the report to be based on all records or groups in the database or only on specific records or groups?

Seagate Crystal Reports gives you the opportunity to base a report on all records in a given database, or on a limited set of records from the database. Seagate Crystal Reports can be used to select records based on simple date ranges or comparisons, or to create complex formulas to identify the records to be included. Take a few minutes to determine the records needed for the report and list the criteria to be used for selecting those records. See *Record and Group Selection*, Page 227.

Groups

Do you want the data organized into groups? How? By customer? By date? Or by other criteria? Seagate Crystal Reports provides several options for grouping data in a report. See *How to group data*, Page 258.

Group values

Do you want to show a subtotal at the end of each group? A count? An average? Seagate Crystal Reports allows you to specify several kinds of group values. See *How to summarize grouped data*, Page 262, and *How to subtotal grouped data*, Page 264.

Group value positions

Where should the group values appear? With the group data? With the group data, but on a page separate from other groups? Only at the bottom of the page?

Seagate Crystal Reports provides all of these options.

Grand totals, subtotals, averages, etc.

Do you want to total, average, count, or determine the maximum or minimum value included in all the values in any column on the report?

Seagate Crystal Reports allows you to do this and also allows the grand total (or the grand total average, grand total count, etc.) to be placed at the bottom of the selected column.

Flags

What information, if any, should be flagged on the report?

You may want to call attention to some data by flagging it on the report. For example, non-moving inventory items are often flagged on inventory reports so they can be given special attention. You might want to flag each item that has shown no activity during the last month, during the last three months, or during some other defined period. So, to flag information, identify it and any conditions that will trigger the flagging.

Flag options

How do you want it flagged?

You may want to flag items with an asterisk or some other symbol, or you may want a word to appear as a flag. In any case, you should write out flagging instructions so they are handy.

Highlights

What information do you want highlighted in some way that makes it really stand out?

Seagate Crystal Reports gives you the opportunity to underline report elements, and change the font type, size, or color used for specific report items. It allows you to put borders around items and to draw lines and boxes (to break the report into sections), set off headings, etc. All of these formatting tools can be used to highlight key data on a report. If you have data that you want highlighted, you should write down highlighting instructions so they are handy too. See *Formatting*, Page 209.

Sorting

Do you want the data sorted based on record or group values?

Seagate Crystal Reports gives you both alternatives. See *Sorting*, *Grouping*, and *Totaling*, Page 245.

Developing a prototype on paper

Graphic designers generally begin working on a magazine cover, brochure, or display advertisement with a rough pencil sketch. They often use boxes, circles, or other symbols to represent the graphic elements they intend to include in the final product, and they often use lines or scribbles to represent text. Doing the rough design on paper helps them create a look for each page. It helps them find a balanced way of positioning the various elements before they begin working with sophisticated graphics tools. You will find a similar exercise helpful in designing reports. See *How to design a paper prototype*, Page 93.

While a paper prototype is useful regardless of your level of expertise with Seagate Crystal Reports, it is particularly valuable when you are first learning the program. With the paper prototype in hand, you can put your full effort into learning and using the commands, rather than into trying to design and learn at the same time.

How to design a paper prototype

- 1 Get paper of the size you will be using for the finished report.
- 2 Position the title and other descriptive header information, using boxes or lines to represent report elements.
- 3 Position the footer information.
- 4 Review the page layout for balance.
- 5 Look at the information you intend to include in the body of the report.
 - Count the number of fields being used and estimate the appropriate spacing between fields.
 - Use rectangles to pencil in the fields within the estimated spacing.
 - Change the spacing if you need to.
 - Decide on a logical sequence for presenting the data in the body of the report.
 - Label the fields to indicate that sequence.
- 6 Use small boxes to indicate group values and totals.
- 7 Place random flags in the column where you want flags to appear.
- 8 Darken any elements you want highlighted to make them stand out from the rest of the prototype.
- 9 Review the finished product for layout and balance, and make changes as needed.

Concepts in reporting

The purpose of this section is to give you a conceptual understanding of the tasks necessary to create a fairly standard report. Each topic is discussed in relation to the Tutorial; please refer to *Tutorial - Customer List, Page 147*, throughout for an illustration of these concepts.

The concepts are presented in the order you might use to create such a report and directions to sources of additional information will be provided.

Report creation options

Each time you create a new report, you have four options:

1. use a Report Expert,
2. use another report as a template,
3. import a pre-existing report from another application, or
4. create a Custom Report from scratch.

You will probably use all the options at some time.

REPORT EXPERTS

The Report Experts help create reports as quickly as possible and many new users and developers alike prefer to create the majority of their reports using them. All you have to do is choose the Expert that most closely matches your report type. The Expert walks you through the process of creating reports step-by-step.

You can quickly create the report and see how it looks against the actual data. And best of all, if you then decide to make changes, you can get back to the Report Expert to further modify the report. Search for *Experts Index* in Seagate Crystal Reports online Help.

ANOTHER REPORT

To build a new report based on one that already exists, another report can be used as a template. The program makes a duplicate of the original report, which can be modified to create a new report. Use this option whenever you think templates can save time. Templates are useful to:

- create a new report with a different grouping or different record selection than that of an existing report,
- create a series of reports, each a little different than the last,
- reconstruct a report based on an earlier time period using the same report structure used today, or
- create an entirely new report based on a set of databases that are linked in another report. You can create a report and delete the fields without disturbing the underlying links. Then, without relinking, you can build all your new reports based on this report.

IMPORTED REPORT

With Seagate Crystal Reports, you now have the option of importing an ASCII text report and converting the text report into a Seagate Crystal Report. For example, you could import and convert a report created and saved as a text (.txt) file. You could then use Seagate Crystal Reports' improved data manipulation and report generation capabilities to enhance the converted report. The importing process requires that the

original report be saved as an ASCII text file. For more information, see *Document Import Tool, Page 433*.

CUSTOM REPORT

The *Custom* option is used to create a report from scratch. This is useful when you want the full flexibility and control of building a report from the ground up, or when a report type is different from the many report types available in the Experts.

The *Custom* option was chosen for the *Tutorial - Customer List, Page 147*, because the process of creating a report from scratch most fully illustrates the basics of reporting.

Selecting the report data

The next step in creating a report is to select the data to use in the report. This is a two step process. The first step is to determine what type of data you want to work with and the second step is to actually select the data. See *How to select data and begin creating a report, Page 101*.

Seagate Crystal Reports provides four different data types:

1. data file,
2. SQL/ODBC,
3. dictionaries, and
4. queries.

DATA FILE

Choose the *Data File* option to report on any of the standard (not client-server) PC databases. These are typically databases whose data and all software used to access that data are on a single machine. Seagate Crystal Reports can access many of the most common PC database formats directly; the program has built-in capabilities to directly open database files and tables designed in dBASE, FoxPro, Clipper, Btrieve, Paradox, and Microsoft Access, among others. Once the program is installed on your system, you can immediately begin creating reports based on these databases simply by selecting the appropriate file. See *Data Sources, Page 579*.

The *Data File* option was chosen for the *Tutorial - Customer List, Page 147*, because the sample data, *xtreme.mdb*, is a Microsoft Access database.

SQL/ODBC

Choose the *SQL/ODBC* option to use SQL or ODBC data sources.

- Structured Query Language (SQL) databases are perhaps the most popular and most powerful database formats. They usually work over a client/server network architecture and use:

- an SQL server to create, store, and manipulate database files, tables, fields, and records, and
- an SQL client interface, allowing workstation users to retrieve data.

See *Using SQL and SQL databases*, Page 535.

- Open Database Connectivity (ODBC) is a standard developed by Microsoft through which many different types of data can be accessed by a single application. An application need only communicate with one set of files, ODBC, to instantly be able to work with any source of data that can be accessed by ODBC. For more information, see *ODBC data sources*, Page 601.

Seagate Crystal Reports provides direct drivers for many of the most popular SQL systems, and ODBC capabilities as well.

DICTIONARIES

In many large organizations, data is stored in a variety of places. It may be in different databases, on different servers, and so forth. IS departments often use naming schemes for tables and fields that are logical and predictable, but the names assigned may seem cryptic to non-technical staff. Enabling staff to create reports themselves in such an environment can create extensive training and support problems and possibly compromise data integrity. Dictionaries provide a solution to these problems. They allow you to provide your staff with ready access to the data in a form that they can understand, but they also allow you to maintain complete control and security over your data resources.

A dictionary is a structured, simplified, and secure view of organizational data that you can create for some or all of the users in your organization.

A dictionary is an optional metalayer that you can place between the user and the data. Using the capabilities of the metalayer you can:

- design a single, dynamic view of all the data that is necessary to create organizational reports and queries,
- include multiple data sources, tables, and links,
- organize the data and rename tables and fields to make it easier for users to understand the content and purpose of the data,
- limit access to specific columns of data (for example, letting only executives see the salary column of the employee data files),
- place restriction formulas on specific rows of data (for example, allowing managers to view employee information only for those employees with a salary under \$40,000), and

- create complex data manipulation formulas that users can access without the need to understand formula concepts.

Dictionaries reduce support cost and time, increase user productivity, and enable you to add an additional layer of security between the user and the data.

NOTE: *When a dictionary is used to create a report the only data used in the report is data accessed through the dictionary. You can not use a dictionary and some other data source in the same report. Because the dictionary is often used to impose data security, it would breach that security to allow unrestricted data access in a dictionary report.*

NOTE: *A subreport based on a different data source can be included in a primary report based on a dictionary.*

NOTE: *Dictionaries are an optional metalayer. Seagate Crystal Reports can be used without ever using dictionaries. See Dictionaries, Page 487.*

QUERIES

A query is a request for specific information from a database. If you are requesting that information from an SQL database (or from a database that you access via ODBC), the query must be written using the Structured Query Language (SQL). The SQL language is not difficult to learn, but mastering the fine points of creating and retrieving data using SQL can take quite a while. Since the SQL Designer eliminates the need to understand SQL, it can get you building effective queries right away.

The SQL Designer has been designed to meet the needs of individuals with little or no query background as well as the needs of experienced SQL professionals.

- If you are new to querying, you will enjoy the way the SQL Designer helps create queries, even if you have no knowledge of SQL whatsoever. By answering a few questions on a set of sequential tabs, you give the program all the information to generate a query that fits your needs.
- If you are an SQL professional, you will appreciate the facility that enables you to fine-tune the queries that the SQL Designer generates. If you are more comfortable writing your own SQL queries, you will find it easy to enter your queries directly or even paste them in from another source.

The SQL Designer can be a powerful tool for many of your information gathering needs.

NOTE: *The SQL Designer can only access data stored in an ODBC data source.*

Linking

If the report contains data from two or more database tables, they need to be linked at this point when creating reports. Database tables are linked so records from one database match related records from another. For example, if you activate a Suppliers table and a Product table, the databases are linked so that each product (from the Product table) can be matched up with the supplier (from the Supplier table) that made the product.

The majority of reports will probably require data from two or more tables, so linking will be necessary. The process of linking is made easy with the Visual Linking Expert. See *How to add and link multiple tables*, Page 104, and search for *Visual Linking Topics Index* in Seagate Crystal Reports online Help.

NOTE: *It isn't necessary to link tables in reports created from a query because any links required by the data have already been processed.*

Placing data on the report

Placing data on a report is a very important task. You need to know what type of data should be placed on the report and where on the report it should be placed.

DATABASE FIELDS

Much of the data placed on a report are database fields, displaying data as it is stored in the database. For example, in *Tutorial - Customer List*, Page 147, the Customer Name, City and Country fields are placed on the report. Normally, database fields will be placed in the Detail section, but under certain circumstances, they will be placed in other sections of the report. See *How to insert database fields*, Page 105.

TEXT OBJECTS

Text objects are used in reports for a multitude of purposes. They are a powerful way of inserting titles; labeling summaries and other data on your report; and of easily combining database fields. For example, in the *Tutorial - Customer List*, Page 147, text objects are used to easily display the two contact name database fields as one object, to insert a column heading for the concatenated contact name, and to insert a title in your report. For more information, see *How to insert text objects*, Page 108.

SPECIAL FIELDS

To display information such as Page Numbers, Print Date, and Report Comments use the commands on the Insert | Special Field Menu. See *How to insert special fields*, Page 106, and search for *Special Field commands* in Seagate Crystal Reports online Help.

FORMULA FIELDS

To display data that is a calculated value, you need to create a formula field and place that formula field on the report. For example, if the database only stores the order dates and ship dates for orders but you need to display the number of days it takes to ship the order, you must create a formula field that will calculate the number of days between ordering and shipping. This is just one example of the use of formula fields. See *Introduction to Formulas, Page 291*, for an introduction to formulas.

RUNNING TOTAL FIELDS

To display a total that evaluates each record and provides a running sum of all the values in a field (or all the values in a certain set of values), a running total field needs to be created and placed in the report. If the first three values in a field were 2, 4, and 6, a running total would print 2, and then 6 (the sum of 2 + 4), and then 12 (the sum of 2 + 4 + 6). See *Running Totals, Page 341*, for an introduction to running totals.

SQL EXPRESSION FIELDS

SQL expressions are like formulas, but they are written in Structured Query Language (SQL), not in the Seagate Crystal Reports formula language. An SQL expression can be used to query the database for specific sets of data. You can sort, group, and select based on SQL expression fields. See *The Crystal SQL Designer, Page 465*, for an introduction to SQL expressions.

Formatting data

At this point in creating a report, you may want to do some basic formatting. Perhaps you would like to change the font size and style of a text object used as a title. Or, if you have a number field, such as a sales figure, you might want to place a dollar sign before the number or change the number of decimal places displayed.

For example, in the *Tutorial - Customer List, Page 147*, you format the title, add a text object to identify the Contact Name information, and insert the company logo. See *Formatting, Page 209*.

Record selection

Record selection, the task of paring down the data to include only the data required for your report, is a crucial step in report creation. You will rarely want a listing of all the information in a database. Most often you will be interested in only the sales in a given time period or for a certain product, etc. For example, a sales report may be designed to only include sales from one product line for the last calendar month.

The sample data used for the *Tutorial - Customer List, Page 147*, has information from both United States and international customers. Record selection is used to create a report listing only customers in the United States. See *Record and Group Selection, Page 227*.

Grouping, sorting, and summarizing data

Once a basic report is created, you will want to organize the data by grouping related information, sorting individual records, summarizing, subtotaling, and grand totaling.

GROUPING RECORDS

To organize the data, you may want to group related data together. For example, in the *Tutorial - Customer List, Page 147*, after grouping the Customer List by region, you will divide the list into regional groups. That way, a sales manager for the California region could quickly locate the California group and focus exclusively on the customers within that region. See *How to group data, Page 258*.

SORTING RECORDS

Seagate Crystal Reports allows you to specify the order in which you want the records on your report displayed. For example, after grouping in the *Tutorial - Customer List, Page 147*, you sort the records within each region in alphabetic order by Customer Name. Many of your reports will use some type of sorting. Depending on the report, you will sort the records in a list or sort in conjunction with grouping. See *How to do a single field sort, Page 253*, and *How to sort records within groups, Page 260*.

SUMMARIES, SUBTOTALS, AND GRAND TOTALS

Many reports use some sort of totaling. For example, in a North American sales report grouped by state, you might want to calculate the total dollar amount sold in each state. You do this by creating a subtotal on the sales field. Summaries are also used at the group level, allowing you to calculate averages, counts, and other group (aggregate) values. For example, in a sales report you may want to calculate an average of sales per state (average summary on the sales field) and calculate the number of products sold in the state (distinct count of the product name field).

Beyond basic reports

Once you are comfortable with the basics of reporting, you will be ready to investigate the more powerful reporting features of Seagate Crystal Reports, including:

- charts (see *Charting, Page 369*),
- OLE objects (see *OLE, Page 403*),
- form letters (see *How to create a form letter using a text object, Page 200*),
- subreports (see *Subreports, Page 415*),

- cross-tabs (see *Cross-Tab Objects*, Page 443),
- multi-section reports (see *Multiple Section Reports*, Page 195),
- and much, much more.

HANDS-ON (Report Creation and Design)

How to select data and begin creating a report



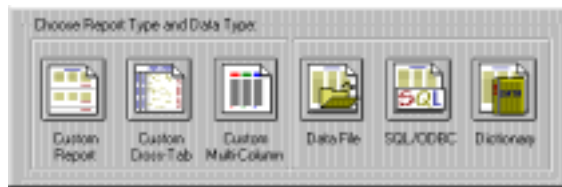
Experts help you create reports as quickly as possible. When you click the **NEW REPORT** button on the Standard toolbar, the Report Gallery appears. In the Report Gallery you will find a series of buttons representing the different types of Experts that are at your disposal.



Click the icon for the type of report you want to create and follow the steps outlined on the tabs in the Expert that appears.

- To build a new report based upon one that already exists, click the *Another Report* button. You can select a report file to serve as a template for the new report. The program makes a duplicate of the original report, which you can modify however you please. For more information, see *ANOTHER REPORT*, Page 94.
- To build a report based on an ASCII text report, click the *Document Import Tool* button. With this specialized reporting tool, you can easily convert a plain ASCII text report into a Seagate Crystal report. For more information, *Document Import Tool*, Page 433.
- To build a report from scratch, click the *Custom* button. Several Report Type and Data Type icons appear at the bottom of the Report Gallery. Click the report and data type appropriate to your needs.

The program opens a dialog box that allows you to select the data you need.



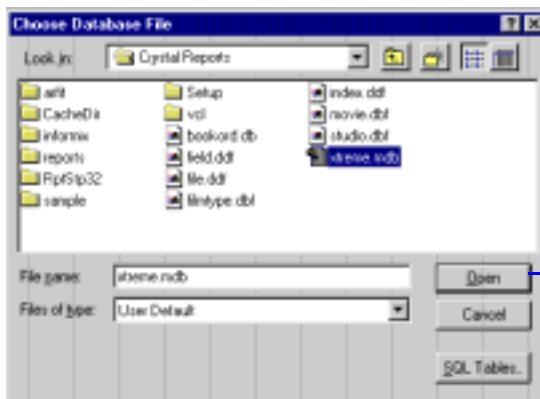
Since building reports from scratch is the easiest way to learn about all the powerful features of the program, this is the method discussed throughout the documentation.

NOTE: For the purposes of this tutorial, it is assumed that you are using the *xtreme.mdb* sample database provided with this version of Seagate Crystal Reports. If you are using another database, some of the dialog boxes shown here may differ from those that actually appear.

If you choose Data File as your data source...

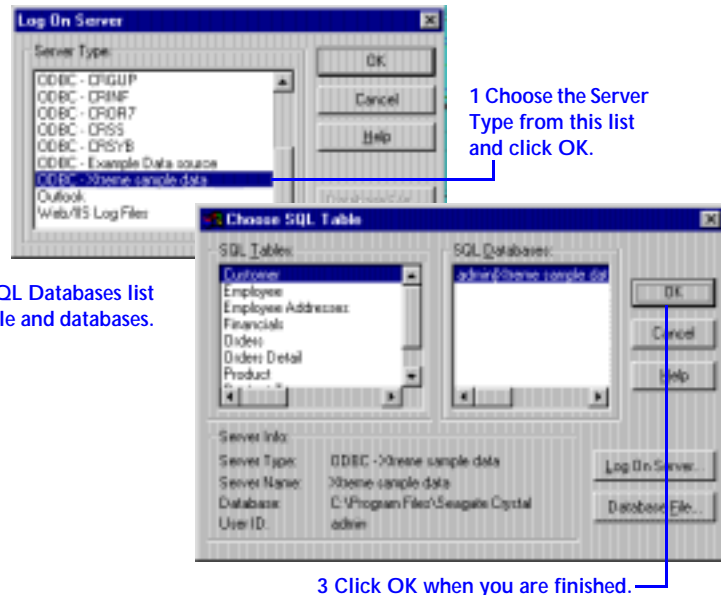
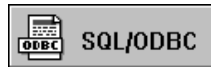


1 Use the File Name and Directories list boxes to select the desired file.



2 Click Open to add the file to your report.

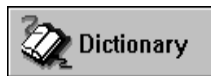
If you choose SQL/ODBC as your data source...



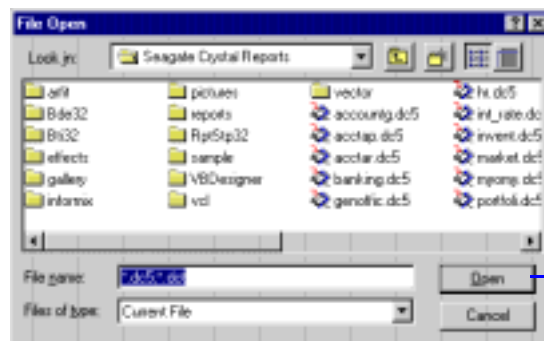
2 Use the SQL Tables and SQL Databases list boxes to select the desired table and databases.

3 Click OK when you are finished.

If you choose Dictionary as your data source...



1 Use the File Name and Directories list boxes to select the desired file.



2 Click Open to open the file and add it to your report.

Related Topics

Data Sources, Page 579

How to select a dictionary for a report, Page 504

How to add and link multiple tables

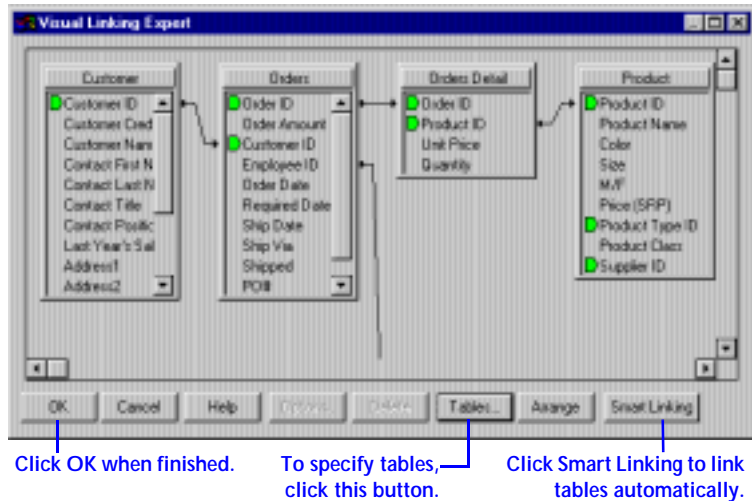
After you have selected a database table to begin working on the report, you may need to select a second table and then link the tables so that the records in each table match up. For example, if you are using a Customers table and an Orders table for the report, you will need to link the tables so the records in the Orders table are matched up with the records of the customers who placed the orders.

- 1 Choose the **ADD DATABASE TO REPORT** command from the Database Menu. The Choose Database File dialog box appears.
- 2 Use the *Directories*, *Drives*, and *File Name* boxes to select the new database you want to use in the report.
- 3 Click *OK* when finished. The Visual Linking Expert appears and displays the databases currently available for linking. Search for *Visual Linking Expert* in Seagate Crystal Reports online Help.

NOTE: *If the Auto-Smart Linking option is toggled on in the Database Tab of the Options dialog box, you will not need to manually create links between the tables. See Linking tables, Page 513, and search for Options dialog box in Seagate Crystal Reports online Help.*

NOTE: *If the primary database is either Access or Btrieve, all tables contained in those databases will appear in the Visual Linking Expert. You do not have to manually add each table to your report.*

To create links manually, drag a field from one table to a field in another table. If successful, a link line is created. If unsuccessful, a message is issued.



NOTE: When manually creating links, the field you are linking “to” must be an indexed field. For more information on indexed fields and tables, see *Indexed tables*, Page 511.

The Visual Linking Expert closes, and you are returned to your report. The linked databases are now available for use in your report. If you are not satisfied with the link, you can modify it using the Visual Linking Expert. Search for *Visual Linking Topics Index* in Seagate Crystal Reports online Help.

Related Topics

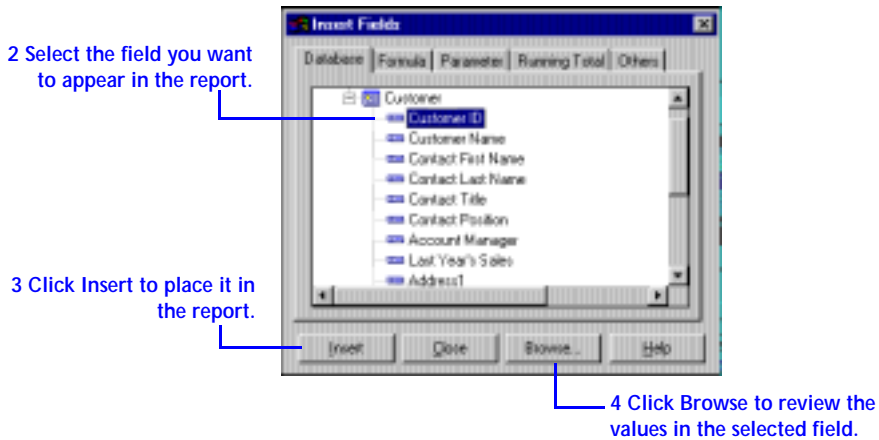
Working With Databases, Page 507

SQL join types (ODBC data sources), Page 527

How to insert database fields



- 1 Click the INSERT FIELDS button on the Standard toolbar. The Insert Fields dialog box appears with the Database Field Tab active, listing all the fields in the chosen database(s). To speed the report building process, this dialog box remains on-screen until you click CLOSE. You can move this dialog box wherever you wish.

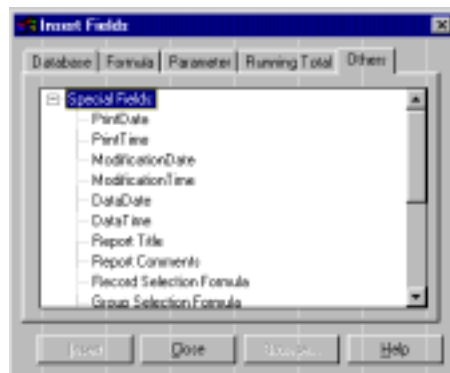


How to insert special fields

Seagate Crystal Reports allows you to easily insert Page Number, Record Number, Group Number, Print Date, and Total Page Count fields, among others, into your report.

There are two ways to insert special fields:

1. click the INSERT FIELDS button on the Standard toolbar and click on the Others Tab, or
2. choose the SPECIAL FIELD command from the Insert Menu. The Insert Fields dialog box appears with the Others Tab active. Search for *Special Field commands* in Seagate Crystal Reports online Help.



Each special field is inserted into the report as an object. An object frame appears. You can now place it on the report.



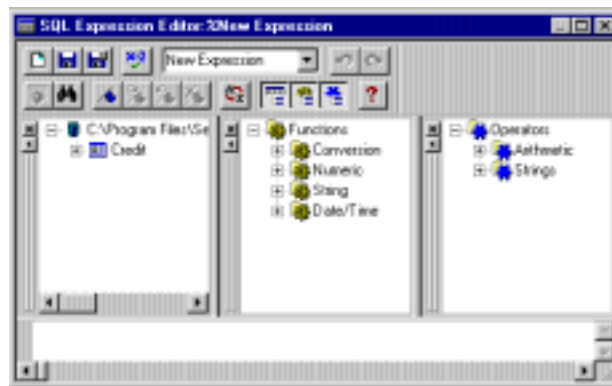
NOTE: To change the formatting of an inserted object, click the object to select it and click the **OBJECT PROPERTIES** button on the **Supplementary** toolbar. The **Format Editor** appears where you can make the desired changes. See *Formatting*, Page 209.

How to create an SQL expression field

An SQL Expression field is similar to a Formula field. An SQL Expression field uses the SQL syntax instead of the Crystal Reports Formula language used in a Formula field. SQL Expression fields can be used in much the same way as a Database field. It is possible to sort, group, and base record selection on them. SQL Expressions are always evaluated on the server.

When an SQL/ODBC data source is used to design a report, the program adds a sixth tab to the Insert Fields dialog box - the SQL Expressions Tab. This new tab allows SQL expressions to be entered in the Insert Fields dialog box and then inserted into a report quickly and efficiently.

- 1 With the SQL Expressions Tab active, click **New**. The SQL Expression Name dialog box appears.
- 2 Enter a name in the *New Name* text box, and then click **OK**. The SQL Expression Editor appears.



NOTE: The SQL Expression Editor functions in the same way as the Formula Editor. For a thorough discussion of these tools see *How formulas are created: an introduction to the Formula Editor*, Page 296.

- 3 Type the expression in the SQL Expression Editor.
- 4 Click *OK*.

How to insert text objects



- 1 Click the INSERT TEXT OBJECT button on the Standard toolbar. An empty object frame appears.



2 Position the text object where you want it to appear in the report.

- Click once on the border of the text object to select it for resizing and moving.
- Double-click inside the text object to select it for editing. The Design Tab ruler changes to a text object ruler sized to the length of the selected object. To the left, a tab indicator appears.



Left-aligned tab.



Right-aligned tab.



Center-aligned tab.



Decimal-aligned tab.

Drag to set the left margin.

Drag to set the right margin.



Once you have chosen the desired tab, click the position on the ruler where you want to insert it.

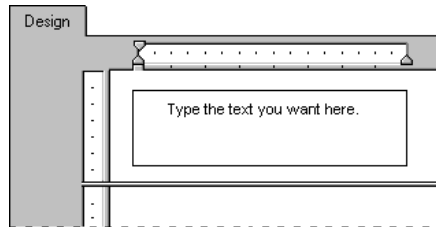
The ruler allows you to add indents and align text within the text object. By clicking the tab indicator, you can cycle through the four tab options available.

NOTE: When you first insert the text object into the report, the object is automatically selected for editing.

How to use a database field in a text object

The primary function of a text object is to hold text. However, text objects can hold database fields as well, making them ideal for creating custom form letters.

- 1 Insert a text object in the report.



2 Type in the text and spaces you want to appear before the first database field (if any).



- 3 Click the INSERT FIELDS button on the Standard toolbar. The Insert Fields dialog box appears with the Database Tab active.
- 4 Highlight the database field to be inserted and drag it into the text object. As you move the Drag and Drop cursor over the text object, the program displays a movable insertion point. See *Cursors*, Page 54.



5 Drag the object to the insertion point where you want the database field to appear, and then Drop the field.

How to insert a picture

When designing reports, there will be times when you want to include a picture. For example, you may wish to put a company logo in the report header.



- 1 Click the INSERT PICTURE button on the Supplementary toolbar. The Open dialog box appears.
- 2 Select the desired picture file from the file list and click *Open* to return to the report. An object frame appears with the picture inside, ready to be positioned.

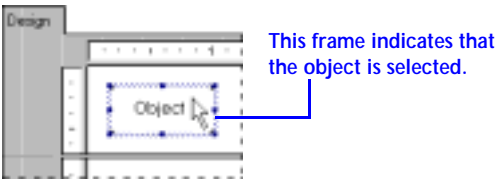


3 Position the picture object at the point where you want it to appear in the report and right-click once.

How to select, move, and resize objects

Selecting objects

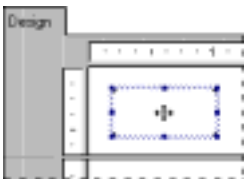
Select an object by clicking it once. An object must be selected in order to change the font, move the object, etc. When you select an object, sizing handles appear around it.



Moving and resizing objects

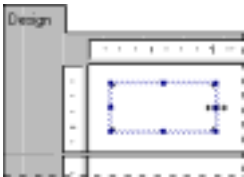
Once an object is selected, you can then tell the program what to do with it. For example, you can move or resize an object as follows:

To move an object...



Press and hold the left mouse button to activate the Move cursor and drag the object to the desired position.

To resize an object...



Drag the handles of the frame to change the size of the object.

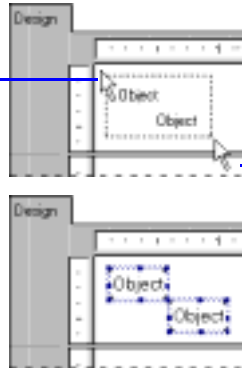
Selecting multiple objects

Seagate Crystal Reports allows you to select multiple objects using the marquee selection technique.

1 Position the mouse pointer above and to the left of the objects you want to select.

2 Drag the selection rectangle to the bottom right of the objects, surrounding them completely.

When the mouse button is released, the rectangle disappears and object frames appear around the selected objects.



Once the objects are selected, you can move them as a group.

NOTE: *Objects can be moved over (across) other objects without affecting the placement of the objects beneath.*

Fields can also be moved between sections, with the following exceptions:

- grand totals can only be moved within the Report Footer section or to the Report Header section, and
- a subtotal or summary can be moved only within its originating section or to the header of its originating section.

Related Topics

Formatting concepts, Page 210

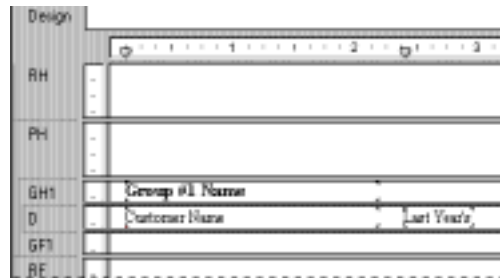
How to make an object underlay a following section(s)

In this example you will make the Xtreme logo (Xtreme.bmp) underlay multiple sections. This is a procedure similar to the procedure for inserting a company watermark to serve as a report background.

To make an object underlay a following section, first place the object in the section above the section you want it to underlay. Then toggle the *Underlay Following Sections* option on in the Section Expert for the section in which the object was placed.

CREATING A SIMPLE REPORT

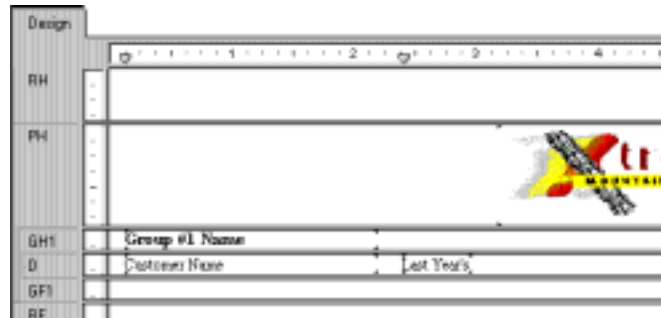
- 1 To get started, create a report using the Customer table in xtreme.mdb (located in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports,(32-bit), or the directory in which the program resides).
- 2 Place {customer.CUSTOMER NAME} and {customer.LAST YEAR'S SALES} side-by-side in the Details section of the report. To eliminate unnecessary objects in this example, delete the field titles that the program places in the Page Header section for each field.
- 3 Break the data into regional groups. To do this, choose the GROUP command from the Insert Menu and select {customer.REGION} as the sort and group by field.



INSERTING A PICTURE




- 1 Click the PICTURE button on the Supplementary toolbar.
- 2 Choose the picture file Xtreme.bmp (located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports (32-bit), or the directory in which the program resides) and place it in the Page Header section, to the right of the report body.



NOTE: In this example, the picture is placed to the right of the fields because it is not meant to underlay the text. When you are working with a watermark, a subdued picture designed to be nearly invisible, place it directly above the text.



- Click the PRINT PREVIEW button on the Standard toolbar. Note that the picture prints first (entirely in the PH section) and then the body of the report follows. Return to the Design Tab when finished previewing.

Design		Preview
RH		
PH		
GHT		
D	S&B Mountain	44,321.15
D	Tortuga	\$8,520.42
D	Platoon Sport	18,394.55
GFT		

UNDERLAYING THE FOLLOWING SECTION(S)



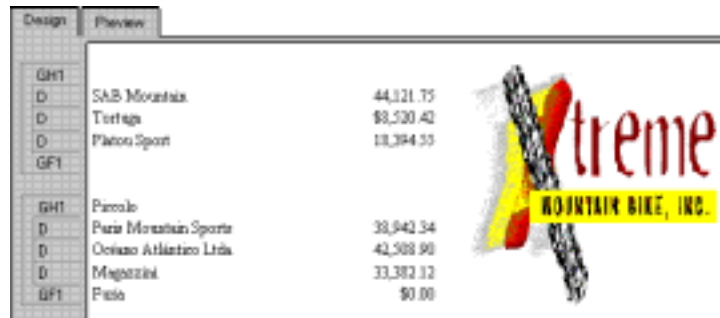
- Click the SECTION EXPERT button on the Standard toolbar. The Section Expert appears.
- Select the Page Header section and toggle the *Underlay Following Sections* check box on. See *Types of formatting properties*, Page 211.
- Click OK and preview your work again. Note that now the picture prints in the Group Header and Details sections, next to (instead of above) the text in the body of the report.



Design		Preview
GHT		
D	S&B Mountain	44,321.15
D	Tortuga	\$8,520.42
D	Platoon Sport	18,394.55
GFT		

NOTE: Placing the picture to the right of the body of the report, as you did here, is the same technique you would follow if you wanted a chart or an employee picture to print beside the details that pertain to the chart or to the employee.

- 4 Return to the Design Tab and resize the object vertically so that it is two or three times bigger, and then preview the report again. The bitmap now underlays more sections.



The area the picture underlays is determined by:

- its size,
- the section in which it was placed originally, and
- its position in the section.

By modifying size and placement of an object, you can create many stunning visual effects using the underlay capabilities.

Pre-printed forms

If you print on pre-printed forms, you may be able to:

- scan a form,
- place it in the report as a bitmap,
- use the underlay capability to line up the bitmap and report and move objects anywhere you want them, and
- eliminate the need to print the forms separately by printing your report and the form as a single unit.

How to hide parts of a report

There are a number of properties you can set to prevent particular parts of a report from printing.

Hiding sections

Seagate Crystal Reports has three properties you can set in the Section Expert to hide report sections.



1. **Hide (Drill-down OK)**

The *Hide* property hides a section whenever you run the report. For example, in a summary report, the *Hide* property can be used to display only the summaries, but not the details behind the summaries. When the *Hide* property is applied to a section, it becomes visible when the Drill-down cursor is used to drill-down on the section contents. This property is absolute; it can not be applied conditionally with a formula. For more information about drilling-down, read about the Drill-down cursor in *Cursors, Page 54*).

2. **Suppress (No Drill-down)**

The *Suppress* property also hides a section when you run the report. Unlike the *Hide* property, however, you can not apply the *Suppress* property and then drill-down to reveal the section contents. This property can be applied absolutely, or conditionally by using a formula. This can be useful for writing form letters. For example, in a form letter you might create two details sections - one to suppress when sales are over \$X and one to suppress when sales are less than \$X.

3. **Suppress Blank Section**

The *Suppress Blank Section* property hides a section whenever there is nothing in it. If something is placed within the section, then it remains visible.

Hiding objects

Seagate Crystal Reports has three formatting options in the Format Editor for use in hiding individual objects.

1. **Suppress If Duplicated (Common Tab)**

The *Suppress If Duplicated* option prevents a field value from printing if it is identical to (a duplicate of) the value that comes immediately before it. The value does not print but the space in which it would have printed remains.

Cust ID	Orde
1	100.00
1	157.00
1	0.00
1	10.00
5	146.00
5	0.00
7	153.00
7	0.00
7	186.00

→

Cust ID	Orde
1	100.00
	157.00
	0.00
	10.00
5	146.00
	0.00
7	153.00
	0.00
	186.00

Duplicated values are suppressed and do not print.

2. **Suppress If Zero (Number Tab)**

The *Suppress If Zero* option prevents a value from printing if it is a zero value. The value does not print but the space in which it would have printed remains. To remove the blank space, toggle the *Suppress Blank Section* option on in the Section Expert.

NOTE: This will only work if there are no other objects in the section.

Cust ID	Orde	
1	100.00	
	157.00	
	0.00	
	10.00	
5	146.00	
	0.00	
7	153.00	
	0.00	
	186.00	

→

Cust ID	Orde	
1	100.00	
	157.00	
	10.00	
5	146.00	
7	153.00	
	186.00	

The zero values are suppressed and do not print.

NOTE: Use the Section Expert to eliminate blank lines in this situation, and toggle the Suppress Blank Section option off for the section that the field is in. This will eliminate the lines as long as there are no other objects in the section.

3. Suppress (Common Tab)

The Suppress option hides an object when you run the report. It is common, for example, to apply this property to formulas that are needed to do some report calculations but that you do not want to print when you run the report. When this property is toggled on, the selected object will not print.

Product ID	Unit Price	SRP
1101	4.00	6.67
1102	8.00	13.33
1103	13.00	21.67
1104	2.00	3.33
1105	11.00	18.33
1106	16.00	26.67
1107	7.00	11.67
1108	4.00	6.67
1109	12.00	20.00

→

Product ID	SRP
1101	6.67
1102	13.33
1103	21.67
1104	3.33
1105	18.33
1106	26.67
1107	11.67
1108	6.67
1109	20.00

The object is invisible and will not print.



NOTE: You can click the Conditional Formula button for any of these properties and create a formula that will make the setting conditional on some event. See Conditional formatting, Page 212.

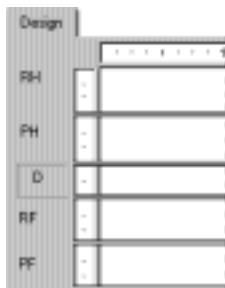


To set these properties, highlight the object, click the OBJECT PROPERTIES button on the Supplementary toolbar and set the property in the Format Editor when it appears.

HANDS-ON (Finishing Your Report)

How to use page headers and footers

You can use page headers and footers by placing the information in the Page Header or Page Footer sections of the Design Tab.



- Information to appear only on the first page of the report goes in the Report Header (RH).
- Information to appear only on the last page of the report goes in the Report Footer (RF).
- Information to appear at the top of every page goes in the Page Header (PH).
- Information to appear at the bottom of every page goes in the Page Footer (PF).

Text, fields, or formulas can be used in these sections just as in the Details section.

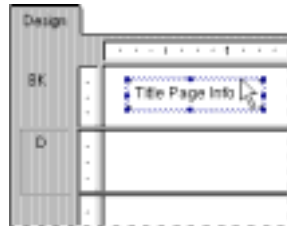
Related Topics

How to create a footer that appears on all pages but the first, Page 221

How to add a title page to the report

Seagate Crystal Reports provides a quick, easy way to add a title page to a report by selecting *Report Title* on the Others Tab of the Insert Fields dialog box. In order to use this field, you must have a title entered in the Summary Tab of the Document Properties dialog box. See *How to add summary information to the report, Page 119*.

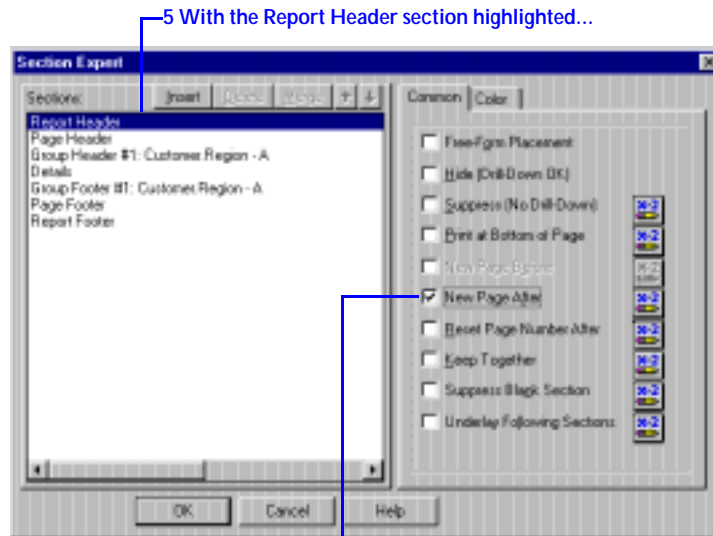
- 1 Choose the INSERT SPECIAL FIELD command from the Insert Menu. The Insert Fields dialog box appears with the Others Tab active.
- 2 Select *Report Title*, and click *Insert*. An object frame appears when the cursor is moved over the report.



3 Move the object frame to the Report Header section and click once to place the frame.



- 4 With the report title highlighted, click the SECTION EXPERT button on the Standard toolbar. The Section Expert appears.



...toggle the New Page After option on.

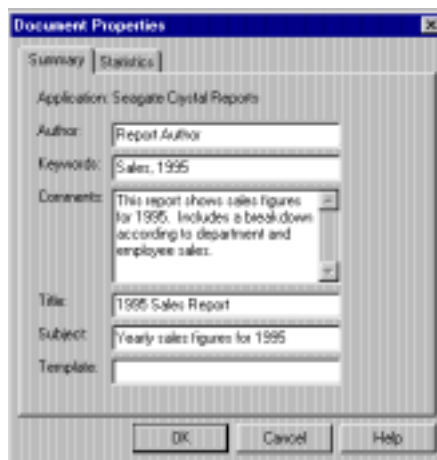
Now the title will appear on the first page and the report will begin on the second page.

How to add summary information to the report

There may be times when you want to include non-printing comments with a report (a personal note to the report recipient, a note to explain more thoroughly the data on which the report is based, a report title, a comment about some particular data on the report, etc.).

The SUMMARY INFO command on the File Menu provides a facility for including anything from a short note to hundreds of lines of text with your report. The comments do not print with the report; they remain in the Summary Tab of the Document Properties dialog box where they can be reviewed on demand. Search for *Document Properties dialog box* in Seagate Crystal Reports online Help.

When you choose the SUMMARY INFO command, the Document Properties dialog box appears with the Summary Tab active.



Enter the desired information and click OK when finished to return to your report.

Related Topics

How to add a title page to the report, Page 117.

Search for *Report Title command* in Seagate Crystal Reports online Help.

Search for *Report Comments command* in Seagate Crystal Reports online Help.

Search for *Special field commands* in Seagate Crystal Reports online Help.

6

Printing, Viewing, and Exporting

What you will find in this chapter...

Printing considerations, Page 122

Design solutions for printing/distributing, Page 123

Report creation checklist for distributed reports, Page 131

Updating printer drivers, Page 131

Report distribution, Page 132

Compiled reports, Page 132

HANDS-ON (Exporting a Report), Page 133

HANDS-ON (Viewing reports with a web browser), Page 141

Printing considerations

When printing, inconsistencies may occur if different printer drivers are used to create and print your reports. These inconsistencies are a result of the varied methods that individual printer drivers use to measure text metrics, such as font size. When printed, text-based objects may be misaligned, cut-off, or overprint each other. Examples of text-based objects include string or character fields, text objects, memo fields, numeric fields, and formula fields.

Problems such as these may arise when you have:

- Two **identical** printers, but each one is using a **different printer driver**,
- Two **different printers** using the **same printer driver**,
- Two **different printers** using **different printer drivers**,
- One **printer driver** that uses the **TrueType font** and a **second printer driver** that **maps TrueType fonts** to PostScript fonts,
- Two **identical printers** using the **same printer driver**, but each one is printing from a **different version of Microsoft Windows**,
- Two **identical printers** using the **same printer driver**, but the printer drivers are **different versions**, or
- Two **identical printers**, two **identical printer drivers**, and two **identical operating systems**, but the **resolution** of the video drivers are **different**.

Therefore, while a document using one printer driver may require six full lines to display a block of text:

- using a second printer driver that measures fonts narrower could result in the same block of text requiring **less** than six full lines, or
- using a third printer driver that measures fonts wider could require **more** than six full lines.

For the most part, this situation can't be avoided. The goal of the report distributor is to design reports that accommodate printer driver dependency and still print consistently using different printer drivers. To do this, Seagate Crystal Reports provides several design solutions. If taken into account when creating your report, these solutions can ensure proper printing and distribution for your report in almost any environment.

Design solutions for printing/distributing

NOTE: Before using the techniques outlined in this section to reformat a report, please read *Updating printer drivers*, Page 131.

There are several things to keep in mind when designing reports that will be distributed in different environments. For the best results, consider the following:

- *Spacing within text-based objects*, Page 123
- *Placing text-based objects*, Page 124
- *Placing multi-line, text-based objects*, Page 126
- *Section characteristics*, Page 127
- *TrueType fonts*, Page 127
- *Video resolution*, Page 128
- *Specific margins*, Page 128
- *Default printer*, Page 128
- *Free form placement*, Page 129

Spacing within text-based objects

While it is recommended that you have the *Free Form Placement* option toggled on (see *Free form placement*, Page 129), spacing text-based objects evenly in the free form environment can be somewhat tricky.

To align text objects, there are two features to assist you:

1. the grid, and
2. the guidelines.

USING THE GRID

Each section of a report contains a design grid. It can be toggled on/off and set to different sizes as needed (see *How to turn the grid on/off*, Page 76). Once set, the grid remains the same size for all sections. It is measured from the upper left hand corner of each section and continues down and to the right until the end of the section. A new grid of the same size then begins from the upper left hand corner of the next section, and so on, through the end of the report.

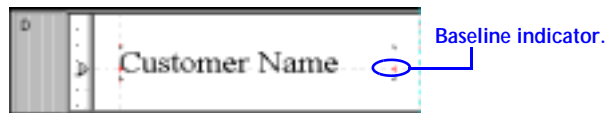
Seagate Crystal Reports gives you the option of snapping objects to the grid. When you toggle the *Snap to Grid* option on using the Layout Tab of the Options dialog box:

- The upper left corner of all newly placed text-based and OLE objects will snap to a grid point.

- Objects placed before enabling *Snap to Grid* will not snap to the nearest grid point. They will remain where they are.
- If you resize an object, the side (or sides) that you are resizing snap to the closest grid point.

USING GUIDELINES

Guidelines are used to line up objects. They too have a snap property that automatically snaps objects to them (see *How to move and position objects using guidelines*, Page 73). However, the snap property of guidelines works differently for text-based objects than other objects (OLE objects, for example). When a text-based object snaps to a guideline, it is the baseline of the text and not the object frame that snaps to the guideline. You can find the baseline of a text-based object by locating the special indicators positioned on either side of the object directly at the baseline.



To place several text objects of different font sizes on one line and have their baselines line up, snap them to a guideline at the baseline indicator.



Becoming familiar with the properties and functionality of the grid and guidelines will require some experimentation.

NOTE: If *Free Form Placement* is toggled off and you enable *Snap To Grid*:

- all objects will snap to the guidelines for vertical placement, and
- the left boundary will snap to both vertical guidelines and grid points.

Placing text-based objects

When a text-based object is placed on a report, the object is represented by an object frame. The height of the object frame is based on the height of the font. The width however, is determined differently depending on the text-based object you are working with.

- For database fields that are not memo fields, the width is initially determined by the width of the field as defined in the database, and by the average character width as provided by the selected font and font size.

For example, you have a database field called {customer.LAST NAME} and your database defines this field as a text field with a length of 35 characters. When you place this field on your report, the width of the boundary will be 35 times the average character width of the font and font size that the text-based database field is formatted to. Remember that this is the initial default boundary width. The width can always be resized to increase or decrease as you see fit.

- For text objects, the default width is approximately 17 average character widths wide. Text objects are different from database fields in that their width will automatically expand as you enter in text and/or database fields into the text object. Again, as with all other text-based objects, the width can be resized by the user.
- For different number fields (double, single, integer, long integer, and byte) the default widths are all different. Once again, as with all other text-based objects, the width can be resized by the user.

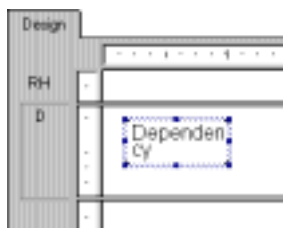
Whether the default widths are accepted or the text-based objects are resized, a problem could arise if the text inside the object prints right to the edge of the object frame. While the report may look fine on the machine it was designed on, when the report is printed using another printer driver that measures the font wider, the length of the text grows but the object frame remains fixed. This results in the text being truncated or cut off.

There are several ways to prevent text from being truncated:



1. Select the object and click the OBJECT PROPERTIES button on the Supplementary toolbar. Use the Common Tab of the Format Editor to toggle the *Can Grow* option on. The object is then formatted to print on multiple lines, so if the text prints wider than the object, the text will wrap onto additional lines.

NOTE: *This is not an effective solution for strings of text that do not contain spaces (such as single words) because, though the line will wrap, the text string will break at the edge of the object frame and then wrap (as in the screenshot below).*



2. Expand the object frame so that it is a little wider than the widest block of text that the object will contain. There are many times when the actual text in a database field is far less than the maximum amount the field can contain.

For example, a {table.LAST NAME} field is designed with a field size of 80 and the longest name in the database is 28 characters. In this case, when you first place the field in your report, the field will be 80 times the average character width. Reduce the width of the field, but not so much that it is just long enough to accommodate the longest string of text. Instead, make it a little wider in order to allow for growth.

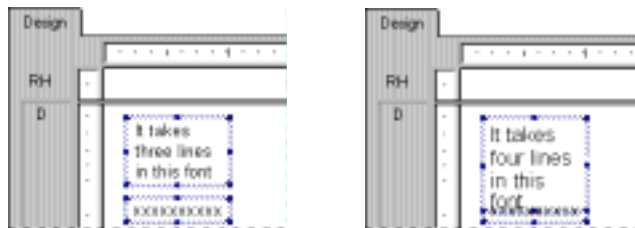
While each of these options offers an effective solution when dealing with a single text-based object in a section, there are still design considerations to take into account when placing more than one text-based object in a section. When sizing one object, you must consider its placement with regard to other objects in the section.

Avoid designing reports where the space between each object is very tight. Leave room for growth by expanding the width of the object by approximately 5%. Alternatively, you may consider reducing the size of the font.

Placing multi-line, text-based objects

While text-based objects that are formatted to print on multiple lines follow the same design rules as other objects, they have one additional characteristic that must be considered. If the printer driver expands or contracts the spacing of the text, word wrapping may differ, thus changing the number of lines necessary to print the object, in order to accommodate growth or shrinkage.

When placing multi-line, text-based objects, you could encounter problems if other objects in the same section are placed directly below them.



Unlike single-line, text-based objects, expanding the object frame of a multi-line, text-based object to accommodate possible growth is not a viable option. When you do this, the line width simply increases according to the expanded boundaries.

So, when possible, place multi-line, text-based objects at the bottom of a section. If they require more lines to print, the section will expand downward to accommodate the growth and they will not endanger other objects.

Section characteristics

A report consists of several sections, including the Report Header, Page Header, Group Header, Details, Group Footer, Page Footer, and Report Footer (see *Design Tab Areas, Page 57*).

Each report section is made up of a series of lines. When a text-based object is placed in a section, it is placed on a line in such a way that the text is aligned to the baseline. The line's height is then adjusted by the printer driver so that it is high enough to accommodate the object.

- If another text-based object is placed on the same line and its font size is **larger** than that of the first object, the line's height is extended to accommodate the second object.
- If another text-based object is placed on the same line and its font size is **even larger**, the line's height is extended once again to accommodate the third object.

A line's height will be determined by the text-based object with the largest font on the line.

As text-based objects are added to a report, either in the same section or other sections, line height is adjusted to accommodate the various fonts. Because this vertical (inter-line) spacing is determined by the printer driver, it becomes difficult to create reports designed for pre-printed forms when they may be printed in various environments.

It is recommended that you follow these guidelines when designing reports:

- always print a test page,
- keep all font sizes the same, and
- be sure to print pre-printed forms on the same machine.

TrueType fonts

Designing your report using printer-specific fonts may lead to problems when using different printers. The fonts may not be supported by the other printers or, while they are supported, they may not be installed on the printers.

When printing, if printer-specific fonts are encountered that the printer driver does not recognize, Seagate Crystal Reports substitutes the fonts, creating inconsistent results. In order to avoid this situation, it is recommended that only common TrueType fonts be used when designing reports.

Video resolution

If you have two identical printers, two identical printer drivers, and two identical operating systems, but the resolution of the video driver varies between machines, then the pagination of documents will be different.

Unfortunately, there is no way to create Windows documents that are immune to changing video driver resolutions. However, it is best to set your video resolution to 640 x 480 pixels when designing reports. A report designed using a coarse resolution (640 x 480 pixels) and printed on a finer resolution will not encounter as many formatting changes as a report designed using a finer resolution (800 x 600 pixels) that is printed on a coarser resolution (640 x 480 pixels).

Developing reports with your video resolution set at the most common and coarsest resolution will ensure that your reports will be the least sensitive to video driver settings.

Specific margins

Seagate Crystal Reports has the option of setting specific margins or using the printer's default margins (see *How to change margins*, Page 217).

Problems may arise if you choose to design your reporting using the default margins.

- When a report is printed in another environment where the printer's default margins are **greater** than its setting, the report objects on the right side of the report will print off the page.
- When a report is printed in another environment where the printer's default margins are **smaller** (allowing a larger printing area), the entire report will be moved to the left of the page.

It is recommended that you always set your own margins. Even if the margins you want to use are the same as the default margins, be sure that the *Use Default Margins* option in the Page Setup dialog box is toggled off, and you set your margins manually using the PRINTER SETUP COMMAND.

Default printer

In general, it is a good idea **not** to choose a specific printer. Even though the printer may be identical to the default printer, how the printer is recognized can still vary for different operating systems.

Consider the following example:

An HP Laser III printer is being installed on three different operating systems.

- With Windows 95 and Windows 98, the printer name can be changed so that HP Laser III is Front Reception Printer, but the printer driver will be listed as HPPCL5MS.DRV.
- With Windows NT, the printer name is also referenced and can be changed by the user, but the printer driver is always WINSPOOL.

- With Windows 3.x, the printer is recognized by the printer name, in this case HP Laser III, and the printer driver is HPPCL5MS.DRV.

If you select a specific printer, Seagate Crystal Reports will look for that printer by **name**. If the printer you selected can't be found, the default printer will be chosen, resulting in the possibility of printing inconsistencies.

When selecting a specific printer, such as a label printer or a printer dedicated to printing invoices, the printer name **must** be the same as the name of the printer the report was designed on. Be aware that **anyone** printing the report must use that same printer or they could encounter problems.

***NOTE:** If your report is part of an application that you are distributing, you can provide a Select Printer dialog box. Using this dialog box, users of your report can choose the correct printer or rename the printer accordingly.*

Free form placement

FREE FORM PLACEMENT ON

In order to create dynamic reports and reduce printer driver dependency as much as possible, it is recommended that all sections of the reports be formatted with the *Free Form Placement* option toggled on. This is especially true if your report includes OLE objects such as charts, boxes, lines, and bitmapped images (such as company logos).

When a section is formatted with *Free Form Placement*, **all** objects can be placed **anywhere** in that section. Seagate Crystal Reports places objects within a section based on their *absolute coordinates*. These absolute coordinates determine the vertical placement of objects in your report. This means that you control the vertical placement of single-line objects rather than the printer driver. In so doing, you can better protect your reports from printing inconsistencies caused by using different printer drivers.

However, while the printer driver no longer controls the vertical spacing of text-based objects within the sections, it still determines horizontal spacing of text within the text-based objects, as well as the inter-line spacing of multi-line text objects. So, while Free Form Placement allows you better control, you must still take into account these considerations when designing your reports (see *Placing multi-line, text-based objects*, Page 126).

FREE FORM PLACEMENT OFF

If a section has the *Free Form Placement* option toggled off, the program no longer references the object's *absolute coordinates* to determine where it prints, except:

- The absolute *x* coordinate is still referenced to determine where each object begins printing horizontally (left/right placement).
- The *y* coordinate is still referenced for vertical placement of the object but the coordinates may be adjusted by Seagate Crystal Reports when the printer driver changes.

So, if the report is printed using a printer driver that measures inter-line spacing **greater** than the original printer driver, the *y* coordinate will be increased and the text-based object will be printed farther down the page. With *Free Form Placement* toggled off, the user no longer controls the vertical placement of text-based objects; the printer driver determines that instead.

However, the placement of OLE objects (such as graphics, boxes, and lines) is **not** controlled by the printer driver. Thus, Seagate Crystal Reports **always** references these objects' *absolute coordinates* when placing and printing. Due to these varied methods of placement, problems can arise when both text-based objects and OLE objects are placed in a report.

Consider the following example:

A box (OLE object) is placed around a database string field (text-based object). Everything looks great and everything is aligned as it should be. However, if the report is printed using a printer with an especially high measurement for inter-line spacing, then:

- the placement of the box will not change relative to the section in which it is placed (the *x* and *y* coordinates will not change), but
- the vertical placement of the text-based object will change because the *y* coordinate will be adjusted upward.

NOTE: *The value is a measurement from the section's upper left corner; so, the greater the value, the farther down the page the object will print.*

If you are distributing reports that have sections formatted with *Free Form Placement* toggled off, and you want the objects in those sections to be surrounded by a border or formatted with lines, it is better to modify the objects' border properties than to insert lines and boxes. This way, the borders will always stay with the objects. Simply right-click the object and select the **CHANGE BORDER** command from the shortcut menu (see *How to add color, shading, and borders*, Page 215).

Remember, **any** section can be formatted with *Free Form Placement* toggled on or off. While it is better to toggle the option on in some cases and not in others, it is highly recommended that every section in your report be formatted in the **same** manner.

Report creation checklist for distributed reports

- To accommodate possible growth caused by varying font measurements of different printer drivers:
 - do not place objects extremely close to each other, and
 - either increase the width of text-based objects by approximately 5% or reduce the size of the fonts.
- Because the number of lines necessary to print a text-based object vary, consider where and how you place multi-line, text-based objects when using different printer drivers.
- Use Windows TrueType fonts where possible. Being the most common fonts they are readily available on all versions of Microsoft Windows and can be recognized by most printers.
- It is recommended to use the most common and coarsest video driver settings and set your video driver resolution to 640 x 480 pixels.
- Set specific page margins.
- Use the default printer unless your application or compiled report requires a specific printer.
- After the report is completed and you are happy with the results, remove all guidelines and format every section to have *Free Form Placement* toggled on.

By adhering to this checklist, your report will be the least sensitive to changing printer drivers.

Updating printer drivers

In order to maintain performance, Seagate Crystal Reports queries the printer driver for each of the font elements (font metrics), such as average character height, character width, height of the ascenders and descenders, internal leading, etc. A problem may develop if using an older printer driver that does not return the font metrics accurately. If you are experiencing problems when printing (missing fields, incorrect formatting, etc.), it is recommended that you obtain and install the most recently updated drivers for your printer. In many cases, these newer printer drivers will provide the accurate font metrics and printing issues will be remedied.

Report distribution

There are many ways to distribute reports.

- You can print the report and send it out by hand.
- You can choose to export reports in Seagate Crystal Reports format (.RPT). You can export to a disk file or to an application (such as MS Excel or Word). See *How to export reports, Page 133*.
- If you want to e-mail a report to someone who does not have Seagate Crystal Reports, you can export it in MS Word or Excel format directly to an Exchange folder (search for *Exchange Data Access* in Seagate Crystal Reports online Help), as well as to many other e-mail systems.
- You can even publish the report on the Internet by exporting it to HTML. See *How to export reports, Page 133*.

Compiled reports

There may be times when you need to compile reports and distribute them to users who do not have Seagate Crystal Reports. Fortunately, Seagate Crystal Reports makes compiling and distributing an easy process.

After compiling reports into executable (.exe) files, use the Report Distribution Expert to distribute them. The Report Distribution Expert:

- allows users to view, print, and export reports, and
- compresses and distributes the selected compiled reports, dependent files, a Setup.exe file that installs the distributed reports, and any databases and DLLs specified.

For more information, see *How to compile a report, Page 138* and *How to distribute a compiled report, Page 139*.

When distributing a report, specify the DLLs and databases you want distributed with the report. The Report Distribution Expert will automatically list the databases and DLLs used by the report. Next, add or remove these files to better suit the end users' needs. For example, users in Marketing and users in Human Resources might need access to very different reporting operations. Search for *Report Distribution Expert* in the Seagate Crystal Reports online help.

For more information, see *How to distribute a compiled report, Page 139* and *How to use a compiled report, Page 140*.

NOTE: You can also include third-party DLLs, if needed. These are files that are included with Seagate Crystal Reports but are not Seagate Crystal Reports components. Most commonly, these DLLs will be database drivers, supplied for accessing certain databases.

HANDS-ON (Exporting a Report)

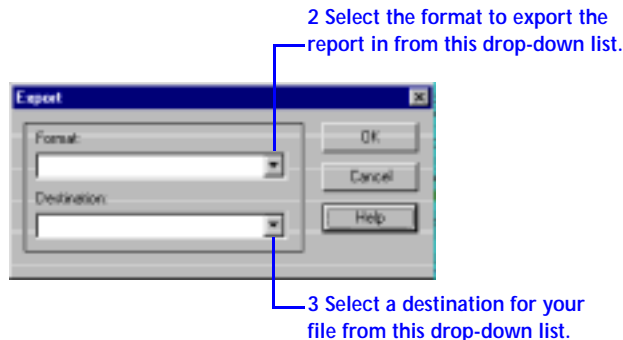
How to export reports

Finished reports can be exported to a number of popular spreadsheet and word processor formats, as well as to HTML, ODBC, and common data interchange formats. This makes the distribution of information easier. For example, you may want to use report data to project trends in a spreadsheet package, or you may want to enhance the presentation of data in a desktop publishing package.

NOTE: When you export a report to a file format other than Seagate Crystal Reports format (.RPT), you may lose some or all of the formatting that appears in your report. However, the program attempts to preserve as much formatting as the export format allows.



- 1 With the report you want exported active, click the EXPORT button on the Standard toolbar. The Export dialog box appears.



- 4 Click OK, and the export process begins.

When a report is exported to a disk file or to an application, a sequence of dialog boxes prompting you for formatting details appear, depending on the format you specified in the Export dialog box. After you supply these details and click OK, the Choose Export File dialog box appears. Use the controls in this dialog box to select a path and file name for the file to which the report is being exported.

NOTE: Although the program assigns the native extension to all files you export in a specific word processor, database, or spreadsheet format, it automatically assigns the extension *.TXT for all files you export in one of the common data interchange formats. The program in which you want to use the data, however, may look for specific extensions other than *.TXT. Consult the manual for that program to determine the correct file extension, and change the extension accordingly in the File Name edit box.

- 5 Click Save. The program exports the report to a disk file in the format specified.

Exporting to an application

If you export to an application, the program saves the report in a temp file and then opens the file in the appropriate application (unless you are exporting in HTML format, in which case you will need to specify a file path).

Keep in mind:

- When exporting in ODBC format, “Application” and “Disk file” are the same.
 - You may not be able to export properly to an application if you are working with 16-bit Seagate Crystal Reports on an NT or Windows 95 and Windows 98 platform, with the application residing in a long path location (such as c:/Program Files/Office/Excel.exe).
 - The file name of the report and the file name of the temp file may not be the same.
- 1 With the report you want exported active, click the EXPORT button on the Standard toolbar. The Export dialog box appears.
 - 2 Select the desired export file format from the *Format* drop-down list.
 - 3 Select *Application* (from the *Destination* drop-down list) as the export destination and click OK.

The program now saves the report and opens it in the appropriate application. For example, if the report was exported in a Word for Windows document format, the program opens the report in Microsoft Word.

NOTE: If you export in the Excel 5.0 Extended format, the *Format Options* dialog box will appear, allowing you to specify the column and row formatting for the report.

Exporting to Lotus Notes

Lotus Notes is a powerful groupware application that promotes communication and information sharing between different departments in an organization.

NOTE: You must have version 3.0 or later of the Lotus Notes Windows client. Seagate Crystal Reports will not export to a Lotus Notes OS/2 client.



- 1 With the report you want exported active, click the EXPORT button on the Standard toolbar. The Export dialog box appears.
- 2 Select an export file format, select *Lotus Notes Database* as the export destination, and click *OK*. The Select Database dialog box appears.
- 3 In the Select Database dialog box, highlight the Lotus Notes server from the *Servers* list box, and select the database to which the report will be exported.
- 4 Verify that the file name in the *File name* text box is correct, and click *OK*. The Comments dialog box appears.
- 5 Type in any comments that are to appear when another user selects your report from the Lotus Notes Desktop.
- 6 Click *OK*, and the export process begins.

The next time a user with access to the Lotus Notes database that you selected logs on to Lotus Notes, your report will be listed in the Lotus Notes Desktop. The user can double-click the report file name to display the comments you wrote, and can double-click the report icon that appears in order to view the report.

Exporting to an Exchange Folder



Seagate Crystal Reports lets you export a report file to an Exchange folder. You select the folder, and the report is stored there in the format that you specify. An Exchange folder can contain standard notes (mail), files, and instances of Exchange forms. For more information, search for *Exchange Data Access* in Seagate Crystal Reports online Help.

- 1 With the report you want exported active, click the EXPORT button on the standard toolbar. The Export dialog box appears.
- 2 Select the desired export file format from the *Format* drop-down list.
- 3 Select *Exchange Folder* as the export destination, from the *Destination* drop-down list and click *OK*. The Choose Profile dialog box appears.
- 4 Select the desired profile from the *Profile Name* drop-down list. If the profile is not listed, click the *New* button to create it.
- 5 Click *OK* when finished.
- 6 When the Select a Folder dialog box appears, highlight the folder in your profile in which you want the report to appear, and click *OK*.

The report is exported to the Exchange folder you selected. The exported report can be accessed through the Microsoft Exchange client.

Exporting to HTML

Providing support for the Internet and corporate intranets becomes more important with every passing day. Seagate Crystal Reports recognizes this importance and provides World Wide Web support. Although incorporated as an export format, HTML represents a whole new export destination for reports as well.

By exporting reports in HTML format, Seagate Crystal Reports provides you with a new option for rapid, convenient distribution of important company data. Once exported, your reports become accessible with many of the most popular web browsers, including Netscape and Microsoft Internet Explorer.



- 1 With the report you want exported active, click the **EXPORT** button on the Standard toolbar. The Export dialog box appears.
- 2 From the *Format* drop-down list, select one of the HTML formats listed.
 - If Netscape is your browser, select *HTML 3.2 (Standard)* format.
 - If using Microsoft Internet Explorer as your browser, select *HTML 3.0 (Draft Standard)* format.
 - The third HTML option, *HTML 3.2 (Extended)*, is a new form of HTML
- 3 Select a destination from the *Destination* drop-down list. The rest of this section assumes you select *Disk file* to store the HTML document in a directory on a web server.
- 4 Click **OK**. The Export To Directory dialog box appears. When exported to HTML format, a report may create more than one HTML file. For this reason, the program asks you for the name of a directory for an export destination, and uses default names for the HTML files. The initial HTML page will be saved as **DEFAULT.HTM**. This is the file you open if you want to view your report through your web browser.
- 5 Select an existing directory, or create a new directory for your report.
- 6 Click **OK**. The program exports the report to HTML format.

Exporting to an ODBC data source

Seagate Crystal Reports allows you to export reports to any ODBC data source. If you have an ODBC data source set up for a database or data format, you can export your report to that data format through ODBC.

For instance, you may have an ODBC data source set up through ODBC Administrator that you normally use to access database tables designed in Microsoft SQL Server. Using the Export dialog box, however, you can select your SQL Server data source and export your report as a new SQL Server database table.

NOTE: You must have an ODBC data source set up through ODBC Administrator in order for the program to export to a particular ODBC database format. See *How to set up an ODBC data source*, Page 556.

Exporting to an ODBC data source lets you:

- change data from a centralized database format into a format compatible with a local DBMS application,
- change data from a local database format into a format compatible with a centralized database,
- create a new database table that can be used as a separate data set in future reporting,
- create a mini data-warehouse, and
- manipulate database data by filtering records, adding formulas, and removing fields to create a new database table that provides the data you need most for your work.



- 1 With the report you want exported active, click the EXPORT button on the Standard toolbar. The Export dialog box appears.
- 2 From the *Format* drop-down box, select the ODBC data source for the format in which you want to export your report. For example, *ODBC - CRSS* allows you to export your report to a Microsoft SQL Server database.
- 3 *Destination* is ignored when you are exporting a report to an ODBC data source. You do not need to make any changes to the *Destination* drop-down box. Simply click *OK* in the Export dialog box.
- 4 If your ODBC data source specifies a particular database, the report will be exported to that database. Otherwise, the Select Database dialog box appears. Select the database to which this report will be added as a new table, and then click *OK*.
- 5 If the ODBC data source you selected requires a Logon ID and password, the Login or SQL Server Login dialog box appears. Enter your ID and Password, and then click *OK*. The Enter ODBC Table Name dialog box appears.
- 6 Enter the name you want to give to the new table in the database, and then click *OK*. The program exports the report as a new table in the database you specified.

NOTE: If your report contains a binary field, you will be unable to export it to an ODBC data source successfully.

Search for *Export format and destination files* in Runtime File Requirements online Help (RUNTIME.HLP).

How to fax a report

Many fax applications, such as Microsoft Fax and Delrina WinFax, allow you to set up a printer driver that will fax documents over a modem. When using one of these applications, you can fax a report from Seagate Crystal Reports.

- 1 Choose the **PRINTER SETUP** command from the File Menu. The Print Setup dialog box appears.
- 2 Select a fax driver from the *Name* drop-down list.
- 3 Click *OK* when finished.
- 4 Choose the **PRINTER** command from the File | Print Menu. The Print dialog box appears.
- 5 Click *OK* to fax the report. Your fax application will appear, allowing you to select a cover page and to fill in the appropriate fax information.

HANDS-ON (Compiled Reports)

How to compile a report

Note: You must save the report before compiling.

- 1 With the report active, choose **COMPILE REPORT** from the Report Menu or click the **COMPILE** button on the Supplementary toolbar. The Compile Report dialog box appears.
- 2 Enter a file path for the compiled report in the *Compiled File Name* text box, or click *Browse* to search for a file name. The default is the report file name with an .exe extension.
- 3 Specify whether you want to create a program item for this executable file. The program will display this item in a window after the report has been compiled. If you click *Yes*, enter the name of the program group in the *Program Group* text box.
- 4 Specify whether you want to distribute the report after compiling. See *How to distribute a compiled report*, Page 139.
 - If you chose to distribute the report after compiling, the Report Distribution Expert appears, and the window for the specified program group appears, with shortcuts to the compiled report

files present in that program group. For more information, see *How to distribute a compiled report*, Page 139.

- If you chose not to distribute the report immediately, the window for the specified program group appears, with shortcuts to the compiled report files present in that program group.

5 Click *OK*.

How to distribute a compiled report

Compiled reports, along with related databases and DLLs, can be distributed to users who do not have Seagate Crystal Reports. More than one report can be distributed at once, and can be distributed to:

- an installation disk, or
- a directory of files.

There are two distinct processes involved in distributing; this section looks at both. The first is the actual distribution; the second is the installation of the distributed executable files (this is the task of the end user).

DISTRIBUTING

- 1 Choose **REPORT DISTRIBUTION EXPERT** from the Report Menu, or click the **DISTRIBUTION EXPERT** button on the Supplementary toolbar. The Report Distribution Expert appears.
- 2 Complete the **REPORT DISTRIBUTION EXPERT**. Click *Build* to distribute the specified reports. Search for *Report Distribution Expert* in the Seagate Crystal Reports online Help.

RECEIVING AND INSTALLING

The Report Distribution Expert Setup makes it easy for end users to quickly install and view, print, and export distributed reports.

- 1 Run Setup.exe.
- 2 Report Distribution Expert Setup opens, and the Introduction dialog box appears. Click *Continue* to decompress the distribution files to a temporary location. The program decompresses the files, and the Options dialog box appears.

- 3 Enter a directory path for the report in the *Directory* text box or click *Set location* to search for a path.
- 4 Click *Continue*. The program will now proceed to Set up the distribution files in the specified directory.
- 5 If you already have an existing Seagate Crystal Reports program group, a message box will appear asking whether you would like to add the new report items to that group. Click *Yes* or *No*, as desired. Setup closes.

How to use a compiled report

- 1 Open the compiled report by double-clicking the program item. A Print Options dialog box appears with the report file name displayed on the title bar.
- 2 In the Print Options dialog box, use the *Report* drop-down list to specify the print destination (Print the report to a window, Export the report, or Print the report to a printer) and the time of printing.
- 3 Set the time (hour and minutes) and the date (month, date, and year) in the *Time* and *Date* text boxes, and click either *AM* or *PM*.
- 4 The center section of the dialog box is dynamic, and the message and the button appearing there are determined by the selection from the *Report* (print destination) drop-down list:
 - If you are printing the report to a window, click *Window Styles* to determine the appearance of the window. The Window Style Options dialog box appears. Use this dialog box to specify the style options (you can specify drill-down ability, the appearance of *Close* and *Refresh* buttons, etc.) If you toggle the *Has Zoom Box with Default Level* check box on, select the default zoom level from the adjacent drop-down list. Then click *OK* to return to the previous dialog box.
 - If you are exporting the report, click *Export Options*. The Export dialog box appears. Select the export format from the *Format* drop-down list, and select the export destination from the *Destination* drop-down list. Click *OK*. (With certain export formats, the Character-Separated Values dialog box will then appear. Enter the separator and the delimiter in the appropriate text boxes, and then click *OK*. With some export formats, the Number and Date Format dialog box will then appear. Toggle the *Same number format as in report* and the *Same date format as in report* check boxes on/off as desired, and then click *OK*.) The Choose Export File dialog box appears. Select an export file and then click *Save*.

- If you are printing the report to a printer, click *Printer Options*. The Print dialog box appears. Specify the printing options, and then click *OK*.
- 5 Click either *Use Saved Data* or *Refresh Data*. If you click *Refresh Data*, the two check boxes in the lower section of the dialog box will become active. Toggle the [*Modify selection formula*] and the [*Modify stored procedure parameters*] check boxes on/off as desired.
 - 6 Click *Print*.

Repeat Steps 2-6 for each additional printing or exporting task. Click *Done* when finished.

HANDS-ON (Viewing reports with a web browser)

How to view reports in a web browser

Your Systems Administrator or IS Manager will have set up an intranet/extranet where you can view your reports in a browser. Contact your web administrator to ask for the URL. The administrator can also tell you which viewer your company uses. There are four Crystal Smart Viewers:

1. The Crystal Smart Viewer for Java
2. The Crystal Smart Viewer for ActiveX
3. The Crystal Smart Viewer for HTML (Plain)
4. The Crystal Smart Viewer for HTML (Frames)

Using the appropriate viewer, you can easily view, print, and export your reports from a web browser.

USING THE CRYSTAL SMART VIEWER FOR JAVA

- 1 Open your report in the Crystal Smart Viewer for Java. The first page of the requested report will appear inside the viewer. A Smart Navigation Group Tree is generated based on the groups in the report.

NOTE: *You may not have access to Smart Navigation with the Group Tree. Smart Navigation may be disabled for the report or for the Crystal Smart Viewer itself. If Smart Navigation is available, you can use the Smart Navigation button in the Crystal Smart Viewer to turn on and off the Group Tree. This button will be disabled if Smart Navigation is unavailable.*

- 2 Use the page controls to scroll through the report page by page.
- 3 Use the Smart Navigation features of the Group Tree, if it is available, to navigate through the report by group.
- 4 Click the *Refresh* button to refresh the report data.

The first time a report is requested, the Crystal Web Report Server generates the report and saves it in a directory cache. If someone else requests the same report, the Crystal Web Report Server can send them the existing report rather than regenerate the data, a time consuming process.

If the data that the report is dependent on changes, though, due to updates in the database, the cached report will no longer reflect accurate data. Use the *Refresh* button to force the Crystal Web Report Server to connect to the database and update the report.

- 5 To search for a specific value within the report, type the value into the *Text to search for* text box and click the *Find Next* button.

The Crystal Smart Viewer will locate the first matching value in the report, if it exists, and highlight that value for you. If you need to find the next instance of that value in the report, simply click the *Find Next* button again.

- 6 Click the *Print Report* button to print the report to a printer available from your machine.
- 7 Click the *Export Report* button to export the report. The Export dialog box appears.
- 8 Select the export format from the *Export Format* drop-down list. You can export in any of the following formats: Crystal Reports, MS Word, MS Excel, or HTML.
- 9 Enter the export destination in the *Save To* text box, or click *Browse* to search for an already existing destination file name.
- 10 Click *OK* when finished.

NOTE: You may experience minor problems scrolling through reports in the Crystal Smart Viewer for Java. Such problems are a result of the Java virtual machine implemented in certain web browsers and can not be accounted for by the Crystal Smart Viewer for Java. If you experience problems, click repeatedly on the scroll buttons to scroll. Do not hold the scroll buttons down.

USING THE CRYSTAL SMART VIEWER FOR ACTIVEX

- 1 Open your report in the Crystal Smart Viewer for ActiveX. The first page of the requested report will appear inside the viewer. A Smart Navigation Group Tree is generated based on the groups in the report.

NOTE: You may not have access to Smart Navigation with the Group Tree. Smart Navigation may be disabled for the report or for the Crystal Smart Viewer itself. If Smart Navigation is available, you can use the Smart Navigation button in the Crystal Smart Viewer to turn on and off the Group Tree. This button will be disabled if Smart Navigation is unavailable.

- 2 Use the page controls to scroll through the report page by page.
- 3 Use the *Zoom* drop-down list to specify a zoom level for the report.
- 4 Use the Smart Navigation features of the Group Tree, if it is available, to navigate through the report by groups.
- 5 Click the *Refresh* button to refresh the report data.

To improve performance, reports are often cached by the web server. This means that the first time a report is requested, the Crystal Web Report Server generates the report and saves it. If someone else requests the same report, the Crystal Web Report Server will simply send them the saved report rather than regenerate the data.

However, the data that the report is dependent on may change while the report file is stored in the cache. If so, use the *Refresh* button to force the Crystal Web Report Server to update the report.

- 6 To search for a specific value within the report, type the value into the *Text to search for* text box and click the *Find Next* button.

The Crystal Smart Viewer will locate the first matching value in the report, if it exists, and highlight that value for you. If you need to find the next instance of that value in the report, simply click the *Find Next* button again.
- 7 Click the *Print Report* button to print the report to a printer available from your machine.
- 8 Click the *Export Report* button to export the report. The Export Report dialog box appears. The Export Report dialog box works like the Save As dialog box in Seagate Crystal Reports.
- 9 Select a directory from the *Save in* drop-down list and list box. The report will be saved in that directory.
- 10 Enter a file name in the *File name* text box. The report will be saved with this file name.
- 11 Select an export format from the *Save as type* drop-down list. The report can be saved as a Crystal Report, an HTML document, a Word document, or as an Excel document.
- 12 Click *Save* when finished.

NOTE: *If the report has been created using different printer settings than those available from your system, you may experience formatting problems when attempting to print a report displayed by the Crystal Smart Viewer for ActiveX. The Crystal Smart Viewer Print button uses printer settings saved with the report file. If you experience problems printing a report, contact your web server administrator.*

USING THE CRYSTAL SMART VIEWER FOR HTML (PLAIN)

- 1 Open your report in the Crystal Smart Viewer for HTML (Plain). The first page of the requested report will appear as a standard HTML page inside the viewer.
- 2 To page through the report, use the page controls at the top or bottom of the report page.
- 3 Click the *Refresh* button to refresh the report data.

The Crystal Web Report Server can store HTML pages for the requested report in a cache directory to improve response time for future requests. If someone else requests the same report, the Crystal Web Report Server will simply send them the saved HTML pages rather than regenerating the pages from the original report.

If database data changes, report data reflected in the HTML pages will no longer be accurate. Use the *Refresh* button to force the Crystal Web Report Server to update the report data and generate new HTML pages.

- 4 To search for a specific value in the report, type the value into the *Search* text box, and click the *Search* button.

The Crystal Smart Viewer will locate the first matching value in the report, if it exists, and highlight it for you. Continue to click the *Search* button to find successive matching values in the report.

USING THE CRYSTAL SMART VIEWER FOR HTML (FRAMES)

- 1 Open your report in the Crystal Smart Viewer for Plain HTML. The first page of the requested report will appear inside the viewer. A Smart Navigation Group Tree is generated based on the groups in the report.

NOTE: *You may not have access to Smart Navigation with the Group Tree. Smart Navigation may be disabled for the report or for the Crystal Smart Viewer itself. If Smart Navigation is available, you can use the Smart Navigation button in the Crystal Smart Viewer to turn the Group Tree on or off. This button will be disabled if Smart Navigation is unavailable.*

- 2 Use the page controls at the top of the Preview Tab to page through the report.

- 3 Use the Smart Navigation features of the Group Tree, if it is available, to navigate through the report by groups.
- 4 Click the *Refresh* button to refresh the report data.

The Crystal Web Report Server can store requested reports in a cache directory to improve response time for future requests. If someone else requests the same report, the Crystal Web Report Server will simply send them the saved report rather than regenerate the data for the report.

When report data becomes old, no longer reflecting accurate data from the database, the cached report must be updated. Use the *Refresh* button to force the Crystal Web Report Server to update the report.

- 5 To search for a specific value within the report, type the value into the *Text to search for* text box and click the *Find Next* button.

The Crystal Smart Viewer will locate the first matching value in the report, if it exists, and highlight that value for you. If you need to find the next instance of that value in the report, simply click the *Find next* button again.

Related Topics

How to drill-down on summarized data, Page 78

Sorting, Grouping, and Totaling, Page 245

7

Tutorial - Customer List

What you will find in this chapter...

Overview, Page 148

Getting started, Page 149

Record Selection, Page 162

Grouping and sorting, Page 165

Completing the report, Page 169

Overview

The following tutorial has been designed to give you confidence when creating your first report.

You begin by learning the basic concepts: calling up a database, placing some fields on the report, and then selecting specific records to be included. You will then learn how to:

- insert and move database fields,
- add and format a title,
- display a report in the Preview Tab so you can fine-tune your work,
- use the Select Expert to ensure the report includes only the data you need,
- move objects,
- group and sort data,
- insert pictures, and
- print a report.

Before you begin

This tutorial assumes you are familiar with Microsoft Windows and uses conventional terms and procedures common to the Windows environment. If you are not familiar with Windows, you may have trouble understanding basic procedures such as *scrolling* and *clicking*. Please refer to the documentation that came with Microsoft Windows for further explanation of these procedures. Also, see *Command, button, key, and control conventions, Page 3*, for a description of the conventions used in this manual.

The default font for all report sections in the program is set to Times New Roman, 10 point. If you have changed the default font, or if your printer does not support this font, the field size, field spacing, and screen shots will look different than those included in this tutorial.

This tutorial has been designed using Microsoft Windows 95, Windows 98 and Win NT 4.0. Screen shots may vary slightly if you are using Windows 3.1, or NT 3.51.

If you are not familiar with Seagate Crystal Reports environment, please review the following sections before beginning this tutorial:

- *Getting to Know Seagate Crystal Reports, Page 41*, which explains the main application window, the Design and Preview Tabs, the Menu bar, Standard and Supplementary toolbars, Formatting toolbar, and Status bar, as well as many other features of the program.

- *How to add, delete, and move guidelines, Page 72, and How to move and position objects using guidelines, Page 73.*
- *Other fundamentals, Page 66, which describes working with the grid, free form placement of objects using guidelines, and also how to work with sections and objects.*

Getting started

In this tutorial, you will get an introduction to the program as you create a Customer List report. The Customer List is one of the most basic business reports and typically has information such as Customer Name, City, Region, and Contact Name.

Creating the report



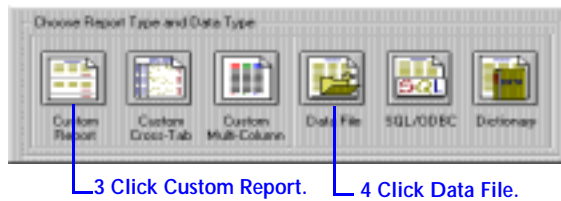
- 1 Click the NEW button on the Standard toolbar. The Report Gallery appears.

The Report Gallery contains a number of buttons. These buttons open the Experts that guide you through the creation of specific types of reports. Since you will be learning reporting concepts here, you can skip the Experts and build your report from scratch. After you have completed this tutorial, you may want to build some reports using the Experts to decide which method of report construction you are most comfortable with.



2 Click Custom.

The Report Gallery expands to reveal several custom report options.



The Choose Database File dialog box appears.

NOTE: You can also create reports based on SQL/ODBC data sources, dictionary files, or query files. See *The Crystal SQL Designer, Page 465*, and *Dictionaries, Page 487*, for more information.

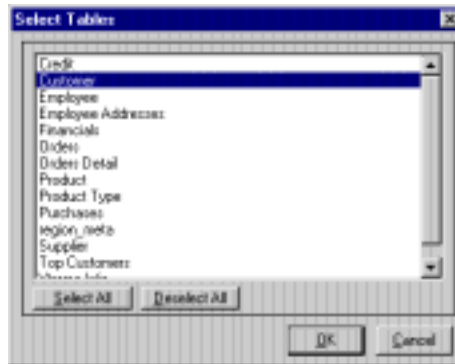
Selecting a database to use

The next step in creating a report is to select a database. Select the xtreme.mdb sample database for this tutorial.

- 1 In the Choose Database File dialog box, select the xtreme.mdb file from the *File Name* list box. This file was installed in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports (32-bit), or the directory in which the program resides.

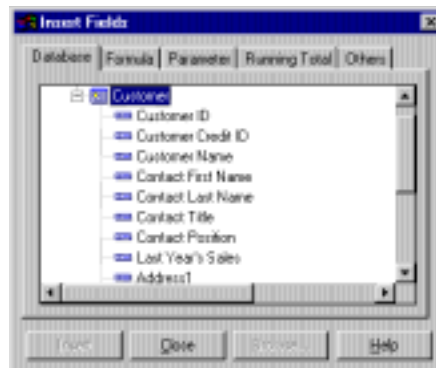


- 2 Click *Open*. The Select Tables dialog box appears.



- 3 Because you are only dealing with customers in this tutorial, you will only need to select the Customer table. Highlight Customer and click **OK**.

The Insert Fields dialog box appears with the Database Tab active.



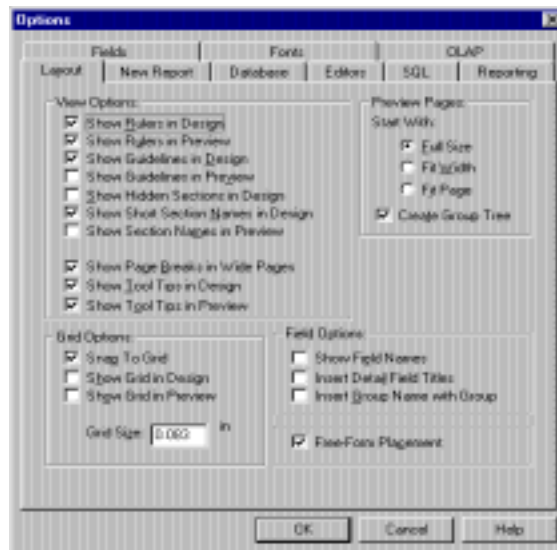
NOTE: If more than one table is selected in the *Select Tables* dialog box, the *Visual Linking Expert* appears. For more information on linking, see *How to add and link multiple tables*, Page 104, and search for *Visual Linking Topics Index* in *Seagat Crystal Reports online Help*.

Report sections

The Design Tab is divided into five sections: *Report Header (RH)*, *Page Header (PH)*, *Details (D)*, *Report Footer (RF)*, and *Page Footer (PF)*. If at any time you are unsure of the report section in which you are working, simply look at the shaded area to the left of the report which always displays either the section names or the initials that designate the names. See *Design Tab*, Page 57.

- If the *Short Section Names in Design* check box in the Options dialog box is toggled on, then the *Report Header*, *Page Header*, *Details*, *Report Footer* and *Page Footer* section names will appear as *RH*, *PH*, *D*, *RF* and *PF* respectively. If this check box is not toggled on, follow these steps:

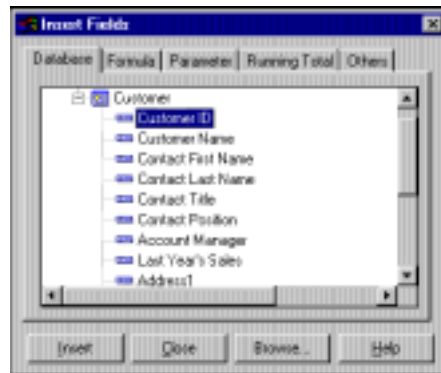
- 1 Choose the **OPTIONS** command on the File Menu. The Options dialog box appears with the Layout Tab active.



- 2 Toggle the *Show Short Section Names in Design* check box on.
- 3 Click **OK** to return to the report.

Inserting a field

The Insert Fields dialog box appears automatically with the Database Tab active, since it is almost certain you will want to insert database fields when you create a new report.

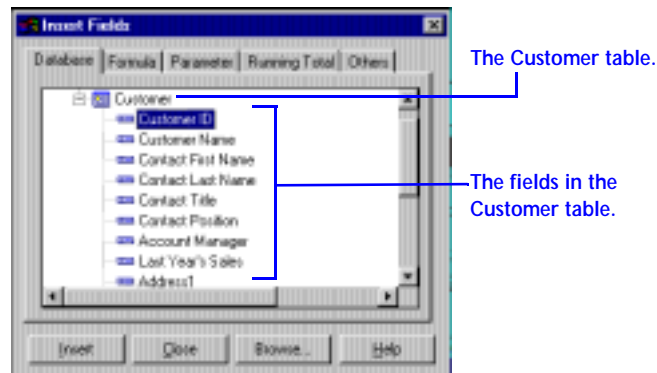


This dialog box is set to remain on-screen until you click the *Close* button. All the tables available for use are listed in this box.

You can move the dialog box to another location on the screen by clicking on its title bar and dragging it to a new location. You can also resize the dialog box by dragging any of its edges with the Resizing cursor. See *Cursors, Page 54*.

You will now start placing objects on the report by inserting the Customer Name field.

First, familiarize yourself with the Database Tab of the Insert Fields dialog box.



- 1 Highlight a field name in the dialog box by clicking the name once. When you highlight a field name, you can review the values for that field as well as the field type and size, by clicking the *Browse* button. The Browse dialog box appears listing the field name, type, length, and a subset of field values.



2 When finished reviewing the data, click this button to return to the Insert Fields dialog box.

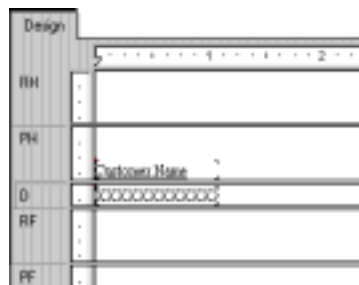
- 3 Click the Customer Name field and drag it into the Details section of the report.

An object frame appears with the Arrow cursor as you drag the field onto the report.



- The object frame represents the object you have just selected for placement.
 - The size of the object frame approximates the size of the data in the field selected.
- 4 Move the object frame as far to the left as you can in the Details section. If you move the field too far to the left, the Arrow cursor turns into a Stop cursor, indicating that you can not drag the field that far. See *Cursors*, Page 54. Keep in mind that you can not place any objects outside the page margin.

The Design Tab should look similar to this:



Understanding fields

Before going any further, take a look at the field you just placed in the Details section.

- First of all, the object frame indicates that when the report is printed, a field value will appear where the box is positioned.
- The X's in the object frame indicate that the database field contains a text string. Other data types have different character representations. For example, a currency data type is represented by \$55,555.56.
- The number of X's in the object frame is the data width, the maximum number of characters in the field as defined by the database. The width of the object frame is the field width (the amount of space allocated to the field for printing). Initially it is set to the width needed to display the maximum number of characters in the field (using the font selected for the field). You can change this width by resizing the field.
- The size of the X's indicates the point size selected for the characters in the field.
- The font and style (Bold, Underline, etc.) used in displaying the X's indicate the font and style selected for the characters in the field. Later in this tutorial you will learn how to make changes to these properties.
- The line spacing is adjusted to the point size selected for the characters in the field.

Selecting fields

When a field is selected, the object frame appears with a handle (box) on its right, left, top, and bottom edge. These handles indicate that the field is selected, and therefore active. To do anything with a field (change the font, move it, etc.), you first have to select it.

- Position the cursor inside the object frame and click once. The handles appear, indicating the object is selected.
- Move the cursor away from the object frame and click in an empty part of the window. The handles disappear.

That's all it takes to select and deselect objects.

Resizing fields

To resize the field, follow these steps:

- 1 Click the Customer Name field to select it.
- 2 Press the Ctrl key and click the field heading to select both objects.
- 3 Move the cursor over the resizing handle on the right edge of the fields until the cursor turns into a Resizing cursor. See *Cursors, Page 54*.
- 4 Resize the fields to the left until they are approximately two inches in length.

Adding additional fields

Next, you will insert two additional fields in the report. This time, however, you will use the Ctrl-click combination to add them at the same time.

- 1 Highlight the City field in the Insert Fields dialog box, press the Ctrl key on your keyboard, and then highlight the Country field. Release the Ctrl key. If you scroll through the field list, you will notice that both fields remain selected.

NOTE: Using the Ctrl-click combination allows you to select a non-continuous range of fields. The Shift-click combination can be used to select several fields from the list that are continuous.

- 2 Click the *Insert* button to place the fields.
- 3 As the cursor is moved over the report, an object frame appears along with the Arrow cursor.
- 4 Place the fields to the right of the Customer Name field. Click once to insert the fields. Both fields appear in the Details section of the report in the same order in which they are listed in the Insert Fields dialog box.

Reviewing your work

Now let's see how the report looks with three fields placed and positioned.



- 1 Click the PRINT PREVIEW button on the Standard toolbar to activate the Preview Tab.

The screen should look similar to this:

Customer Name	City	Country
City Cyclists	Sterling Heights	USA
Pathfinders	Duluth	USA
Bike-A-Holics Anonymous	Blacklick	USA
Psycho-Cycle	Huntsville	USA
Sporting Wheels Inc.	San Diego	USA
Rockablocke for Jocks	Avonita	USA
Power Cycles	Eden Prairie	USA
Swivel 'N' Wheels Ltd.	Two Rivers	USA

NOTE: The first time you preview a report, you must click the PREVIEW button on the Standard toolbar to activate the Preview Tab. The Preview Tab appears to the right of the Design Tab. You can then switch between designing and previewing the report by clicking the corresponding tab.

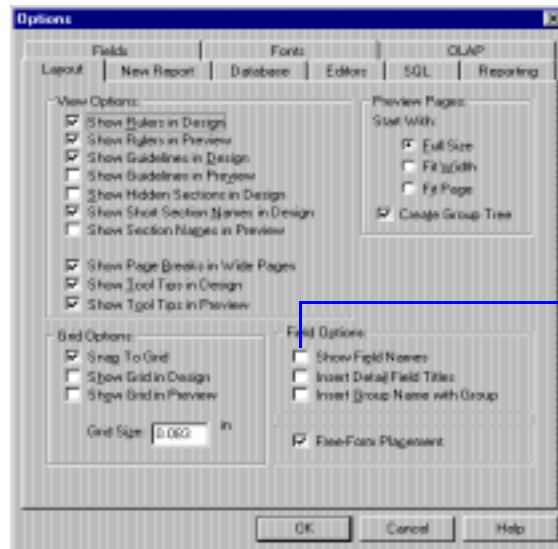
You have the beginnings of a customer list report, but you still have several fields to add.

- 2 When you are finished reviewing the report, return to the Design Tab by clicking it.

Displaying field names

Field pictures (object frames containing character representations) have been discussed, but there may be times when you want to see the field names in the Design Tab.

- 1 Choose the OPTIONS command from the File Menu. The Options dialog box appears with the Layout Tab active.



2 Toggle this check box on and click OK.

Now in the Design Tab you will see the actual field names instead of character representations (X, \$, #, etc.).

Combining database fields in a text object


Instead of adding the Contact First Name and Contact Last Name fields as separate objects, you can insert both fields in a text object. This allows you to control the formatting of both fields by making changes to only one object. When you insert fields in a text object, the fields are automatically trimmed (they do not have any extra white space on either side). This is important because a field is a fixed size but the data in the fields can vary in size, leaving various amount of unwanted white space.

- 1 Click the INSERT TEXT OBJECT button on the Standard toolbar. As you move the cursor over the report, an object frame appears next to it.



- 2 Insert the field to the right of the fields in the Details section. As you drag the field, the Design Tab automatically scrolls to the right, if necessary. When you click to place the object, a text object appears and the horizontal ruler of the Design Tab changes to a ruler/tab selector that is used for editing the text object. If you click an empty area of the report or a field object, the standard Design Tab ruler appears.
- 3 Click once on the border of the text object to select it for resizing. Handles appear on all sides of the object.
- 4 Move the cursor over the right sizing handle of the text object and increase the width by about 1 inch. You may need to scroll to the right and continue resizing.
- 5 Double-click inside the text object to select it for editing. Notice the insertion point is now flashing within the text object.
- 6 Highlight the Contact Last Name field in the Insert Fields dialog box. Remember, you can move the Insert Fields dialog box by dragging and dropping it by its title bar.
- 7 Click *Insert*.
- 8 Move the cursor over the text object until the cursor becomes a Drag and Drop cursor. See *Cursors, Page 54*.
- 9 Click once to place the field in the text object. The cursor now appears after the Contact Last Name field, within the text object.
- 10 Type a comma and a space after the Contact Last Name.
- 11 In the Insert Fields dialog box, highlight the Contact First Name field.
- 12 Click *Insert*.
- 13 Move the cursor over the text object until the cursor becomes a Drag and Drop cursor. Move the cursor to the right of the comma and space you just typed, and click once. The field will be inserted to the right of the comma and space.
- 14 You are finished inserting fields, so click *Close* in the Insert Fields dialog box.
- 15 Click the Preview Tab to look at the fields you just placed.

The report should now look similar to this:



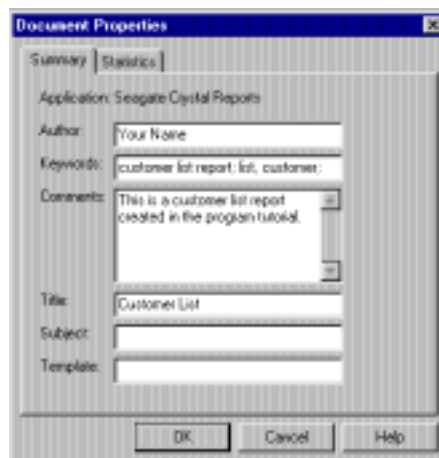
The screenshot shows a report preview window with a table of customer data. The table has four columns: Customer Name, City, Country, and a fourth column containing names. The data is as follows:

Customer Name	City	Country	
City Cyclists	Sterling Heights	USA	Christianson, Chris
ParkMaden	Duluth	USA	Masley, Christine
Bike-A-Holics Anonymous	Blacklick	USA	Jennin, Gary
Psycho-Cycle	Huntsville	USA	Mast, Alexandre
Sporting Wheels Inc.	San Diego	USA	Reynolds, Patrick
Rockabocha for Toots	Aurora	USA	Devia, Heather
Power Cycles	Eden Prairie	USA	Smith, Alex
Sanitas 'N' Wheels Ltd	Des Moines	USA	Chester, Kristina

Adding summary information

The next step is to add summary information to your report. Adding summary information allows you to specify the author, title, and subject of the report, as well as any keywords or comments related to the report. If a template is used when creating the report, you can specify that as well. When you add summary information, users can find information related to the report quickly. Summary information will also appear in the Reports at a Glance application. Choose Reports at a Glance from Seagate Crystal Reports program menu.

- 1 Choose the SUMMARY INFO command on the File Menu. The Document Properties dialog box appears with the Summary Tab active.



The screenshot shows the Document Properties dialog box with the Summary tab selected. The fields are filled with the following information:

- Application: Seagate Crystal Reports
- Author: Your Name
- Keywords: customer list report, list, customer,
- Comments: This is a customer list report created in the program tutorial.
- Title: Customer List
- Subject:
- Template:

Buttons at the bottom: OK, Cancel, Help.

- 2 Enter information about your report in the text boxes provided. Be sure to enter the title “Customer List” in the *Title* text box. This information will be used in the next section of the tutorial.
- 3 Click *OK* when finished.

Adding a title

As you can see, the report looks incomplete without a title. Although you can add a title using a text object, you can also tell the program to take the title information directly from the *Title* text box in the Document Properties dialog box.

- 1 Click the Design Tab to activate it.
- 2 Choose the REPORT TITLE command from the Insert | Special Field Menu.
- 3 Move the cursor over the report. An object frame appears.
- 4 Position the object frame in the upper left-hand corner of the Page Header (PH) section of the report and click once to place the object.
- 5 Click the Preview Tab to review your changes.

The report title object now displays the title that you entered in the *Title* text box of the Document Properties dialog box.

Formatting objects

Now you can format the report title. This time, however, you will remain in the Preview Tab to do the work. This will make it easier to see your work while you are formatting the title.

- 1 To center the title, you will first need to expand the title field box so that it's about the same width as the data in your report. To do this, select the object.
- 2 Position the cursor on the right edge of the object until the cursor turns into a Resizing cursor. Drag the right edge of the field box until it is even with the right edge of the data in the Contact Name field object.

You have created a large field that extends from the left edge to the right edge of the report.



- 3 With the report title object still selected, click the CENTER ALIGNMENT button on the Formatting toolbar. The title is centered within the object.
- 4 Right-click the object and choose CHANGE FONT from the shortcut menu. The Format Editor appears with the Font Tab active. Search for *Format Editor* in Seagate Crystal Reports online Help.
- 5 Set the report title to a larger, bolder version of the active font by choosing Bold from the *Style* drop-down list and 16 (or a point size suitable to the font you are using) from the *Size* drop-down list.

- 6 Change the color of the text by choosing Maroon from the *Color* drop-down list. Notice that the *Sample* box shows an example of how the text will look.
- 7 Click *OK* when finished.
- 8 Resize the report title object vertically to accommodate the increased size of the title.

The title is now formatted to stand out on the report.



Adding a field heading

As you can see, the Contact Name field is the only field without a heading. In this section you will create a heading using a text field.

- 1 Return to the Design Tab.
- 2 Click the INSERT TEXT OBJECT button on the Standard toolbar. As you move the cursor over the report, an object frame appears next to it.
- 3 Place the object in the Page Header (PH) section, above the contact name object.
- 4 Type "Contact Name" (without the quotation marks) in the text object edit box.
- 5 While the text object is still in edit mode, highlight the field heading.
- 6 Click the UNDERLINE button on the Formatting toolbar.

The Contact Name field now has a heading that looks just like the other field titles.

Saving the report

- 1 Click the SAVE button on the Standard toolbar to save your work. Since this is the first time you are saving the report, the File Save As dialog box appears displaying the default directory where the database resides.

- 2 Type CUSTLIST.RPT in the *Filename* edit box and click *Save*. Your report is saved to the default directory in which the program resides.
- 3 Click the *Preview* Tab to view the report.

The report should now look similar to the following:

Customer Name	City	Country	Contact Name
City Cyclists	Sterling Heights	USA	Christensen, Chris
Petaluma	DeKalb	USA	Mosley, Christine
Bike-A-Holic Anonymous	Blacklick	USA	Jansen, Gary
Psycho-Cycle	Huntsville	USA	Mart, Alexander
Sporting Wheels Inc.	San Diego	USA	Rogers, Patrick
Rockabeach for Jocks	Austin	USA	Davis, Heather
Posei Cycles	Eden Prairie	USA	Smith, Alex
Snake N' Wheels Ltd.	Twin Mound	USA	Chester, Kristin

Congratulations! You have just created a basic listing report. You will continue to refine this report throughout the rest of this tutorial.

Record Selection

Seagate Crystal Reports allows you to limit or restrict the records that are to be included in a report. In this section you will learn how to:

- select the records you want included in the report, and
- save a report, including the selection criteria.

For example, it may be useful to have a customer list that only lists customers from the USA. The sample data contains records from the United States and International customers. It is easy to restrict lists like this using the Select Expert. See *Record and Group Selection*, Page 227.

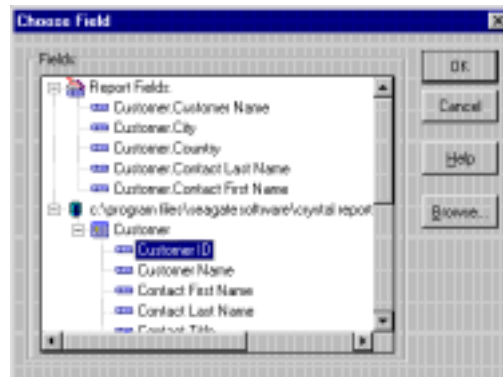
Entering the selection criteria

When you scroll through the report, you will see that it contains information for customers from many different countries. In this step, you will limit the number of countries displayed to the USA.

- 1 To begin, click the *Design* Tab to return to design mode.
- 2 Click an empty area of the report to make sure all fields are deselected.

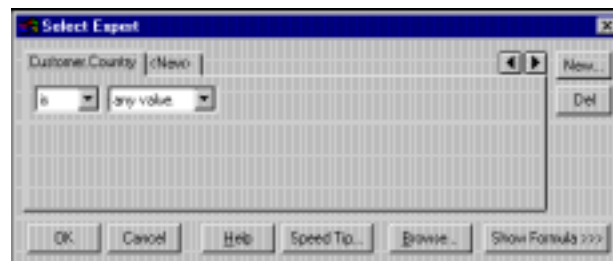


- 3 Click the SELECT EXPERT button on the Standard toolbar. The Choose Field dialog box appears.



This dialog box lists all the fields currently in the report in the *Report Fields* section and then lists all fields that are available from each table in the *Database Fields* section.

- 4 Since you are going to base record selection on the country field, choose {customer.COUNTRY} from the *Fields* list box and click OK. The Select Expert appears.



Your job in this dialog box is to imagine that you are completing the following sentence:

Select all records where a customer's COUNTRY is

You complete the sentence with the condition you want the program to use when selecting records for your report. Right now the condition is *any value*, clearly not a restrictive condition.

- 5 Click the arrow on the right drop-down list to see what other options you have. Since you want only those records where the Country is USA, select the *equal to* condition. A new list box appears on the right. The dialog box sentence now reads:

Select all records where a customer's Country is equal to

All that you need to complete the sentence is the value USA.

- 6 Click the arrow on the drop-down list. A list of all the country values appears. Select *USA* from the list.

The sentence now reads:

Select all records where a customer's Country is equal to USA

- 7 Click *OK* to return to the Design Tab.
- 8 Click the Preview Tab to review the results of your work.
- 9 Save this version of the report without overwriting the original report by choosing the *SAVE AS* command from the File Menu and giving the new report the name *USA.RPT*.


Congratulations! You have started formatting your report and have added selection criteria to it. More than that, you have learned how to manipulate your data. By now, you have a good idea of the powerful kinds of reports you can prepare. As you can see, it is an easy program to use.

Deleting a field

Now that the report only contains records from the USA, displaying the Country field in the body of the report is not necessary. You will quickly delete this before continuing.

- 1 Select the Country field and the Country column heading using the Ctrl-click combination.
- 2 Press the *DELETE* button on your keyboard. That is all it takes to delete fields from the report.

The report should now look similar to this:



Customer Name	City	Contact Name
City Cyclists	Stirling Heights	Christiansen, Chris
PerfIndust	DelCob	Blaney, Christine
Edie A. Glick Assocys Inc	Blacklick	Jacobs, Gary
Psycho-Cycle	Houstonville	Mart, Alexander
Sporting Wheels Inc.	San Diego	Reyes, Patrick
Kendrick Inc Joe's	Austin	Evans, Heather
Power Cyclists	Eden Prairie	Smith, Alex
Seaside M. Wheels Ltd	The Meadows	Chenier, Kristina

Balancing field spacing

Now that the Country field has been deleted, there is a large amount of white space between the City and Contact Name fields. You might be satisfied with the spacing as it stands, but it might be more readable if the columns were better balanced across the page.

- 1 Return to the Design Tab. Select the Contact Name field and its field heading by using the Ctrl-click combination.
- 2 Place the cursor over one of the two highlighted text objects and drag them to the left, closer to the City field.
- 3 Click the Preview Tab and review your work again.

The report should look similar to this:



The spacing between the fields is much better, but it looks as if the report title is off-center.

- 4 Click the report title object to select it.
- 5 Position the cursor on the right handle of the object until the cursor turns into a resizing cursor. Drag the right edge of the object frame until it is even with the right edge of the data in the Contact Name field object.

The report title automatically recenters itself based on the size of the object.

Grouping and sorting

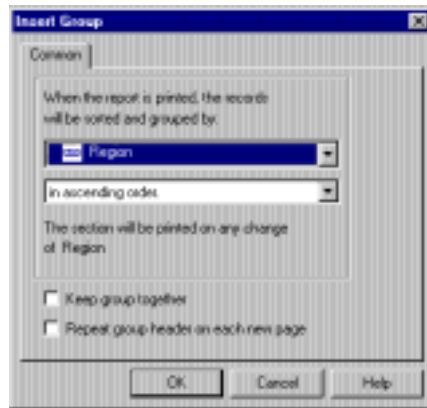
Reports can be grouped and sorted in a variety of ways. Sorting and grouping tools provide a great deal of flexibility for customizing reports.

Grouping the report



In many reports you need to break the data into groups in order to make it easier to read and to understand. Seagate Crystal Reports lets you do this easily. For this customer list, you will group the customers by region and then sort the customers alphabetically within each group.

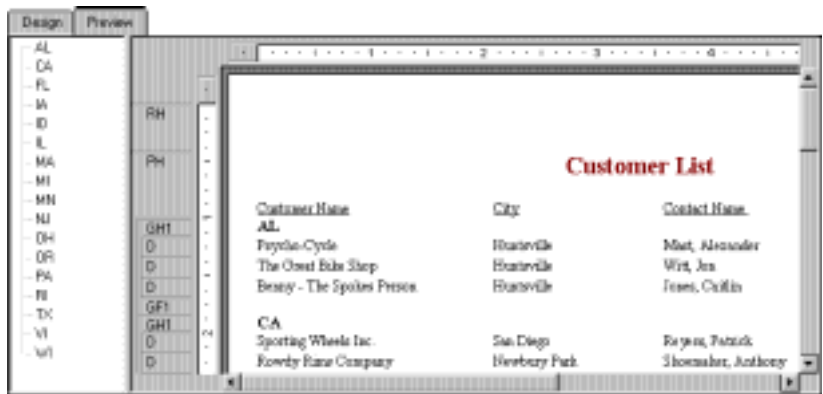
- 1 In the Design Tab, click the INSERT GROUP button on the Supplementary toolbar. The Insert Group dialog box appears.



- 2 Select the Region field from the Customer table in the first drop-down list. The program will now take all records with the same value in the region field and place them together in a group on the report.
- 3 Select *in ascending order* from the second drop-down list. The region grouping will be displayed on the report in alphabetic ascending order.
- 4 Click *OK*.

Notice that two new sections now appear in the Design Tab: GH1 (Group Header) and GF1 (Group Footer). This is how the program shows that the report has been grouped.

5 Click the Preview Tab to see what the report looks like.



6 If the group tree is not visible, click the TOGGLE GROUP TREE button on the Formatting toolbar to see the groups included in the report.

You can view the group of interest by simply clicking on the group name in the Group Tree. For example, to see the Texas customer group, simply click TX in the Group Tree. The program jumps to the Texas group, displaying that group in the Preview Tab. The Group Tree allows you to quickly jump to a specific group of interest instead of scrolling through the report looking for the group. For more information on the group tree, see *Group Tree view, Page 63*.

NOTE: For many reports, you will want to insert summaries, subtotals and grand totals. For example, when creating a sales report rather than a customer list, you would want to calculate the total sales amount for each region. See *Sorting, Grouping, and Totaling, Page 245*.

Understanding “live” group headers

When a group is inserted, a group name field is automatically inserted in the Group Header section of the report. The group name field displays the current group’s name. For example, if you group by region, when you preview the report, the group header for the CA (California) group will show “CA”.

The group field name is automatically formatted to stand out from the records in the group.

Sorting records

In a typical customer list report, customer names are listed alphabetically. In this example, you will sort the customer names alphabetically within each region.



1 In the Preview Tab, click the SORT ORDER button on the Standard toolbar. The Record Sort Order dialog box appears.



- The *Report Fields* list box displays all fields currently on your report. You can choose to sort based on any of these fields.
 - The *Sort Fields* list box displays the fields that are already sorted in the report. Since the region field has already been sorted, the sorting you are about to do will be within each region, and not for the entire report.
- 2 Highlight the Customer Name field and click the *Add* button. Notice that the Customer Name field now appears in the *Sort Fields* list box.
 - 3 Click the *Ascending* option button for the Sort Direction and click *OK*.
The report should now look similar to the following:

Customer Name	City	Contact Name
AL		
Benny - The Spoils Prince	Huntsville	Jones, Cuffin
Fryden-Cycle	Huntsville	Mart, Alexander
The Great Bike Shop	Huntsville	Wirt, Jan
CA		
Bike Shop from Mars	Newbury Park	MacCloud, John
Changing Gears	Irvine	Baker, David

Notice that the records within each group are in alphabetic order.

Completing the report

You have just one step left to complete the report. A company logo needs to be added to the first page of the report.

Inserting a company logo



In this section, you will place a company logo at the top of the first page of the report.

- 1 In the Design Tab, click the INSERT PICTURE button on the Supplementary toolbar. The Open dialog box appears.
- 2 Choose the xtreme.bmp and click *Open*. An object frame appears as you move the cursor over the report. The object frame represents the logo you will place.
- 3 Position the object frame in the upper left-hand corner of the Report Header (RH) section of the report and click once to place it.

Placing the logo in the Report Header (RH) section ensures that the logo is printed only on the first page of the report. See *Area printing characteristics, Page 59*.

NOTE: *Although there does not appear to be enough room in the Report Header (RH) section when you place the graphic, the section will automatically expand to accommodate the picture.*

- 4 Click the Preview Tab to view the report.

The final report should look like this:



- 5 Save the report by clicking the SAVE button on the Standard toolbar.

You have just completed your first report. It is an impressive report, and Seagate Crystal Reports made it easy to do.

Related Topics

For information about distributing reports (printing, exporting, etc.) see *Printing, Viewing, and Exporting, Page 121*.

8

Reporting on OLAP data

What you will find in this chapter...

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Working with OLAP data, Page 172

OLAP Reporting with Seagate Crystal Reports, Page 172

OLAP grid objects, Page 173

Updating an OLAP database location, Page 174

OLAP Language, Page 175

Working with Hyperion Essbase data (Report Script Method), Page 175

Working with Informix MetaCube (MetaCube SQL Method), Page 183

HANDS-ON (Reporting on OLAP data), Page 183

Introduction

Although relational databases such as SQL servers and PC databases are the most common source of data, Online Analytical Processing (OLAP) and Multi-Dimensional Data (MDD) are rapidly becoming popular data-storage and analysis formats. Seagate Crystal Reports provides the same access and reporting features for OLAP data sources that it provides for relational data.

NOTE: *The term OLAP is used in this topic to refer to all common forms of OLAP and multi-dimensional data storage and access systems.*

Many of the tools and dialog boxes Seagate Crystal Reports provides for working with OLAP data require a previous understanding of the OLAP concept. Make sure you are familiar with OLAP concepts and your OLAP software before attempting to design OLAP-based reports. If you are already familiar with OLAP, this chapter provides the information you need to extend OLAP data with Seagate Crystal Reports, the most powerful solution to analyzing any data.

Working with OLAP data

Seagate Crystal Reports now integrates some of the most powerful OLAP tools for report creation and design. If your company uses the multi-dimensional power of OLAP, you can easily design complex OLAP reports using Seagate Crystal Reports.

NOTE: *If you are not sure if your company uses OLAP, contact your Administrator.*

Many OLAP products allow you to quickly and easily manipulate dimensions and drill-down on complex data relationships through client-side spreadsheet and worksheet applications. However, only Seagate Crystal Reports lets you apply the most powerful reporting features available to your OLAP data, not only evaluating multi-dimensional data, but also formatting that data in presentation quality reports, and finally, distributing that data in any format to any location.

OLAP Reporting with Seagate Crystal Reports

There are many different OLAP vendors on the market today. You can use Seagate Crystal Reports to report on the following OLAP data sources:

- Seagate Crystal Info Cube
- Hyperion Essbase
- DB2 OLAP Server
- Informix MetaCube
- Microsoft SQL Server OLAP Services
- OLEDB for OLAP sources

There are different methods for reporting on these OLAP sources. The first method uses what we call the Grid Object Method. All of these OLAP sources can be used by the Grid Object Method to create OLAP aware, grid-like reports. To learn how to create reports using this method, see *How to create an OLAP report using the Grid Object, Page 183*.

Hyperion Essbase and DB2 OLAP Server can use another method, aside from the Grid Object Method. This method is called the Report Script Method. To learn more about this method see *Working with Hyperion Essbase data (Report Script Method), Page 175*.

Informix MetaCube uses a different method to access data from its OLAP engine. MetaCube reporting follows more of a relational report creation model. For more information, see *Working with Informix MetaCube (MetaCube SQL Method), Page 183*.

OLAP grid objects

When designing a report with OLAP data, Seagate Crystal Reports creates a primary report containing one or more OLAP grid objects. OLAP grid objects look and act much like cross-tab objects, but are designed specifically for OLAP data.

The OLAP grid object plots OLAP cube dimensions and fields across columns and rows, organizing hierarchies of data into bands. Highlight individual data cells or entire bands, format and pivot the entire grid or change the OLAP data entirely - only seconds are required to reshape complex multi-dimensional data into a clear and informative report.

The OLAP Grid, designed specifically for OLAP data, provides true, multi-dimensional reporting. Add multiple dimensions to either axis to analyze three, four or more dimensions in a single OLAP grid. Alternately, create groups in your report using the fields from one or more dimensions and multiple grid objects are generated, one per group.

Updating an OLAP database location

There are many situations in which the location of the OLAP data accessed by a report may change. For instance, the location of the OLAP server or database may actually change due to a restructuring of IS resources. In addition, another cube instance may have been successfully processed and reflect more current information. Alternately, some reports may be designed and developed on a smaller database that represents a subset or production version of the primary OLAP database, then ported over to the actual working database to report on real data. In either case, you must update the information about the locations of the OLAP server and database in your report files.

The location on an OLAP database may be changed. To preview the data correctly:

- The report must be altered to meet any structural changes in the cube.
- Any dimensions and generations contained in the report that are not in the cube must be removed or renamed.
- Any field referred to explicitly in the design of the report, such as a formula, must be removed or renamed.

If this is the case, the report file can be easily updated to point to the new location. Keep in mind, though, if a report contains one or more subreports, and the databases used for the subreports have changed name or location, you must also update each of the subreports.

To change a cube in the OLAP grid object:

- 1 Select the grid by clicking anywhere on it.
- 2 Right-click on the grid and choose a shortcut menu command or choose SET OLAP CUBE LOCATION from the Database menu.
- 3 Choose the new OLAP location that you would like to point to. If the report also displays dimension information in column format (i.e., in the multi-grid scenario), you need to use "set database location" to change to reference to the datasource by these "column fields".

NOTE: You can not change from one OLAP type to another, i.e., if working with Essbase you must only choose a different Essbase cube. Also, if a report contains more than one grid object, this process must be done for each grid object.

To change location for Essbase or DB2 OLAP Server using the Report Script Method:

- 1 Select SET LOCATION from the Database menu and choose the different location of server, application and database.
- 2 Log on to the new database.
- 3 Click DONE.

To change location for MetaCube using the MetaCube SQL Method:

- 1 Select SET LOCATION from the Database menu and choose the different DSS location you would like to use.
- 2 Log on to the DSS.
- 3 Click DONE.

OLAP Language

Different OLAP Databases have different OLAP terminology. This section is designed to help ease the pain that you may experience when trying to report from a cube.

NOTE: This applies only to the Grid Object. The term "Use Long Field Names" is a Holos term and is the same as an "alias" in Essbase or DB2 OLAP Server.

When selecting the appropriate rows and columns in your Grid Object, you will notice the term "Level". "Level 0" is the top dimension and listed in "level 1" are its children. In "level 2" are level 1's children and so on. 'Level' refers to a "Generation" in Essbase and DB2 OLAP Server.

Working with Hyperion Essbase data (Report Script Method)

Seagate Crystal Reports provides many features for working directly with Essbase data. This section provides conceptual information specific to creating reports based on Essbase databases. Essbase reports can be created using the Create Report Expert in Seagate Crystal Reports, just like any other report. Simply click the New button on the Standard toolbar, select a report style from the Report Gallery, and begin designing your report in the Create Report Expert.

The Data Tab of the Create Report Expert includes a button for accessing Essbase databases. Once you select an Essbase application and database, use the Members Tab of the Create Report Expert to specify dimensions and members to be included on a report. The Members Tab has been designed to resemble data selection dialog boxes that appear in Arbor Essbase client applications. If you have worked with Essbase before, you will quickly learn how to extract OLAP data in Seagate Crystal Reports.

Selecting members for dynamic reporting

If database members frequently change and are updated in an Essbase database, you should consider carefully how you add members to a report during the design process. Rather than select specific members from the database outline, forcing the data to be filtered out by the Essbase server, you should consider including entire generations or levels and filtering out specific members from the Seagate Crystal Reports client.

For example, consider the Product dimension in the Essbase Sample Basic database:



NOTE: This diagram displays only a portion of the Product dimension in the Sample Basic database.

If new products are frequently added and older products discontinued, a report that includes this dimension should be designed to be easily refreshed whenever a product change occurs. As an example, consider the following scenario:

- You have created a report that includes sales information for Cola, Diet Cola, Old Fashioned Root Beer, Birch Beer, Dark Cream Soda, and Vanilla Cream Soda. When you created the report, you selected each member individually from the database outline in an effort to exclude other products that you were not interested in.
- A recent corporate decision has now eliminated Dark Cream Soda because of low sales figures. In addition, a recent marketing study has suggested that a new Cherry Cola be added to the company's product line, and you decide to include sales figures for this soda in your report.

When you open the report and attempt to refresh the report data, Dark Cream Soda will no longer exist in the database, producing an error in your report. Furthermore, to add the Cherry Cola to the report, you must go through several steps to examine the new database outline, select the new member from the database, and add the member to the report.

A different approach to designing this report would be to select the descendants of the Product dimension, generation 3 of the Product dimension, or level 0 of the Product dimension. Any of these methods produces similar results, without using specific members. When new members are added or old members eliminated, a simple refresh will update the report.

What if there are certain members you want to exclude from the report? In the above example, Caffeine Free Cola, Diet Root Beer, Sasparilla, and Diet Cream Soda are not used in the sales report. These members can be much more efficiently excluded using the Select Tab in the Create Report Expert or using the Select Expert. Once members are filtered out through record selection, those members will never appear in the report, even after refreshing the report. If one of the excluded members is removed from the original database, the report remains unaffected.

Keep in mind, though, that more general methods of selecting data, as described here, force Seagate Crystal Reports to retrieve more data from the Essbase database, increasing network traffic and resources and increasing time spent generating the report on the local system.

Essbase database security

Seagate Crystal Reports fully supports Essbase security. There are no additional settings or layers that need to be invoked.

Since Seagate Crystal Reports forces users to log on to an Essbase server before accessing Essbase databases, the server is allowed to verify log on information. All security is turned over to the Essbase server, and access to data is controlled by the server.

If a user attempts to request member data from Essbase that they do not normally have rights to view, Essbase will not return the requested data to Seagate Crystal Reports. Only data that the user has rights to view is returned and displayed in reports. In place of data that the user does not have access to, Essbase returns the #NOACCESS value.

When Seagate Crystal Reports receives #NOACCESS from Essbase, it translates this message into a null data value. The database members that produce the #NOACCESS value still appear in the report, but a blank space appears where the actual data value would normally be.

Using the Suppress Missing Data check box of the Report Options dialog box or the OLAP Tab of the Options dialog box, you can prevent Essbase from returning even the #NOACCESS value and any database member combinations that produce #NOACCESS.

To illustrate what happens to data that a user does not have access to, examine the following sample data:

Qtr1	33
Qtr2	NOACCESS
Qtr3	55

Normally, Seagate Crystal Reports produces the following output on reports:

Qtr1	33
Qtr2	
Qtr3	55

With the *Suppress Missing Data* check box toggled on, the following data will appear in the report:

Qtr1	33
Qtr3	55

The report definition and the Essbase outline

A Seagate Crystal Reports file that reports on Essbase data is made up of a report definition, report data (optional), and an Essbase database outline (optional). The report definition is the core description of what data exists in the report, where that data comes from, and how the data looks when the report is printed or previewed on screen.

If you choose to store database data (actual data values stored in the database) with the report, you can save time generating the report when it is opened or printed in the future. However, if data values change in the original database, the report will not reflect these changes until you refresh the report data.

Additionally, an Essbase database outline can be saved with the report definition if the report, or a subreport, is based on an Essbase database. Having access to the Essbase database outline can be important when trying to view or edit existing report files. See *Server Independence of Reports*.

By default, Seagate Crystal Reports saves outline information of an Essbase database with any report that accesses it. Only information relevant to the data used by your report is saved, though.

When outline information is stored with a report, Seagate Crystal Reports has access to the original design of OLAP database information used to design the report. Such information allows you to make formatting changes to the report without reconnecting to the Essbase database.

NOTE: Actual Essbase DATA values (numeric data) are not stored with your report files unless the Save Data with Report check box from the File menu is toggled on.

You can prevent the program from storing database outline information with your report using the OLAP Tab in the Options dialog box. The OLAP Tab contains a Store Outline Information check box. By default, this check box is toggled on, but by toggling it off, you can keep database outlines from being stored with the report.

NOTE: In most cases, you should allow the program to store outline information with a report file unless drive space is a critical issue. Outlines increase the size of a report file and, therefore, require more disk space.

Storing database outlines

When you store a database outline with a report, the outline information is stored with the report definition file (a standard .RPT file). The database outline includes dimensions, members, consolidation attributes, expense attributes, any aliases defined in the Essbase Default alias table, and more.

Storing this information allows Seagate Crystal Reports to easily determine member parents, children, generations, and levels.

Although storing outline information with a report allows more flexibility and power when working with existing reports, changes to the database outline in the original Essbase database are not reflected in a report file until the report is updated. Without updating the report, Seagate Crystal Reports remains unaware of any discrepancies between the outline in the report file and the actual database outline in Essbase. You can update the outline stored with a report file using the Verify Database command on the Database menu.

Saving reports without outlines

If you choose not to include the database outline from your Essbase databases with your reports, be aware that the lack of an outline forces the program to depend on connectivity to the Essbase server anytime changes are made to the report.

Most reports should be saved with database outline information unless disk space is a critical issue on your system. For more information about how report files can be dependent on or independent of the Essbase server, see *Server independence of reports*, Page 179.

Server independence of reports

When you first create a report based on Essbase data, you must connect to the Essbase server to access the Essbase database. However, after you generate a report, you can save the Essbase database outline with the report, as described in the previous section, eliminating the need to have a connection to the server the next time you open the report file.

On the other hand, some report features require that you re-establish the server connection before printing or scheduling a report. A server connection can be re-established by the Log On Server command on the File menu, if no report is currently open, or the Log On Server command on the Database menu, if another report is already open. The independence of a report file, in regards to the Essbase server, is controlled by several factors.

You must have a connection to the Essbase server if:

- the report contains a cross-tab, and the database outline has not been saved with the report file,
- the report uses member aliases that are stored in an alias table other than the Default table, or
- the report uses an Essbase related UFL function, such as EssbaseGeneration or EssbaseAncestor, and the database outline has not been saved with the report file. For more information, see *The report definition and the Essbase outline, Page 178*).

Otherwise, you do not need to have a connection to the Essbase server as long as you do not plan to refresh the database data values in the report. A good set of rules to follow is:

- Cross-tabs require access to the database outline.
- Essbase related UFL functions require access to the database outline.
- Changes to database members that appear in the report require access to the server.
- Access to member aliases stored in the Default alias table require access to the database outline.
- Access to member aliases stored in an alias table other than the Default table require access to the original database.
- Changes to database data values that appear in the report require access to the original database.

Access to the database outline can be given either by saving the outline with the report (see The Report Definition and the Essbase Outline), or by having a connection to the Essbase server. Access to database data values that are not saved with a report can only be given through a connection to the Essbase server.

Updating Essbase server and database locations

If the location of the Essbase server or database changes, you must update the information about the server and database in report files. In addition, many reporting scenarios may require that you develop a report based on a smaller database that represents a subset or production version of the primary Essbase database.

In such cases, as long as the new database has the same structure as the original database that the report was based on, the report file can be easily updated to point to the new location. In addition, if a report contains one or more subreports, and the databases used for the subreports have changed name or location, you must update each of the subreports separately.

Seagate Crystal Reports provides several sample reports based on the Essbase Sample Basic database. By examining these sample reports, you may get ideas on how to design some of your own reports. Before you can use the subreports, though, you must update the location of the databases used for each one, based on the location of your Essbase server.

The following tutorial leads you through the process of updating the location of the databases used in the PL.RPT sample report located in the \Program Files\Seagate Software\Crystal Reports\Essbase directory.

With Seagate Crystal Reports running:

- 1 Choose the OPEN command from the File menu. The Open dialog box appears.
- 2 Locate and select the PL.RPT report file in the Open dialog box. By default, this report is installed in the \Program Files\Seagate Software\Crystal Reports\Essbase directory. When you have selected the report file, click OPEN, and the report file is opened inside Seagate Crystal Reports.
- 3 Choose the REFRESH REPORT DATA command from the Report menu. The Essbase Server Login dialog box appears.
- 4 Log on to your Essbase server using the user name and password you normally enter to log on. The Essbase Application & Database dialog box appears.

NOTE: If your Essbase server happens to have the same name as the server specified in the sample report, you do not need to change the server location. If so, the remaining steps are unnecessary.

- 5 Select the Sample application and the Basic database from your Essbase server. Click OK. Seagate Crystal Reports will continue prompting you for each subreport. You will be asked to log on to your Essbase server.
- 6 Save your report.

Efficient access of Essbase databases

Normally, when Seagate Crystal Reports connects to an Essbase database, it loads the entire outline for that database into memory. This may create an initial delay while the outline is loaded, but once loaded, queries to the database are fast and changes to your report can be made easily and quickly in the Preview Tab.

Since the entire database outline is loaded into memory all at once, though, the size of the Essbase outline that can be accessed is limited by the size of the machine's memory and virtual memory. If you work with large Essbase databases that contain many dimensions and members, you may encounter problems when trying to connect to an Essbase database.

To solve this problem, Seagate Crystal Reports allows you to optimize its performance with large Essbase databases. When large database optimization is toggled on, Seagate Crystal Reports does not load the Essbase outline into memory ahead of time. So any size database outline may be accessed without regard to the machine's available memory. The drawback is that Seagate Crystal Reports must retrieve outline information directly from Essbase each time it requires additional data, thus slowing database access time.

Optimizing for large Essbase databases

Use the following process to optimize Seagate Crystal Reports for working with large Essbase databases:

- 1 With Seagate Crystal Reports running, choose the **OPTIONS** command from the File menu. The Option dialog box appears.
- 2 Click the **OLAP Tab** to activate it. This tab provides several options specific to OLAP databases.
- 3 Toggle the *Optimize for Large Database* check box on.
- 4 Click **OK**.
- 5 Close Seagate Crystal Reports and then reopen the program. The program will now allow you to access any database, regardless of size.

NOTE: Any reports that are open when the *Optimize for Large Database* check box is toggled on will not be affected by this option. Seagate Crystal Reports will continue to work with this report with the database outline stored in memory.

NOTE: For more information on creating Hyperion Essbase reports search for *Working with Essbase in Crystal Reports online Help*. The topics included will detail step by step the creation of several different types of Essbase reports.

Working with Informix MetaCube (MetaCube SQL Method)

In addition to Info OLAP and Hyperion Essbase, Seagate Crystal Reports has been designed to work with MetaCube 4.02 and can take full advantage of MetaCube's 3-tier system.

Creating a report with MetaCube is very similar to creating a report based on any relational database. MetaCube is referred to as ROLAP, which stands for Relational Online Analytical Processing. When creating a report you will see a list of Tables, Sample tables and Predefined Queries with dimensions, attributes and measures. After you log on to the server you can choose the appropriate dimensions, attributes and measures and place them in your report just like you would fields in a relational database report. When working with OLAP data it is often a good idea to create a Cross-Tab style report. In addition it is also a good idea to add a filter to your report to limit the number of records that are returned when you run the report. This filtering can be done using the Record Selection Formula Editor in Crystal Reports.

HANDS-ON (Reporting on OLAP data)

How to create an OLAP report using the Grid Object

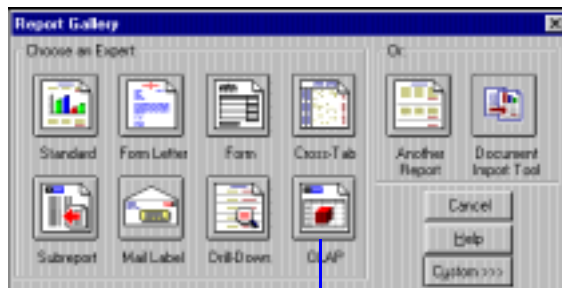
NOTE: The following tutorial demonstrates basic techniques for creating a report based on an Info OLAP cube.

The OLAP Expert in the Report Gallery of Seagate Crystal Reports provides a fast and easy method for designing reports based on OLAP data.

In order to design reports based on Info OLAP cubes, you must have a successfully scheduled instance of a cube. If you are not sure whether or not an OLAP cube has been successfully scheduled on your system, contact your Network Administrator. Once a successful instance of an Info OLAP cube exists, you can begin designing reports based on that cube:

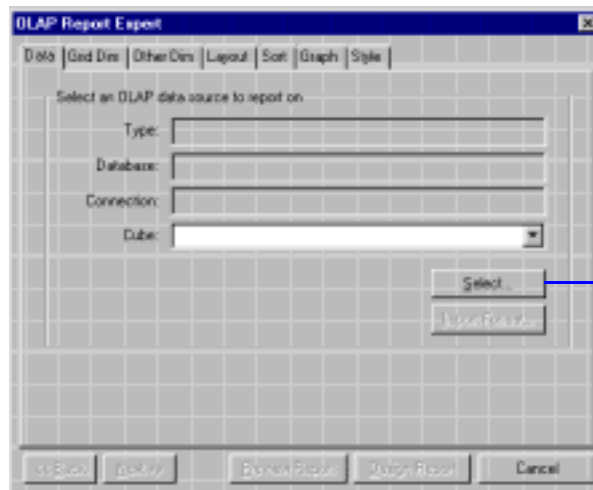
- 1 Click the New button on the Standard toolbar.

The Report Gallery appears.



2 Click the OLAP button to create a report using the OLAP Report Expert.

The OLAP Report Expert appears with the Data Tab active. The Data Tab allows you to select an Info OLAP cube to design a report.



3 Click Select.

NOTE: It is possible to use OLAP data with other report types that appear in the Report Gallery. However, only OLAP dimensions and fields are available to other report formats. No OLAP data values or aggregate values can be accessed. Such reports are most often used by Info OLAP Administrators that need to design reports based on the structure of the OLAP cube rather than the data contained within the cube.

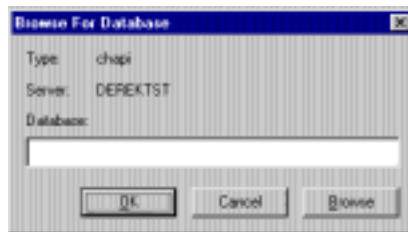
The Choose OLAP Type dialog box appears.



4 Select the Info OLAP Cube.

NOTE: The types of OLAP servers you can connect to may vary. Contact your Network Administrator to find out what types of servers you may connect to.

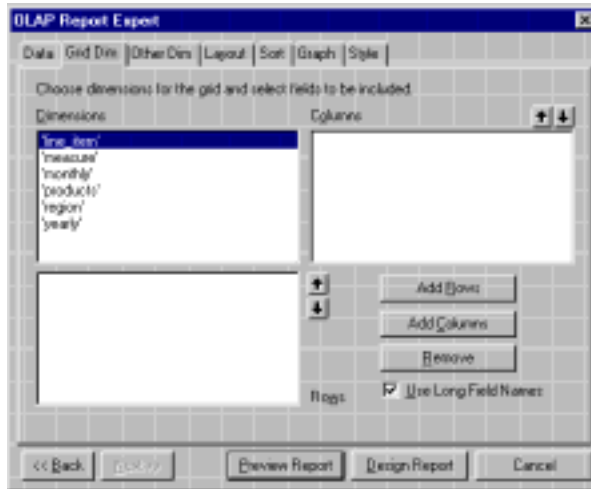
5 Click OK. The Browse For Database dialog box appears.



6 Click the *Browse* button and use the files and directories dialog box to locate an instance which appears as an *.HDC file in a location designated by your Network Administrator.

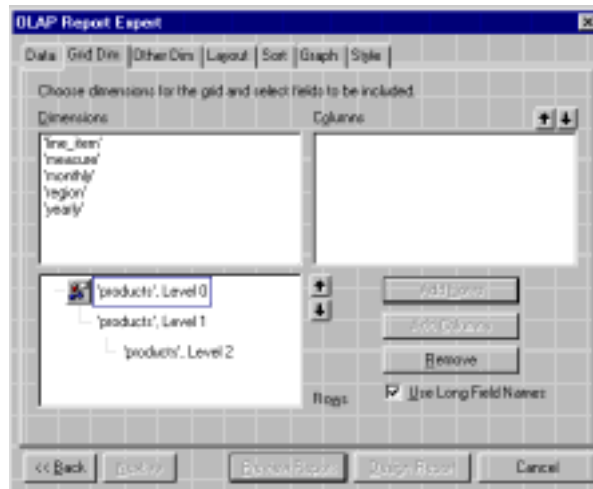
7 Click OK. You are returned to the OLAP Report Expert.

8 Click the Grid Dim Tab to activate it.

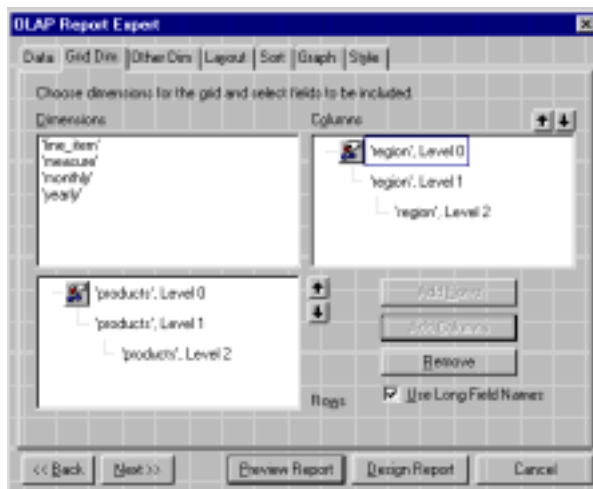


NOTE: The Show Long Names check box is toggled on by default. This means that, for example, the month field will be displayed as January, February, etc., as opposed to M01, M02, etc. You can toggle between long and short names in your report by returning to the OLAP Report Expert and toggling the Show Long Names check box on and off on the Grid Dim Tab. Use the Grid Dim Tab to specify the dimensions that will appear in the rows and columns of your report. This tutorial will show you how to create a report that analyzes products by region.

- 9 Highlight the products dimension in the *Dimensions* list box and click *Add Rows*. The generations of the products dimension appear in the Rows list box.

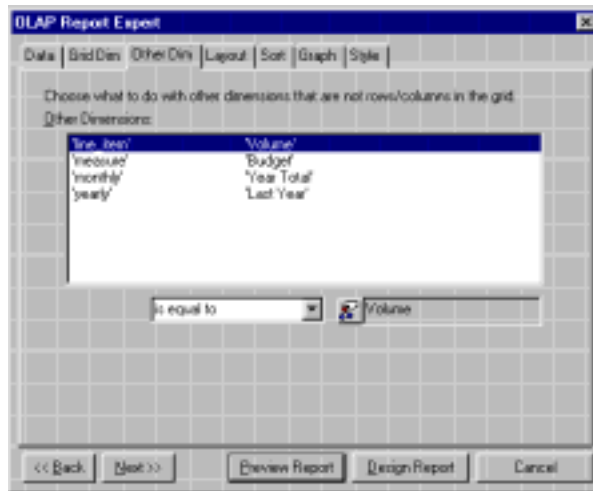


- 10 Highlight the region dimension in the *Dimensions* list box and click *Add Columns*. The generations of the region dimension now appear in the *Columns* list box. Optionally you can click on the dimension icon to bring up a field picker, from it you can specify which subset of fields to display on the grid row/column.



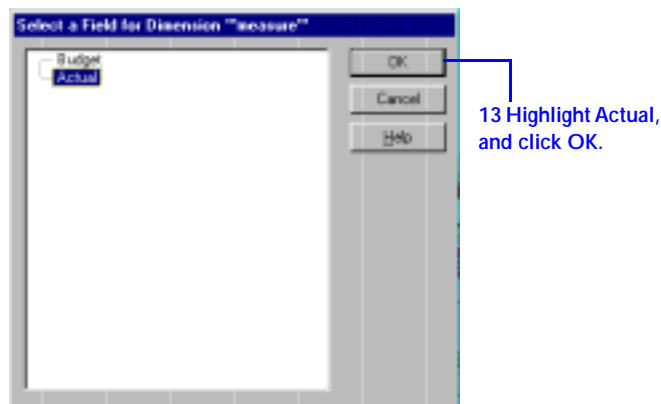
At this point, you have successfully performed all of the necessary steps for designing an OLAP report.

- 11 Click the Other Dim Tab.

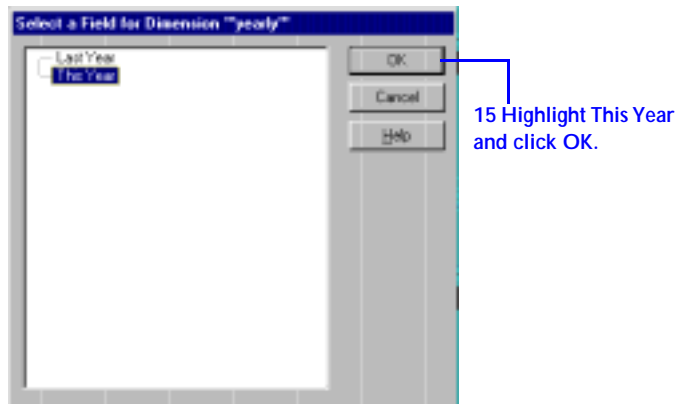


The *Other Dimensions* list box displays all of the dimensions you did not use in the Grid Dim Tab. The Other Dim Tab lets you specify how dimensions that do not appear in your grid will affect the data for the dimensions that do appear in the grid. For example, the measure dimension currently displays the Budget member. This means all values in your report will represent budgeted data. However, you may want the values in your report to represent actual data.

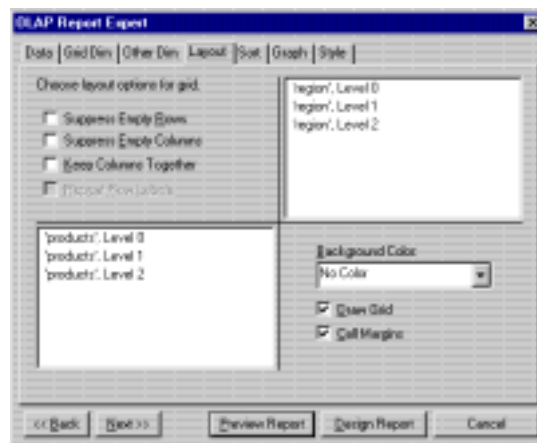
- 12 To change this so that the report uses Actual sales data, highlight the measure dimension in the *Other Dimensions* list box, and click the *Select Fields* button. The Select a Field for Dimension "measure" dialog box appears.



- 14 To change the report so that it uses This Year data, instead of Next Year data, highlight the yearly dimension, and click the *Select Fields* button. The Select a Field for Dimension "yearly" dialog box appears.



- 16 Finally, to use Sales Revenue data in the report instead of Volume data, highlight the line_item dimension, and click the *Select Fields* button. The Select a Field for Dimension "line_item" dialog box appears.
- 17 Highlight Revenue and click OK. Your report will display Sales Revenue of products in the line_item dimension in the Other Dim Tab.
- 18 Click the Layout Tab of the OLAP Report Expert.

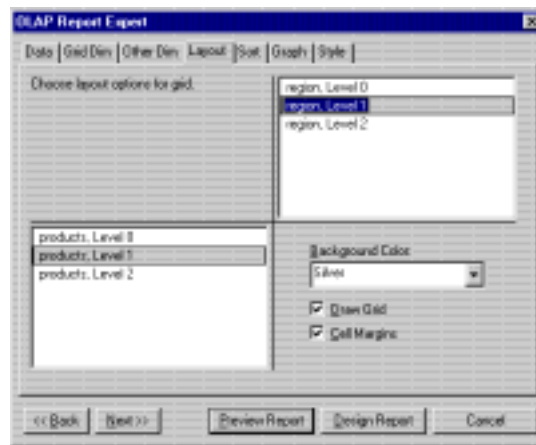


- 19 Use the Layout Tab to design the general look of the OLAP Grid

object. You will use it now to highlight the generation 2 aggregates of the products and region dimensions.

- 20 Highlight *products, Level 1* in the *Rows* list box (the bottom left list box).
- 21 Select *Silver* from the *Background Color* drop-down list for level 1 data of the products dimension. A silver rectangle appears around the highlighted item in the list box.
- 22 Highlight *region, Level 1* in the *Columns* list box (the top right list box), and select *Silver* for the background color.

The Layout Tab should now look like this:



At this point, you have connected to an OLAP database, selected dimensions and fields from the database, and formatted the report. Now, it is time to preview the results of your work.

- 23 Click Preview Report.

This Grid object can be formatted or moved anywhere in the report, and more Grid objects or other subreport objects can be added to the primary report. As you can see, designing OLAP reports is exceptionally easy. After designing a few reports using your own OLAP data, you will quickly master this powerful report design technique.

How to create a MetaCube report

- 1 Start Seagate Crystal Reports, and click the NEW button on the

Standard toolbar.

- 2 Click *Standard* from the Report Expert Gallery dialog box.
- 3 Scroll down in the list box in the Data Tab and click on *MetaCube*.
- 4 In the RDBMS Login & Choose DSS System dialog box, click *OK* to log on to the Demo database for this example.
- 5 Choose *Brand Channel Net Profit* from the *SQL Tables* list box.
- 6 Click *Add*, then click *Done*.
- 7 Click the Fields Tab to choose dimensions and members.
- 8 In the Fields Tab, select the fields you want from the *Database Fields* list box and click *Add*. In this case, select *Channel*, *Brand* and *Net Profit*.
- 9 Click the Sort Tab. Select *Brand Channel Net Profit.Channel* from the *Report Fields* list box and click *Add*. To view the report, click *Preview Report*.

NOTE: You may have to adjust the column widths of the fields and field headers to see all the data. If you wish to hide the Channel Field column simply select the top element in the field, click the right mouse button and select *DELETE* from the shortcut menu.

How to apply a filter to a MetaCube report

Imagine you wish to only see the records where net profit was \$50,000 or above. The following instructions explain how to apply a filter using the report created from the tutorial on creating a MetaCube report. For more information, see *How to create a MetaCube report, Page 190*.

- 1 Choose *EDIT SELECTION FORMULA | RECORD* command from the Report Menu.
- 2 In the Fields list box double click *Brand Channel Net Profit.Net Profit*. Type in *>= 50000*. Click *ACCEPT*.
- 3 Click *USE SAVED DATA* in the Change in Record Selection Formula Detected dialog box you will notice that records with net profit under 50000 have disappeared.

How to create a MetaCube cross-tab report

- 1 From the Report Gallery dialog box, choose the Cross-tab Expert. From the list box in the Data Tab, scroll down and click *MetaCube*.

- 2 In the RDBMS Login & Choose DSS System dialog box click OK to login to the Demo database for this example.

NOTE: If you have already been working with MetaCube reports during this session, step 2 may not be necessary.

- 3 In the choose SQL table dialog box choose Audio Sales YTD by Channel and Click ADD. Do the same for Brand Channel Net Profit. Click DONE. Click the Cross-Tab Tab.
- 4 In the *Report Fields* list box, drag and drop *Channel under Audio Sales YTD* by Channel to the *Rows* list box, *Brand under Brand Channel Net Profit* to the *Columns* list box, and *Net Profit under Brand Channel Net Profit* to the *Summarize Fields* list box. Click *Preview Report* and you will see a cross-tab report based on the fields you selected. Save the report.

How to add a field to a MetaCube cross-tab report

This tutorial is based on the report created in the tutorial for creating MetaCube cross-tab reports.

- 1 Select the entire cross-tab object by clicking in the top, left-hand corner of the object above the top row header, to the left of the far left column header.
- 2 Choose FORMAT CROSS-TAB from the Format menu.
- 3 In the Cross-Tab dialog box select Fiscal Year under Audio Sales YTD by Channel and drag and drop it to the *Columns* list box.
- 4 Click OK. Notice Fiscal Years is now added to the Cross-Tab report.
- 5 Save the report.

How to pivot fields in a MetaCube Cross-Tab report

This tutorial is based on the report created in the tutorial on how to add a field to a MetaCube cross-tab report. Because of the numerous brands, the report is difficult to work with as far as viewing data or printing. To make it more user friendly, it would be beneficial to switch the fields so that the columns became rows and rows became columns.

- 1 Click on the top column header "Alden" and drag it so that it is positioned over the row header "Department Stores" and drop it.
- 2 Now take the row header and drag it so it is positioned over the

column header "Year 1996" and drop it.

- 3 Finally, take the "Year 1996" column header, position it over the Alden row header and drop it.

How to add a formula to a MetaCube report

This tutorial is based on the report created in the tutorial on how to pivot fields in a MetaCube report.

- 1 Select the entire cross-tab object by clicking in the top left hand corner of the object above the top row header and to the left of the leftmost column header. Choose FORMAT CROSS-TAB from the Format menu.
- 2 Click New Formula. In the Formula Name dialog box, type in *Net Profit Per Unit*. Click OK.
- 3 In the Formula Editor dialog box, double-click *Brand Channel Net Profit.Net Profit* in the *Fields* list box, type "/" and double-click *Audio Sales YTD by Channel.Units Sold* in the *Fields* list box. Click Accept.
- 4 Now select *Brand Channel Net Profit.Net Profit* in the *Summarized Fields* list box and Click *Remove*. Drag and drop the formula @Net Profit Per Unit to the *Summarized Fields* list box. Click OK. You will notice the data has changed to reflect the formula.

9

Multiple Section Reports

What you will find in this chapter...

Using multiple sections in reports, Page 196

HANDS-ON (Multiple Section Reports), Page 197

Using multiple sections in reports

Seagate Crystal Reports provides five design areas to use when building your report:

1. Report Header,
2. Report Footer,
3. Details,
4. Page Header, and
5. Page Footer.



Each area contains a single section when you first create a new report. Certain reporting tasks are performed most efficiently by creating multiple sections within an area, such as:

- keeping variable length objects from overwriting each other (see *How to prevent variable length objects from overwriting each other*, Page 197),
- putting conditional messages in form letters (see *How to print conditional messages in form letters*, Page 205),
- eliminating blank lines when fields are empty (see *How to eliminate blank lines*, Page 207), or
- adding blank lines under specific conditions (see *How to add blank lines conditionally*, Page 208).

Once you understand the power of multiple sections, you will discover even more ways to produce the effects you want.

Related Topics

How to add, delete, move, and merge sections, Page 79

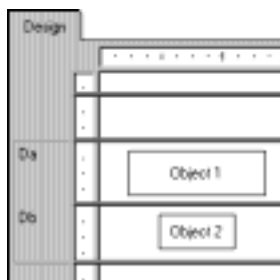
HANDS-ON (Multiple Section Reports)

How to prevent variable length objects from overwriting each other

When subreports or other variable length objects are placed above other objects in one section of the report while the *Can Grow* option for the variable length object is toggled on in the Format Editor, that object may overprint objects positioned directly below it unless you have:

- expanded the section to fit the maximum size of the object, and
- spaced the objects, allowing enough space for the first object to complete printing before the second one begins. See *Types of formatting properties, Page 211*.

You can eliminate this overprinting problem by creating multiple sections in an area and placing objects below the variable length object in their own section(s).



Now, when the report runs, the section with the variable length object will finish printing before the section below it prints and you will get the results you want. See *FOR TWO UNRELATED REPORTS, Page 425*.

NOTE: *Memo and BLOB fields, as well as subreports, can cause overprinting.*

How to work with text objects

You will use many of the capabilities of text objects when creating form letters. A brief discussion of text objects should make it easier for you to create the form letter in the next section.

- A text object can contain both text and fields; you will use both in this example.
- You can resize text objects; you will be resizing the text object so that it prints as a letter.

Text objects operate in two modes:

1. the move/resize mode, and
2. the edit mode.

Move/Resize mode

When the object is in the move/resize mode, it appears as a broken line frame with resizing handles.



In this mode, you can resize the object by dragging any of the resizing handles, or you can move it by placing the cursor inside the object and dragging it to a new location. You can also insert fields in this mode, but you can not insert text. You put a text object into the move/resize mode in one of two ways:

1. by clicking the text object when it is inactive, or
2. by clicking the frame when the object is in edit mode.

Edit mode

When the object is in the edit mode, it appears as a broken line frame without sizing handles, and an in-place ruler appears at the top of the tab.



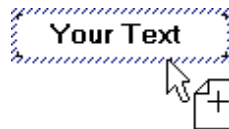
When you first place a text object, the program sets it in the edit mode. You can also put a text object into the edit mode by double-clicking it if it's inactive or in the move/resize mode.

Each text object contains word processor capabilities, including the ability to change the fonts for individual characters and fields, and automatic word wrap. In the edit mode you can insert text and such non-text objects as database fields and formulas. Whenever the object is in edit mode, it contains an insertion point, a flashing vertical line that indicates the position at which typed text or inserted fields will begin.

The insertion point moves as you type, automatically staying to the right of the last character. It also moves when you insert a field, automatically staying to the right of the field. It moves one character position at a time when you press the space bar. It moves down one line, to the inside left edge of the text object, when you press Enter. It moves to your cursor position when you click anywhere within the existing text.

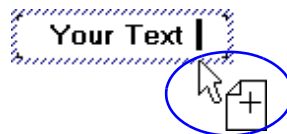
As you work through the tutorials for multiple sections, it is always expected that you will type or place fields at the existing insertion point, unless otherwise indicated.

- To select text within a text object (to delete it, to change a font, etc.), position the cursor over the text and, when the I-beam cursor appears, drag the cursor to highlight the text you want to select. See *Cursors*, Page 54.
- To select a field which is inside a text object, position the cursor over the field and, when the I-beam cursor appears, right-click.
- To insert text, type in the desired text and it will appear at the insertion point.

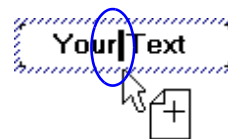


NOTE: It is critical that you see the drag and drop cursor before placing the field. If it does not appear, you might place the field so that it overlays the text object instead of being inserted into it. It may appear to be inside the text object, but if you move the object the field will not move with it.

- The insertion point is tied into the drag and drop cursor. If you have existing text or fields in the text object, the insertion point moves as you move the drag and drop cursor, enabling you to pick the exact position where you want to place the field. The program always places the field at the insertion point.



As you move the drop cursor...



the insertion point moves.

Related Topics

How to insert text objects, Page 108

How to create a form letter using a text object

While form letters themselves are not necessarily multi-section reports, they are often used in multi-section reports to generate custom mailings. The topic *How to print conditional messages in form letters*, Page 205, explains how to use multiple form letters or multiple versions of the same form letter for custom mailings. The following section shows you how to create a form letter.

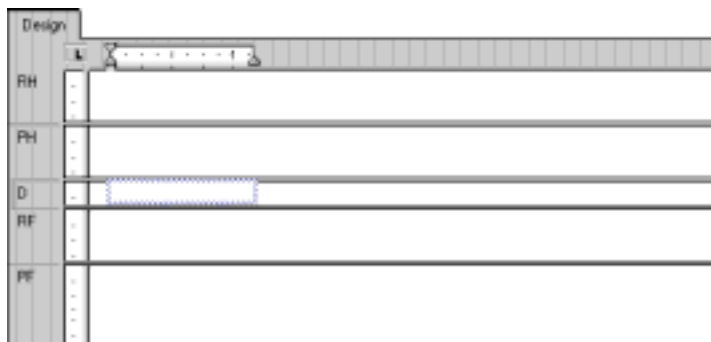
You are going to use a text object to create a form letter. The form letter you create will be tied to a database table so that each letter will be customized with company information from a different record.

If you have difficulty performing any of the steps in this tutorial, please see *How to work with text objects*, Page 197.

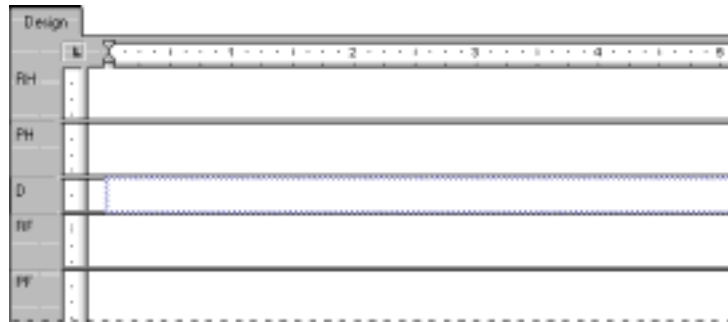
Creating the form letter

The letter will consist of a date, an inside address, a salutation, a one paragraph letter body, and a closing section.

- 1 Create a report using the Customer Table of xtreme.mdb. The Design Tab appears with the Database Tab active in the Insert Fields dialog box.
- 2 Since you do not want field titles to appear above the fields that you insert into the letter, toggle the *Insert Detail Field Titles* option off on the Layout Tab of the Options dialog box.
- 3 Insert a text object into the Details section of the report.



- 4 Click the text object frame to put the object in move/resize mode.
- 5 Drag the resizing handle on the right side of the object to the right edge of the Design Tab. This will make the object about eight inches wide, the approximate width of a page. You may have to stop resizing, scroll the window, and resize some more to accomplish this.



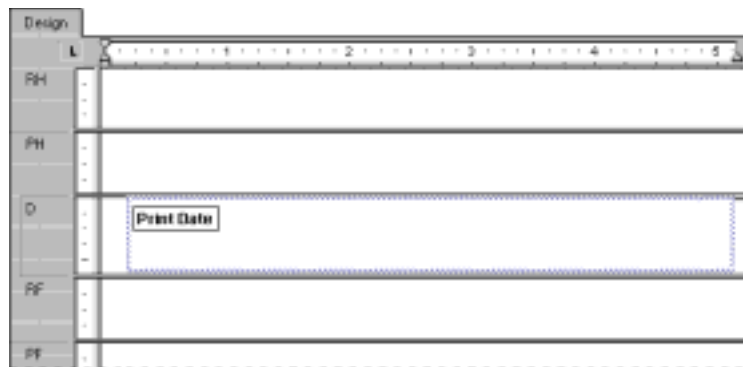
- 6 Double-click inside the text object to place it in edit mode. It is now ready for you to begin your work. The insertion point appears at the extreme left, inside the object.

DATE

- 1 To insert a date into the letter, select the PrintDate field on the Others Tab of the Insert Fields dialog box, drag the placement frame into the text object, and place it at the insertion point.

NOTE: To change the way the date is formatted in the letter, first click the border of the text object to put it in move/resize mode, right-click the PrintDate field, choose **FORMAT [PRINTDATE]** from the shortcut menu that appears, and make your modifications on the Date Tab of the Format Editor when it appears.

- 2 Press Enter twice to insert some white space between the date and the inside address and to move the insertion point down within the text object.

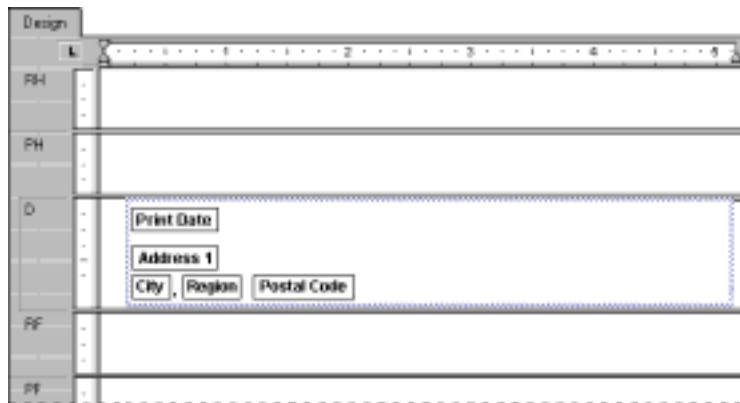


INSIDE ADDRESS

To create the inside address, drag database fields into the text object from the Customer table on the Database Tab of the Insert Fields dialog box.

- 1 Drag in the Address 1 field and place it at the insertion point, and press ENTER. The insertion point moves down to the line below.
- 2 Drag in the City field and place it at the insertion point.
- 3 Type a comma, followed by a space.
- 4 Drag in the Region field and place it at the insertion point.
- 5 Type in two spaces.
- 6 Finally, drag in the Postal Code field, place it at the insertion point, and press ENTER. The insertion point moves down to the line below.
- 7 Press Enter one more time to move the insertion point down one more line to the position where the salutation should start. This completes the inside address.

NOTE: When a field is placed within a text object, it is automatically trimmed on both the left and right sides, so that it contains no extra white space.



SALUTATION

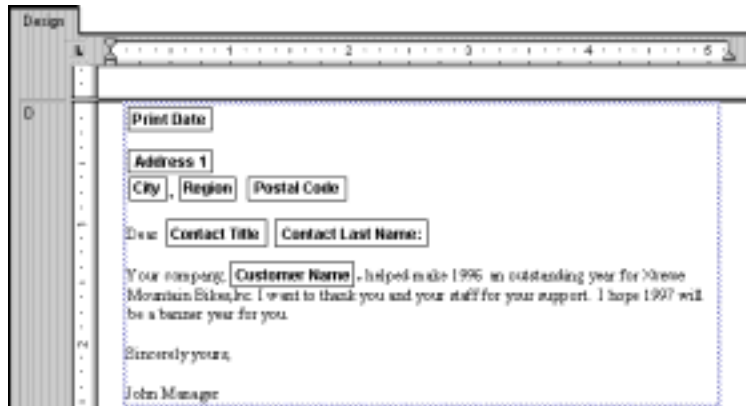
- 1 Press ENTER four times to move the insertion point down.
- 2 Type in the word "Dear" and a space (do not include the quotation marks).

- 3 From the Insert Fields dialog box, highlight the Contact Title field from the Customer table and drag it into the text object, placing it immediately after the space.
- 4 Type a space. The program positions the insertion point immediately after the space.
- 5 Again from the Insert Fields dialog box, drag the Contact Last Name field into the text object and place it at the insertion point. The insertion point moves to the right of the field.
- 6 Type a colon “:” at the insertion point (without the quotation marks) and press ENTER to move the insertion point to the next line.

LETTER BODY

- 1 Now type “Your company” (do not include the quotation marks) and type a comma followed by a space.
- 2 Drag the Customer Name field into the text object and place it at the insertion point, just after the space.
- 3 Type a comma, followed by a space.
- 4 Type the following text (do not include the quotation marks):
“helped make 1996 an outstanding year for Xtreme Mountain Bikes, Inc. I want to thank you and your staff for your support. I hope 1997 will be a banner year for you.”
- 5 Press ENTER twice.
- 6 Type “Sincerely yours” (without the quotation marks), followed by a comma, and then press ENTER four times.
- 7 Finally, to complete the form letter, type your name.

The Design Tab should look similar to this:

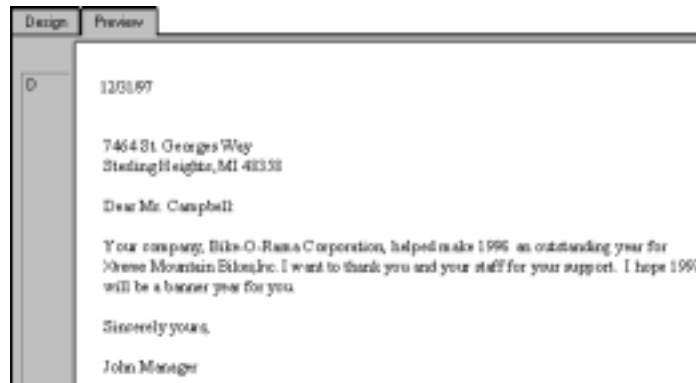


The screenshot shows the Design tab of a Crystal Reports form letter. The layout includes a ruler at the top, a 'Print Date' field, an 'Address 1' field, and fields for 'City', 'Region', and 'Postal Code'. Below these is a 'Dear:' field with sub-fields for 'Contact Title' and 'Contact Last Name:'. The main body of the letter contains a paragraph: 'Your company, [Customer Name], helped make 1996 an outstanding year for Moose Mountain Elix, Inc. I want to thank you and your staff for your support. I hope 1997 will be a banner year for you.' This is followed by a signature line: 'Sincerely yours, John Manager'.



- 8 Click the PRINT PREVIEW button on the standard toolbar to preview the form letter.

It should look similar to this:



The screenshot shows the Preview tab of the same Crystal Reports form letter. The fields are now populated with data: the date is '12/31/97', the address is '7464 St. Georges Way, Sterling Heights, MI 48338', and the salutation is 'Dear Mr. Campbell:'. The body text remains the same, with 'Bike-O-Rama Corporation' as the company name. The signature 'Sincerely yours, John Manager' is also present.

How to format objects conditionally

You may want to create a report that uses different formats depending on the field value. For example, you may want to create an international report that prints currency values for each country in the format that is common in that country. You can do that using multiple sections.

1 Create a report. See *Tutorial - Customer List, Page 147*, and *Introduction to Reporting, Page 85*.

2 Create one Details section for each country that requires a unique format. See *How to add, delete, and move guidelines, Page 72*.

3 Make certain that each of the Details sections contains the same data; every field that you place in the Details A section, you must also place in the Details B section, and in the Details C section, etc.



4 In the Details A section, select the currency field and then click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears.

5 Set the currency values you want to use for the first country. See *Formatting, Page 209*.

6 Click OK to return to the report.



7 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.

8 Select the Details A section in the *Sections* list box. Toggle the *Suppress (No Drill-Down)* check box on.



9 Click the *Conditional Formula* button to the right of the *Suppress* check box and use the Format Formula Editor to create a formula that specifies the conditions under which the section should be suppressed.

For example, if the Details A section contains currency values for the UK, you would create a formula that specifies that the country value is not equal to UK. In other words, you create a formula that suppresses the section when the country value is not UK. This will make the section print only when the record contained a UK value.

10 Repeat Steps 4 through 9 for each additional section.

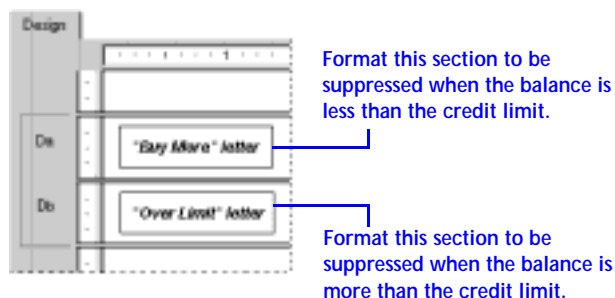
Now, when the report is printed, the date and currency data for each country appears in the format that is expected for that country. See *Conditional formatting, Page 212*.

How to print conditional messages in form letters

It is likely that you will want to print conditional messages in form letters. For example, you may want to encourage customers with available credit to buy more and those who are over their credit limit to bring their accounts down below the limit once again. You can create both of these letters within a single report.



- 1 Use the Section Expert to insert a second Details section in the report. See *How to add, delete, move, and merge sections*, Page 79.
- 2 Create two form letters. Place a letter that encourages customers to buy more in the Details A section of the report; place a letter that encourages customers to bring their balance down in the Details B section of the report. See *How to create a form letter using a text object*, Page 200.
- 3 Use the Section Expert to format the Details sections so that each is suppressed under certain conditions. For example:



Now, when a record indicates available credit, the *buy more* letter will print. When the account is over limit the *over limit* letter will print. And when the customer is right at the credit limit, nothing will print at all.

Related Topics

How to format objects conditionally, Page 204

Conditional formatting, Page 212

How to alternate background colors for rows



Another typical use of multiple sections is to vary the background color in alternating lines for the Details section of your report in order to improve readability (a greenbar-paper effect).

- 1 Use the Section Expert to insert a second Details section. You should now have Details A and Details B sections. See *How to add, delete, move, and merge sections*, Page 79.
- 2 While in the Section Expert, highlight Details A in the *Sections* list box, click the *Color* Tab, and set the background color to White. See *Formatting*, Page 209.



- 3 Click the Common Tab, click the *Conditional Formula* button to the right of the *Suppress (No Drill Down)* option, and type the following formula in the Format Formula Editor when it appears:

`Remainder (RecordNumber , 2) <> 0`

«This formula divides the record number by 2 and if the remainder is something other than zero (which will happen for every odd numbered record), it tells the program to suppress the section.»

Search for *Formula Compiler Errors* in Seagate Crystal Reports online Help.

- 4 Now select Details B and set the background color to Green.
- 5 Use the technique from Step 3 to set the *Suppress* option conditionally for this section using the following formula:

`Remainder(RecordNumber, 2) = 0`

«This formula divides the record number by 2 and if the remainder is equal to zero, it tells the program to suppress the section.»

- 6 Create the report and make certain that the information and layout of each of the Details sections is identical. In other words, whatever objects you put in Details A should be put into Details B as well.

Now when you run the report, the program will print every even numbered line with a white background and every odd numbered line with a green background.

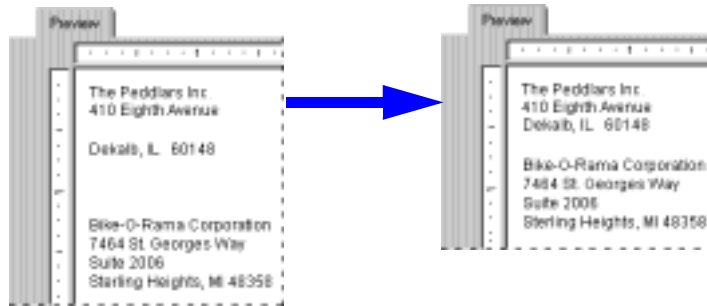
How to eliminate blank lines

It is very common to have two address lines in a customer table, one (Address 1) for street address and one (Address 2) that can be used for a suite number or mail stop. Address 1 usually contains a value but Address 2 is often blank. If you create a customer list using this data and stack the fields on top of one another in mailing label format, those customer records with an empty Address 2 field will print with a blank line. You can eliminate this blank line using multiple sections.



- 1 Use the Section Expert to create two new Details sections so that you have a total of three. See *How to add, delete, move, and merge sections*, Page 79.
- 2 Place the Address 2 field in the middle section and the other data in the sections above and below it as you want it to appear in the report.
- 3 Format the middle section to *Suppress Blank Section*. See *How to hide parts of a report*, Page 114.

Now, when the report prints, if the Address 2 section is blank, the program will not print it and you will not get unwanted blank lines in the report.



Before suppressing blank lines, the Address2 field prints a blank line if it is empty.

After suppressing blank lines, the Address2 field does not print if it is empty.

How to add blank lines conditionally

Use multiple sections to print a blank line on your report under specific conditions. For example, you may want to insert a blank line after every fifth record in the report.

- 1 Create two Details sections. See *How to add, delete, move, and merge sections*, Page 79.
- 2 Put the report detail data in the top section.
- 3 Leave the second section empty.
- 4 Format the second section to be suppressed unless the following condition is met:

```
Remainder (RecordNumber,5) <> 0
```

«This formula divides each record number by 5. If the division produces a remainder, it suppresses the blank section. But if the division produces no remainder, a zero (which it will for every fifth record printed), the program prints the second section, thus inserting a blank line.»

NOTE: To insert a blank line under different conditions, you can modify your formula appropriately. See *Conditional formatting*, Page 212.

10

Formatting

What you will find in this chapter...

Formatting concepts, Page 210

Absolute formatting, Page 211

Types of formatting properties, Page 211

Conditional formatting, Page 212

HANDS-ON (Absolute Formatting), Page 215

HANDS-ON (Conditional Formatting), Page 221

Formatting concepts

In this section, you will learn about formatting a report. Formatting refers to those things that are done to change the layout and design of a report, as well as the appearance of text, objects, or entire report sections.

You can use formatting to do many things, including:

- divide sections of a report,
- call attention to certain data,
- change the presentation of dates, numbers, Boolean values, currency values, and text (strings),
- hide unwanted sections, or
- give the report a professional appearance.

Seagate Crystal Reports offers a wide range of formatting commands and properties which can be applied to various elements of a report.



- Use formatting commands by choosing or setting options in dialog boxes that are specific to the kind of formatting you are doing. For example, to change page margins, use a dialog box that allows you to specify the top, bottom, right, and left margins.
- Set formatting properties in either the Format Editor (for objects) or the Section Expert (for sections) by toggling check boxes on and off or by supplying attribute values. In most cases, you can set one of two types of properties:
 - Absolute (always apply the property), or
 - Conditional (apply the property only if certain criteria are met).

You can use both kinds of formatting properties wherever you need them in the report. See *Absolute formatting*, Page 211, and *Conditional formatting*, Page 212.

In the topics that follow, you will learn about the kinds of formatting you can do with Seagate Crystal Reports, and you will get step-by-step instructions for performing a variety of formatting tasks.

NOTE: *There are many date formats you can choose to use in your English report, but if you send the report to a Japanese system, there may be some formatting irregularities. Not all English date formats are viewable on a Japanese system, and the same is true going from Japanese to English. For more information, see Japanese Dates in Seagate Crystal Reports online Help.*

Absolute formatting

Absolute formatting is formatting that applies under any condition.

SELECT, THEN APPLY

Absolute formatting always follows a *select, then apply* procedure:

- you *select* what it is that you want to format (an object or a section), and then
- you *apply* the formatting to the selection using property settings.

Use the following dialog boxes for formatting reports:



- Format Editor for formatting field values.
 - Borders Tab for formatting objects, numbers, and text,
 - Box Tab for formatting boxes, and
 - Line Tab for formatting lines.
- Section Expert for formatting entire sections.
- Highlighting Expert for formatting currency and number fields.

Each of these dialog boxes contains a number of different formatting properties as well as the tools for turning the properties on or off, or for specifying attributes. Search for the dialog box by name in Seagate Crystal Reports online Help.

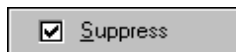
Types of formatting properties

Formatting properties fall into two general categories:

1. On or Off Properties, and
2. Attribute Properties.

ON OR OFF PROPERTIES

An on or off property is a property that is set using a check box.



- When this check box is toggled on, the property is always applied.
- When this check box is toggled off, the property is never applied.

The *Suppress* property is one such on or off property; an object or section

is either suppressed (on) or it is not (off).

ATTRIBUTE PROPERTIES

An attribute property is a property that specifies one of many possible attributes. The *Color* property, for example, gives you the opportunity to specify one of the 16 basic Windows colors or a custom color and then to create that color using the tools provided. Clearly such a property cannot be handled with a simple on or off switch.

You set an attribute property in one of several ways, depending on the property. You can set it:

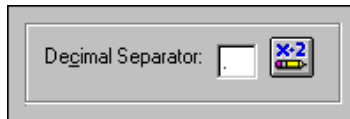
- by clicking an option button,



- by selecting an attribute from a drop-down list,



- or, by typing an attribute in a text box.



Conditional formatting

Conditional formatting is formatting that applies only under certain conditions. For example, in a report you may only want:

- customer balances printed in red if they are past due,

- the dates to appear in Day, Month, Year format if the customer is Canadian, or
- background color to appear on every other line.

Seagate Crystal Reports makes it easy to apply formatting conditionally in these and hundreds of other situations. See *How to format objects conditionally*, Page 204.

With absolute formatting you follow the *select, then apply* procedure. For conditional formatting you follow the same general procedure, but you go a step further and set up conditions that determine whether or not the formatting will be applied. You specify these conditions using simple formulas. See *Introduction to Formulas*, Page 291.

NOTE: When you set up a conditional formatting formula, the formula overrides any fixed settings you have made in the Format Editor. For example, if you toggle the Suppress option on and then set up a conditional formula for the Suppress option, the property will still apply only if the condition in the formula is met.

The program enables you to set both on and off properties and set attribute properties conditionally. However, each of these requires a different kind of formula.

Conditional on or off properties

A conditional *on* or *off* property tests to see if a condition has been met. It is *on* if the condition is met, *off* if the condition is not met. There is no middle ground. Use Boolean formulas for this kind of formatting.

```
Value = condition
```

The program tests each value to see if it meets the condition and it returns a yes or no answer. It then applies the property to every value that returns a yes answer.

Conditional attribute properties

A conditional *attribute* property tests to see *which* of two or more conditions is met. The program then applies the formatting appropriate to the condition. For example, assume that you want values under quota printed in red and all other values printed in black. The program tests to see whether the value is under quota or not. If it is under quota, then it applies the *red* attribute; if it is not, then it applies the *black* attribute.

Use an If-Then-Else formula for this kind of conditional formatting. See *How to create If-Then-Else formulas*, Page 316.

```
If Condition A Then
    Red
Else
    Black
```

NOTE: When conditional attribute properties are set up, the program loads a selection of attributes into the Functions list in the Formula Editor. Double-click any of these attributes to add them to your formula. For example, if you are setting horizontal alignment conditionally, the Functions list box will contain attributes such as *DefaultHorAligned*, *LeftAligned*, *Justified*, etc. If you are setting borders conditionally, the Functions list box will contain attributes such as *NoLine*, *SingleLine*, *DashedLine*, etc.

You can take this kind of property one step further. You can specify a list of conditions and a property for each; you are not limited to two conditions. For example, if you have a number field on your report that contains sales figures from countries around the world, you can specify the number attribute(s) that you want to apply to each country. In this case, your conditions would specify that if it is from Country A, the program should apply the Country A attribute; if it is from Country B, the Country B attribute; if it is from Country C, the Country C attribute, and so on.

With more than two alternatives, use this kind of formula:

```
If Condition A Then
    Red
Else If Condition B Then
    Black
Else If Condition C Then
    Green
Else
    Blue
```

Use a multi-condition If-Then-Else formula for this kind of conditional formatting. See *How to create multi-condition If-Then-Else formulas*, Page 317.

Values that do not fit any condition

With **conditional on or off** properties, values will either meet the condition you set or they will not. But **conditional attribute** properties are different. There may be some cases in which values do not fit any of the conditions set up.

For example, if you set:

- all sales figures that are more than 10% over quota to appear green, and
- all sales figures that are less than 10% over quota to appear red,

what is going to happen to values that are exactly 10%? The program takes care of that automatically. When a value does not fit any of the conditions in the formula (in this example, all values that are 10%), the program formats that value using the attribute setting in the dialog box.

In this example, if the *Color* drop-down list on the Font Tab of the Format Editor is set to Blue for the sales field, all values that are exactly 10% will appear in blue. The dialog box setting does not override the formula setting; it simply provides an attribute when the formula does not.

Several Hands-On topics are included showing how to format sections and objects conditionally. These topics both detail specific reporting needs and illustrate basic procedures.

HANDS-ON (Absolute Formatting)

How to add color, shading, and borders

Seagate Crystal Reports allows you to add color, borders, and shading to fields on your report in order to emphasize important data and create professional looking reports.

- 1 Right-click the field you want to format and choose CHANGE BORDER from the shortcut menu.

The Format Editor appears with the Border Tab active.



- 2 Select the border type (line style), color, placement, and background color you want and click *OK* when finished.

The program formats the selected field to your specifications.

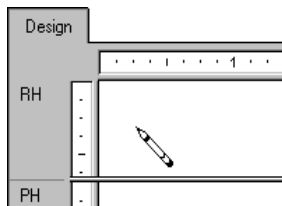
How to add/edit lines and boxes

Seagate Crystal Reports allows you to add lines and boxes to a report to emphasize important data and create professional-looking reports.

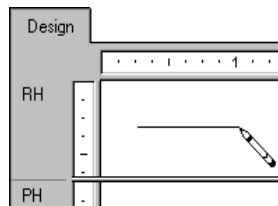
Adding lines



- 1 Click the INSERT LINE button on the supplementary toolbar. A pencil-shaped cursor appears.



2 Use the Pencil cursor to draw the line where desired.



Editing lines

- 1 Right-click the line you want to format and choose FORMAT LINE from the shortcut menu. The Format Editor appears with the Format Line Tab active.



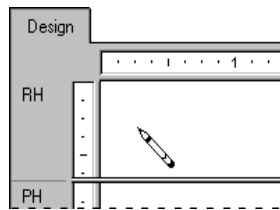
2 Make the desired changes and click OK when finished to return to your report.

The program formats the selected line to your specifications.

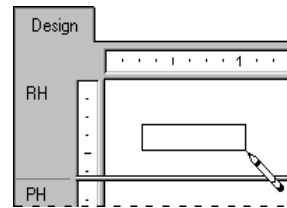
Adding boxes



- 1 Click the INSERT BOX button on the supplementary toolbar. A pencil-shaped cursor appears.

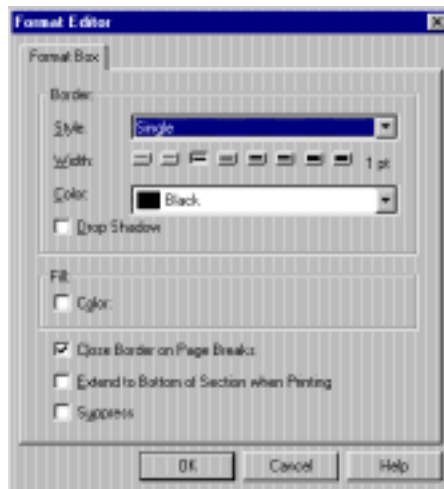


2 Use the pencil cursor to draw the box where desired.



Editing boxes

- 1 Right-click the box you want to format and choose **FORMAT BOX** from the shortcut menu. The Format Editor appears with the Format Box Tab active.

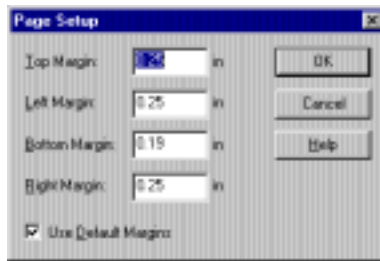


2 Select the color, width, style, and/or fill color you want and click OK when finished.

The program formats the selected box to your specifications.

How to change margins

- 1 Choose the **PAGE SETUP** command from the File Menu. The Page Setup dialog box appears.

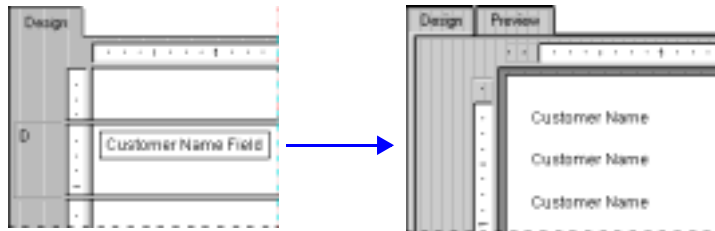


2 Change the default page margins to fit your needs and click OK when finished.

All margins are calculated from the paper edge. Thus, a left margin of .25 inches causes the printing to start exactly one quarter inch in from the edge of the paper.

How to add/delete white space between rows

The height of a section in relation to the objects within it affects the amount of white space that appears between rows on the report.



The free form Design Tab allows you to add and delete white space in two ways:

1. by using the Resizing cursor to resize the area in the Design Tab, or
2. by changing the options in the Section Expert.

NOTE: You can also right-click the shaded area to the left of the section and choose **FIT SECTION** from the shortcut menu. The program automatically resizes the section so that the bottom boundary is even with the baseline of the bottom object in the section. See *How to eliminate blank lines*, Page 207.

Deleting white space by resizing

To delete unnecessary white space within a section, simply move the mouse pointer over the lower section boundary line. The pointer will change to a Resizing cursor.



When the Resizing cursor appears drag the section boundary upward to remove extra white space.

Your report will print like this...



Deleting white space using the Section Expert



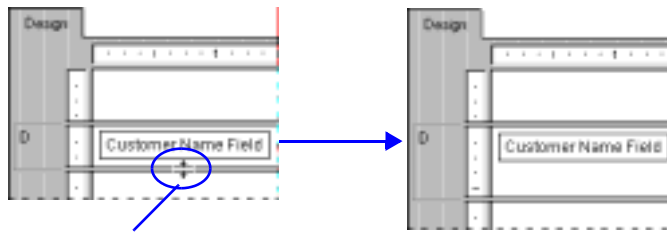
If an entire section is blank (for instance, if you are not putting anything into the Page Footer section of the report), you can eliminate the unnecessary white space by suppressing the section in the Section Expert.

- 1 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.
- 2 Highlight the Page Footer section in the *Sections* list box.
- 3 Toggle the *Suppress (No Drill-Down)* check box on.
- 4 Click *OK* to return to the report.

The Page Footer section will no longer print.

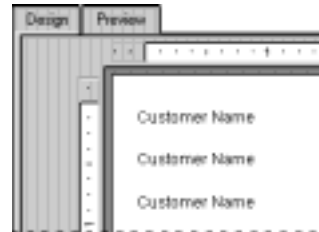
Adding white space by resizing

To add extra white space between rows in the report, simply move the mouse pointer over the lower section boundary line. The pointer will change to a Resizing cursor.



When the Resizing cursor appears, drag the section boundary downward to add extra white space.

Your report will print like this...



NOTE: White space can also be added to a section by right-clicking the shaded area to the left of the section and choosing **INSERT LINE** from the shortcut menu. The program resizes the section automatically, adding the amount of space necessary to hold a line of typical database fields.

Related Topics

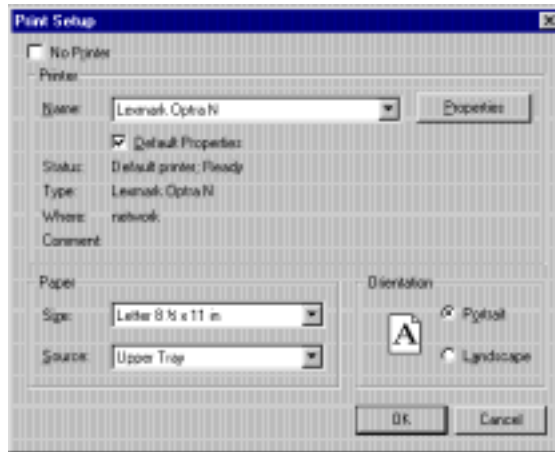
How to add, delete, and move guidelines, Page 72

How to add blank lines conditionally, Page 208

How to set page orientation and paper size

You can print your reports using either portrait or landscape orientation, and in a variety of paper sizes. You can specify these options using the **PRINTER SETUP** command on the File Menu.

- 1 Choose the **PRINTER SETUP** command from the File Menu. The Print Setup dialog box appears.



- 2 Activate the printer you want to use if it is not already the active printer. The options for paper size are directly related to the selected printer.

For example, the HP LaserJet driver (PCL) offers a choice of letter, legal, executive or A4 paper sizes, whereas the PostScript printer driver lets you choose from letter, legal, note, A4, B5, letter small, and A4 small paper sizes.

- 3 Select either Portrait or Landscape orientation by clicking the appropriate option button in the *Orientation* section.
- 4 Select the desired paper *Size* and *Source* from the drop-down lists in the *Paper* section.
- 5 Click *OK* when finished.

NOTE: The *Remove* and *Remove All* buttons can also be used to delete formulas.

HANDS-ON (Conditional Formatting)

How to create a footer that appears on all pages but the first

You may choose to print a page footer on all pages except the first page. You can do this by formatting the Page Footer section conditionally, using an *on* or *off* property.

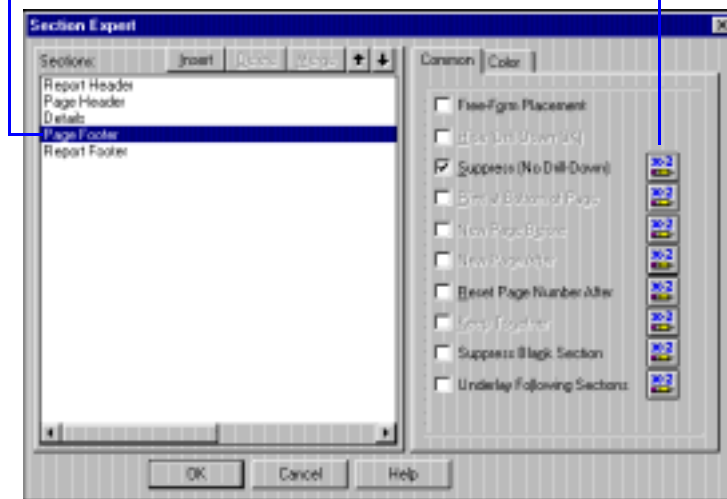
- 1 Place the field you want displayed as a page footer in the Page Footer section of the report.



- 2 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.

- 3 Highlight the Page Footer section from this list.

- 4 Click the Conditional Formula button to the right of the Suppress property to open the Formula Editor.



- 5 Enter the following formula in the Format Formula Editor:

`PageNumber = 1`

This formula suppresses the page footer on the first page but not on any of the other pages.

- 6 Click the *Save formula and Close* button.
 - If there is an error in the formula, a message box appears, asking whether to exit without examining the error. If you click *No*, a second message box will be displayed, detailing the error.
 - If there is no error in the formula, you are returned to the Section Expert. Note that the *Formula* button has changed. This indicates that a formula has been entered for that property.

Search for *Formula Compiler Errors* in Seagate Crystal Reports online Help.



- 7 Click the PREVIEW button on the standard toolbar to preview the report and ensure that the page footer appears on all pages but the first.

NOTE: If you have a multi-line page footer and you have inserted the lines into separate Page Footer sections, you will need to suppress each of those sections conditionally, using the formula above.

NOTE: To create a page header that appears on all pages but the first, put the header information in the Page Header section and then suppress that section conditionally, using the same formula that was used for suppressing the Page Footer section.

How to conditionally format fields using the Highlighting Expert

NOTE: You can only highlight currency and number fields.



- 1 Right-click the currency or number field you want formatted and choose HIGHLIGHTING EXPERT from the shortcut menu, or select the frame you wish to highlight and click the HIGHLIGHTING button on the Formatting toolbar. The Highlighting Expert appears.

2 Select a comparison from this drop-down list.

3 Enter a numeric value in the adjacent text box.

- 4 To specify formatting changes, set the *Font color*, *Background*, and *Border* using the appropriate drop-down lists in the Item editor section of the dialog box.
- 5 Apply new formulas as needed. Use the *Priority* arrow buttons to specify the priority for each formula.
- 6 Click *OK* to return to the report.

How to Use the Highlighting Expert

Seagate Crystal Reports includes a powerful Highlighting Expert that allows you to efficiently apply conditional formatting to currency and number fields. The Highlighting Expert is most commonly used for highlighting field values that are in some way distinguished from the other values in the report. For example, if you wanted to highlight the {customer.LAST YEAR'S SALES} field in red whenever the sales are greater than \$25,000, you could specify in the Highlighting Expert that, if the value is greater than \$25,000, a red background color is applied to the field. You can also use the dialog box to set conditional font color and border style.

NOTE: *Think of the Highlighting Expert as an alternative to the formula editor. The Highlighting Expert essentially runs the following equation: If Condition is True, Then Apply These Formatting Specifications. For this purpose, the dialog box is divided into two sections, the Item list section (which displays the formula), and the Item editor (which allows you to set the formula). The Item editor includes a Sample view to demonstrate the formatting specifications applied.*

Here are some additional benefits to note:

- The Highlighting Expert can also be used for numeric/currency fields in Cross-tabs, as well.
- You can undo highlighting.

Setting highlighting priorities

The Priority buttons in the *Item list* section of the Highlighting Expert allow you to set the priorities for your formulas. This is useful when you have two or more formulas that could offer conflicting results in some situations.

For example, suppose you are highlighting the Unit Price field on the report. You assign to this field a highlighting formula that shows a yellow background when a unit price is greater than \$100. Imagine then, that on this same report, you create another highlighting formula that shows a red background when a unit price is greater than \$200. Considering that 100 is a subset of 200, you could have Unit Price fields with yellow backgrounds when, in fact, those fields should have red backgrounds. In other words, a unit price of \$300 could receive either a red or a yellow background depending on which formula has been assigned priority.

To set the priority for a formula:

- 1 Select the formula.

- 2 Use the *Up* and *Down* Priority buttons to move the selected formula to a position above or below the conflicting formula(s).

NOTE: A formula has priority over another formula when it is higher in the Items list section.

- 3 Click *OK*.
- 4 Refresh the report (or click the Preview tab) to see the highlighting changes.

NOTE: The Remove and Remove All buttons can also be used to delete formulas.

11

Record and Group Selection

What you will find in this chapter...

Record selection, Page 228

Group selection, Page 231

Record selection formula templates, Page 233

HANDS-ON (Record and Group Selection), Page 238

Record selection

Specifying records/groups to be included

When a field is selected to appear on a report, field values from every record in the active table(s) are printed by default. In many cases, you may not want to include all the values, but only a subset of those values. For example, you may want to include:

- records only for a specific group of customers,
- records for a specific range of account numbers out of the total number of records in the database, or
- values from only those records that fall within a particular date range.

You can select records in one of two ways:

1. by using the Select Expert, or
2. by using the Formula Language.

Setting up record selection

USING THE SELECT EXPERT

Seagate Crystal Reports includes a very sophisticated formula language which you can use to specify virtually any type of record selection. However, you may not always need the flexibility in record selection that the formula language provides. The Select Expert is designed for such instances.



NOTE: *The Select Expert can be used to set up both record selection and group selection requests. When a group name or summary field is selected, the program knows that the selection criteria set up is intended for group selection. In all other cases, the program knows that you are setting up record selection.*

The Select Expert makes it easy to specify the records you want included in your report. You simply highlight the field on which you intend to base your selection and then set the selection criteria. If you want to set additional criteria for the selected field or if you want to base record selection on additional fields, then the Select Expert provides the tools you need. See *How to set up record selection using the Select Expert, Page 238*, and search for *Select Expert* in Seagate Crystal Reports online Help.

The Expert can be used to set up simple record selection requests. For example:

- customers from Arizona,
- orders in the first quarter, or
- sales over \$10,000.

The Expert can also be used to set up some very sophisticated requests:

- customers whose names start with “A”, “M”, or “S”, or
- customers from California or Florida who ordered in July.

These are all range limit requests. One or more constants define the range. The program compares the field value in each record to the constant(s) and rejects records with values outside the range. The report is thus limited to values within the range. The Select Expert handles requests like this with ease.

NOTE: When creating a range limit request based on part of a field value, you are limited as to what you can do in the Select Expert.

You can set up all of these types of record selection requests without any previous knowledge of the formula language.

NOTE: You can use the formula language from within the Select Expert if you wish, but that masks its main purpose. The Select Expert's purpose is to create powerful record selection requests using simple point-and-click processes.

USING THE FORMULA LANGUAGE

If you are planning to create a selection formula using the formula language, you can go directly to the appropriate Selection Formula Editor by using the EDIT SELECTION FORMULA command on the Report Menu, then choose either RECORD or GROUP from the submenu.

From the Selection Formula Editor, you can build your selection request using fields, functions, operators, and other formulas. The only restriction is that the resulting formula must be Boolean; that is, it must return either a True or False value.

Related Topics

For complete instructions on creating formulas, see *Introduction to Formulas, Page 291*.

For sample record and group selection templates, see *Record selection formula templates, Page 233*, and *How to use record/group selection templates, Page 241*.

Search for *Record/Group Selection Templates* in Seagate Crystal Reports online Help.

DETERMINING WHAT FIELD(S) TO USE

When you select records, you are basing your report only on those records that meet some conditions that you have set. You base those conditions on what kind of information you want in the finished report.

Assume, for example, that you want a report that only shows California data. The challenge is to find the best way to identify those records that come from California.

- If the table used in a report has a State field or a Region field, you can specify in your request that the program use only those records in which the value in the state field is equal to California (Region is equal to CA). This is clearly the easiest way.
- If the table does not have a State field and you still want to report only on California data, there may be another way to identify that data.
 - If the table has a Postal Code field, you could base your record selection on the range of ZIP codes that apply to California (Postal Code is between n and N).
 - If the table has an Area Code field, you could base your record selection on California Area Codes (Area Code is one of x, y, \dots, z).

NOTE: *If the Area Code is stored in the telephone number field, you will not be able to do this same record selection using the Select Expert based on the Area Code. You will have to create a record selection formula using the formula language to extract the Area Code part of the phone number and then do record selection based on that. Search for Subscript in Seagate Crystal Reports online Help.*

Clearly you are not locked into any one method of record selection. However, you should still use caution when you set up your selection criteria. For a list of details to consider, see *Selection performance tips*, Page 236.

NOTE: *As a general rule, if you can base your record selection on a number of fields (as in this example), you should select an indexed field instead of a field that is not indexed. See Indexed tables, Page 511.*

Interaction of the Select Expert and the Selection Formula Editor

The Select Expert and the Selection Formula Editor are interactive. That is, record selection criteria you enter via the Select Expert automatically generates a record selection formula which can be reviewed and modified using the *Show Formula* button in either the Select Expert or the Record Selection Formula Editor. Likewise, record selection formulas and modifications to existing record selection formulas automatically update the selection criteria in the Select Expert.

Because of this interactivity, you can use the two facilities together as a tutorial for learning the formula language.

- 1 Use the Select Expert to set up the selection criteria.

- 2 Click the SHOW FORMULA button and the Select Expert expands so you can review the formula the program generated based on your criteria.
- 3 Click the HIDE FORMULA button when you are done with your review.
- 4 Change your selection formula using the Select Expert.
- 5 Review the updated formula by clicking the SHOW FORMULA button again.
- 6 As you gain confidence and decide to make changes using the formula language, click the FORMULA EDITOR button in the expanded Select Expert and use the tools in the Record Selection Formula Editor to make your formula changes.
- 7 Review the results of those changes in the Select Expert. Select each field used in the record selection formula and observe how the program translates your formula into Expert selection criteria.

NOTE: Selection formula components that do not fit any of the fixed criteria in the Select Expert will not be translated. For example, if part of your record selection formula extracts the last four characters in a customer number, then the section of the formula code that performs that extraction will not be converted to Select Expert selection criteria. The Select Expert has no facility to perform such an extraction simply by pointing and clicking.

Group selection

When you group or summarize data, all the groups in the report are included by default. There may be times, however, when you do not want to include all the groups. For example:

- You might want to see only those groups that have certain group names, or whose summarized values meet a certain condition.
- You might want to see only the groups with the highest summary values, or the lowest.

You can select the groups that appear in the report in several different ways.

You can do some selections by using either a record selection formula or a group selection formula. For example:

- If you have a mailing list grouped by Region and your record selection formula specifies only California customers ({customer.REGION} = "CA"), your report will have only a single group: California.

- If you have a group selection formula that specifies only groups with the group name “CA” (`GroupName({customer.REGION}) = "CA"`) and no record selection formula, you will get an identical report, assuming that the California condition was the only selection test in both situations. However, if the group selection method is used, it could take longer to get the report back.

Select Expert

You can select groups of records using the Select Expert in the same way that you can select individual records.

Instead of basing the selection criteria on standard fields, as you do for record selection, you base your criteria on group name fields or summary fields when you are setting group selection criteria.

- If you have grouped your data but you have not summarized it, you can only set up group selection based on the group name field. For example, you may want to select only those groups whose Region is Massachusetts:

```
GroupName ( {Customer.REGION} ) = "MA"
```

- If you have summarized your data, you can set up group selection based on either the group name field or the summary field. For example:

```
Sum( {Customer.LAST YEAR'S SALES} ,  
      {Customer.REGION} ) > 10000
```

NOTE: *The Select Expert can be used to set up record selection and group selection requests. When a group name or summary field is selected, the program knows that the selection criteria you set up is intended for group selection. In all other cases, the program knows that you are setting up record selection.*

Formula language

You can also select groups using the formula language. To do this, activate the Group Selection Formula Editor by choosing the GROUP command from the Report | Edit Selection Formula Menu.

In the Formula Editor you can build your group selection request using group fields, group name fields, and other formulas. As with record selection formulas, your only restriction is that the formula you create must be Boolean; that is, it must return either a True or False value. See *Introduction to Formulas, Page 291*.

Top N

At times, you might want to show only the “top” or “bottom” groups in a report: the fastest selling product lines, the least productive sales regions, the states that generate the most orders, etc. Because this kind of group selection is so popular, the program includes the Top N Sort Group Expert for setting it up easily.



You access the Top N Sort Group Expert by clicking the TOP N button on the supplementary toolbar. Use this Expert to specify first whether you want to display the Top N or Bottom N groups and then specify which number *N* is to represent.

For example:

- To report on the three fastest selling product lines, select the top N option in the Top N Sort Group Expert and set *N* to be equal to three.
- To report on the five least productive sales regions, select the bottom N option in the Top N Sort Group Expert and set *N* to be equal to five.

The program will display those groups as specified.

But there is one other element to consider when setting up Top N group selection and that is what to do with all the records from other groups that do not fit the Top N or Bottom N criteria you have set. You need to decide whether to eliminate those records from your report entirely or to lump them all together into a single group. The program enables you to do choose either option. See *How to select the top or bottom N groups, Page 242*.

Record selection formula templates

Formula templates

The following sample formulas can be used as templates to help you create your own selection formulas using the Record Selection Formula Editor. The examples illustrate different selections that you *could* do, not necessarily the best selections. To help identify the best way to set up your record selection, see *Selection performance tips, Page 236*.

NOTE: All of these formulas are available in Seagate Crystal Reports online Help, so you can copy them directly into the Selection Formula Editor. Search for Record selection formula templates in Seagate Crystal Reports online Help.

Record selection templates

FOR SELECTING RECORDS USING CHARACTER STRINGS

```
"C" in {file.FIELD}[1]
```

«Selects those records in which the value in the {file.FIELD} field begins with the character "C" (includes values like CyclePath, Corp. and Cyclist's Trail Co.; excludes values like Bob's Bikes Ltd. and Feel Great Bikes, Inc.).»

```
not ("C" in {file.FIELD}[1])
```

«Selects those records in which the value in the {file.FIELD} field does not begin with the character “C” (includes values like Bob’s Bikes Ltd. and Feel Great Bikes, Inc.; excludes values like CyclePath, Corp. and Cyclist’s Trail Co.).»

```
"999" in {file.FIELD}[3 to 5]
```

«Selects those records in which the 3rd through 5th digits of the {file.FIELD} field is equal to “999” (includes values like 10999, 70999, and 00999; excludes values like 99901 and 19990).»

```
"Cycle" in {file.FIELD}
```

«Selects those records in which the value in the {file.FIELD} field contains the string “Cycle” (includes values such as CyclePath Corp. and CycleSporin, Inc.; excludes values like Cyclist’s Trail Co. and Feel Great Bikes, Inc.).»

FOR SELECTING RECORDS USING NUMBERS

Single values

```
{file.FIELD} > 99999
```

«Selects those records in which the value in the {file.FIELD} field is greater than 99999.»

```
{file.FIELD} < 99999
```

«Selects those records in which the value in the {file.FIELD} field is less than 99999.»

Range of values

```
{file.FIELD} > 11111 and {file.FIELD} < 99999
```

«Selects those records in which the value in the {file.FIELD} field is greater than 11111 but less than 99999 (neither 11111 or 99999 is included in the range of values).»

```
{file.FIELD} >= 11111 and  
{file.FIELD} <= 99999
```

«Selects those records in which the value in the {file.FIELD} field is greater than 11111 but less than 99999 (both 11111 and 99999 are included in the range of values).»

FOR SELECTING RECORDS USING DATES

The Month, Day, and Year functions can all be used in examples like the following:

```
Year ({file.DATE}) < 1996
```

«Selects those records in which the year found in the {file.DATE} field is earlier than 1996.»

```
Year ({file.DATE}) > 1992 and  
Year ({file.DATE}) < 1996
```

«Selects those records in which the year found in the {file.DATE} field falls between 1992 and 1996 (1992 and 1996 not included).»

```
Year ({file.DATE}) >= 1992 and Year ({file.DATE})  
<= 1996
```

«Selects those records in which the year found in the {file.DATE} field falls between 1992 and 1996 (1992 and 1999 are included).»

```
Month ({file.DATE}) in 1 to 4
```

«Selects those records in which the month found in the {file.DATE} field is one of the first four months of the year (includes January, February, March, and April).»

```
Month ({file.DATE}) in [1,4]
```

«Selects those records in which the month found in the {file.DATE} field is the first or fourth month of the year (includes January and April, excludes February and March).»

SELECTING RECORDS USING PRESET DATE RANGES

The preset date ranges can be used to create selection formulas similar to these:

```
{file.DATE} in LastFullMonth
```

«Selects those records in which the date found in the {file.DATE} field falls within the last full month. (If the month is May, this selects all records with an April date.)»

```
not ({file.DATE} in LastFullMonth)
```

«Selects all records except those in which the date found in the {file.DATE} field falls within the last full month. (If the month is May, this selects all records except those with an April date.)»

```
{file.DATE} < Today
```

«Selects all records in which the date found in the {file.DATE} field falls before today's date.»

SELECTING RECORDS USING DATE/NUMBER/CHARACTER COMBINATIONS

These formulas simply “mix and match” formulas from the categories above.

```
"C" in {file.FIELD}[1] and Month({file.DATE}) in [1,4]
```

«Selects those records in which the value in the {file.FIELD} field begins with “C” and the month is either January or April. For example, if this kind of formula was used with an order database, you could be asking for a report showing all customers whose names begin with “C” and who placed orders in January or in April.»

```
"AOK" in {file.HISTORY}[3 to 5] and {file.OPENCRED} >= 5000
```

«Selects those records in which the {file.HISTORY} field shows the characters “AOK” as the 3, 4, and 5 characters and the {file.OPENCRED} field (the amount of available credit) is at least 5000.»

These templates can be used as they are (with your own data), or they can be combined to create complex formulas. You can also use the principles illustrated here plus Seagate Crystal Reports online Help topics for functions and operators to create powerful selection formulas for yourself. Search for functions or operators by name in Seagate Crystal Reports online Help.

Selection performance tips

There are a number of performance-related items that you should consider when you are setting up your selection requests:

- Record selection will be faster if it is based on indexed fields instead of non-indexed fields. See *Indexed tables*, Page 511.
- If you have based record selection on indexed fields, make sure the *Use Indexes or Server for Speed* option is toggled on in the Report Options dialog box. Search for *Report Options dialog box* in Seagate Crystal Reports online Help.
- If at all possible, avoid performing record selection based on formula fields, since it will result in less efficient reporting. For example, assume you have a formula field (@ExtendedPrice) in your report that returns the extended price of a line item (Quantity * Price). If you base your selection criteria on the formula (@ExtendedPrice > 1000), the SQL server will not understand the formula and the program will not pass the selection criteria down to the server. Instead, it will retrieve all of the records from the server and then it will apply record selection on the client machine.

- Try to avoid subscript ranges such as:

```
{file.FIELD}[1 to 5]
```

The program parses selection formulas and converts anything it can to SQL so that the bulk of the work can be off-loaded to the SQL server. However, because there is no SQL equivalent to subscript ranges, SQL pass through will not occur. Subscripting of only the first character works, but subscripting multiple characters does not. Search for *Subscript* in Seagate Crystal Reports online Help.

- If you are using SQL/ODBC data sources and you are unsure whether or not the record selection is passing through to SQL, check it by choosing the SHOW SQL QUERY command from the Database Menu. If the SQL query does not have a WHERE statement or if the WHERE statement does not mention all the fields that you are dealing with in your record selection, then you will need to work through the formula again since the translation did not occur properly.
 - Make sure you have logged on to your data source before choosing the SHOW SQL QUERY command from the Database Menu.
 - SQL syntax will change with different drivers (ODBC or SQL), but the majority follow the Oracle SQL model as a guide. Consider the possibility that your driver may use slightly different syntax. This may also be the case for non-SQL databases.
- Do not perform any data type conversions in the record selection formula (for example, converting a number to a string using the ToText function). Such conversions can not be translated to SQL and so SQL pass through will not occur. Search for *ToText* in Seagate Crystal Reports online Help.

Record selection with a group selection formula

To perform record selection on both indexed and non-indexed fields, you can set up your record selection in such a way as to maximize performance. You do this by creating a record selection formula and a group selection formula, and using them both to select records. This may require some explanation.

The Group Selection Formula Editor has the same functionality as the Record Selection Formula Editor. While its primary use is for setting up group selection, it can also be used to set up record selection.

While the two Formula Editors are fundamentally the same and the formulas they produce appear the same, they each produce formulas that are evaluated at different times.

- The formulas from the Record Selection Formula Editor are evaluated as the program reads records.
- The formulas from the Group Selection Formula Editor are evaluated as the program is printing records. At this point, the only records that are saved with the report are those that passed record selection criteria.

By using this functionality, you can set up record selection based exclusively on:

- indexed fields in a record selection formula, or
- non-indexed fields in a group selection formula.

Since the program runs record selection when it reads records and runs group selection when it prints records, the following events occur:

- The record selection formula on the indexed fields quickly returns a subset of data from your database. For this example, let's say that it returns 5,000 records out of 100,000 and saves them in a buffer.
- The group selection formula performs record selection but only on the subset of data records (5,000) that are saved with the report.

You accomplish the same record selection but do it in a more efficient manner. With really big databases, this technique can save you significant processing time.

Related Topics

Introduction to Formulas, Page 291

Advanced Formulas, Page 315

Search for *Functions and Operators and Variables* in Seagate Crystal Reports online Help.

HANDS-ON (Record and Group Selection)

How to set up record selection using the Select Expert

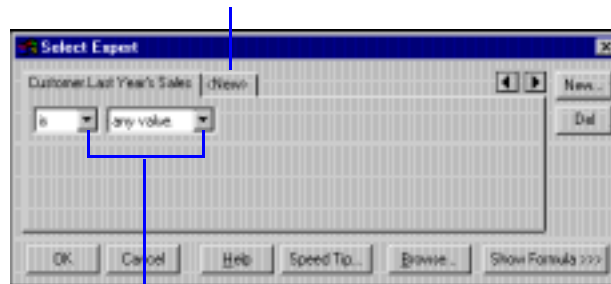
When you work with the Select Expert, you select the field to which you want to apply selection conditions and then you specify those conditions.

- 1 Right-click the field on which you want to base record selection and choose SELECT EXPERT from the shortcut menu, or select the field and click the SELECT EXPERT button on the standard toolbar. The program opens the Select Expert, ready for you to set the conditions on the highlighted field.



NOTE: If you click the **SELECT EXPERT** button without first selecting a field in your report, the **Choose Field** dialog box appears. Select the field on which you want to base record selection (preferably an indexed field, see *Indexed tables*, Page 511) and click **OK**. The **Select Expert** appears. See *Selection performance tips*, Page 236, and search for **Choose Field** dialog box in *Seagate Crystal Reports online Help*.

2 To base record selection on more than one field, click the **New** Tab and choose the next field from the **Choose Field** dialog box when it appears.



3 Use these drop-down lists to enter your selection criteria for the indicated field.

4 Click **OK** when finished.

A selection formula is generated based on your specifications, limiting the report to the records you indicated.

NOTE: To view or edit the selection formula, click the **Show Formula** button. The **Select Expert** expands to show the formula. To use the tools in the **Record Selection Formula Editor** to modify the formula, click the **Formula Editor** button. The formula will appear in the **Record Selection Formula Editor**.

How to set up group selection using the Select Expert

When you work with the **Select Expert**, you select the summary field to which you want to apply selection conditions and then you specify those conditions.



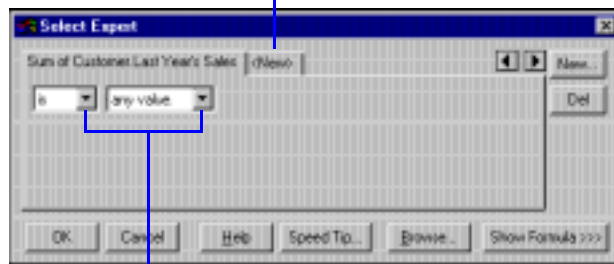
1 Right-click the summary field on which you want to base group selection and choose **SELECT EXPERT** from the shortcut menu, or select the field and click the **SELECT EXPERT** button on the standard toolbar. The program opens the **Select Expert**, ready for you to set the conditions on the highlighted group field.

NOTE: If you click the **SELECT EXPERT** button without first selecting a summary field in your report, the **Choose Field** dialog box appears. Select the summary field on which you want to base group selection (preferably an indexed field, see *Indexed tables*, Page 511) and click **OK**. The **Select Expert** appears. See *Selection performance tips*, Page 236, and search for **Choose Field** dialog box in *Seagate Crystal Reports online Help*.

NOTE: Summary fields identify the location of the summary value, the field that triggers a grouping when its value changes, the kind of summary, and the field being summarized. They look similar to this in the **Choose Field** dialog box:

Group Footer #1: Customer.Region
Sum of Last Year's Sales

2 To base the group selection on more than one field, click the **New Tab** and choose the next field from the **Choose Field** dialog box when it appears.



3 Use these drop-down lists to enter your selection criteria for the indicated field.



If you have not already previewed the report or refreshed the data, there will not be any data saved with the report. Without the data, the program can not calculate group values; thus, no values appear when you click the arrow in the right drop-down list. In this situation, you will have to type in the values you want. If you want real values to work with, you will need to preview your report first. This will calculate the actual summary values available for you to work with.

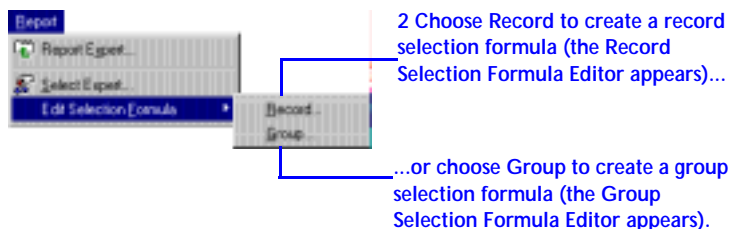
- 4 When you are finished, click **OK** in the **Select Expert** to return to the report.

How to create a record or group selection formula

NOTE: In order to create a selection formula, you need to have some understanding of the formula language and the use of the **Formula**

Editors. For a thorough discussion of these tools, see Introduction to Formulas, Page 291, and Advanced Formulas, Page 315.

- 1 Choose the EDIT SELECTION FORMULA command from the Report Menu. A submenu appears.



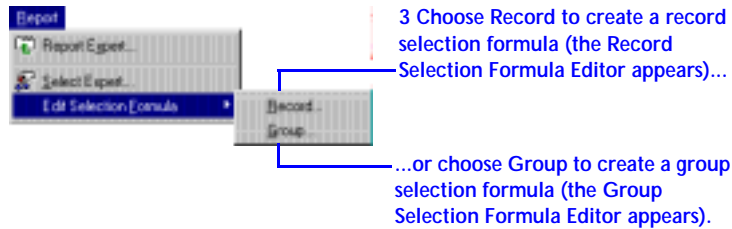
- 3 Enter your selection formula in the *Formula* text box as you would any other formula. Since this is a selection formula, however, the formula must be Boolean (return either a True or False value).
- 4 Click the SAVE AND CLOSE button when finished.
- 5 If the Formula Editor reports errors, debug the formula as necessary and then click the SAVE AND CLOSE buttons again. See *How to debug a formula, Page 336*.



Now, when the program runs the report, it will include only those records or groups of records that you specified. See *How to set record selection using parameter fields, Page 359*.

How to use record/group selection templates

- 1 Select the template you want to use. You can do this in one of two ways:
 - Review the list in *Record selection formula templates, Page 233*, and write down the formula of interest.
 - Find the *Record/Group Selection Templates* topic in Seagate Crystal Reports online Help and copy the formula of interest to the Clipboard.
- 2 Choose the EDIT SELECTION FORMULA command from the Report Menu. A submenu appears.



- 4 In the *Formula text* box, type in the formula you wrote down in Step 1 or paste it from the Clipboard.
- 5 Replace the values (fields, text, etc.) in the formula with the values you want. For example, if the example formula is:

```
{file.FIELD} > 99999
```

and you want to limit your report to records for which the value in the {orders detail.QUANTITY} field is greater than 25, simply replace the existing values with the values you want, so that your selection formula reads:

```
{orders detail.QUANTITY} > 25
```



- 6 Click the SAVE AND CLOSE button when finished to exit the Selection Formula Editor, or click the REFRESH button on the standard toolbar to preview the results.

How to select the top or bottom N groups

NOTE: A report must contain a summary value in order to be able to perform a *top N* or *bottom N* selection.

When selecting top N or bottom N groups:

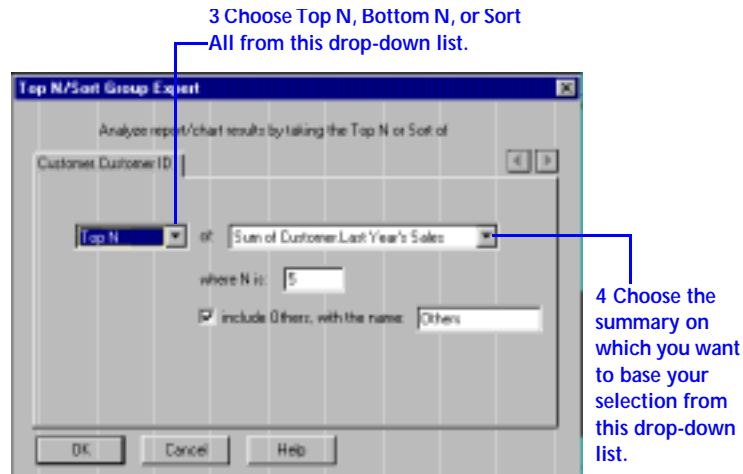
- choose whether to show the top or the bottom groups,
 - specify how many groups to show, and
 - tell the program how to deal with the records that are not in one of the selected groups.
- 1 Create a report and summarize the data as desired. When you summarize the data, the program breaks the data into groups and summarizes each group.
 - With top N grouping, you are instructing the program to display those groups that have the highest summary values (Top N).



- With bottom N grouping, you are instructing the program to display those groups that have the lowest summary values (Bottom N).

- 2 Click the TOP N EXPERT button on the supplementary toolbar. The Top N/Sort Group Expert appears with a tab for your group.

If you have multiple group sections, the program will display a tab for each of the groups.



The summary drop-down list on the right is for those cases in which you have multiple summaries within a single group section. For example, in an orders report, you might sum and average the orders for each customer and then display both the sum and the average in the same group section. In such a case, you would select the sum or the average from this drop-down list.

- 5 In the *where N is* text box, enter the number of groups you want to display.
- 6 All that is left is deciding what you want to do with all those records that do not fit into the selected groups.
 - Toggle the *include Others, with the name* check box off if you want the other records excluded from the report.
 - Toggle the check box on and assign a name to the group to lump all the other records into a single group.
- 7 Click *OK* when finished.
- 8 Now, when the program runs the report, it will include only those groups that you specified.

12

Sorting, Grouping, and Totaling

What you will find in this chapter...

Sorting, Grouping, and Totaling Overview, Page 246

Creating custom groups, Page 250

HANDS-ON (Sorting, Grouping, and Totaling), Page 252

Sorting, Grouping, and Totaling Overview

Sorting, grouping, and totaling are the steps that turn disorganized data into useful information on a report. This overview is an introduction to the concepts behind sorting, grouping, and totaling. Refer to the many Hands-On tutorials for detailed instructions.

Sorting

Sorting means putting values in some kind of order to help you find and/or evaluate them. For example, information in a phone book is sorted because unsorted, it would have little usefulness. Trying to find someone's phone number in an unsorted book would entail a random search through tens of thousands of names, a true *needle-in-a-haystack* experience. With sorting, however, you can find the number you need in a hurry. For example, if you are looking for the phone number of John J. Smith, the following levels of sorting might help you to find it.

- The data is sorted alphabetically by last name so you know the name Smith is in the S section of the book and you turn there immediately.
- When you find the Smiths, (and there are a lot of them) you see that they are sorted alphabetically by first name so that John Smith comes after Bob Smith. You turn to the John Smiths.
- Finally, when you find the John Smiths, you see that they are sorted by middle initial so the John J. Smiths come after the John D. Smiths. You turn to John J. Smith, find his phone number, and place the call.

Thanks to sorting, you can find anybody's listed phone number in seconds.

Sorting by record

When you sort, the program asks you to select two things:

1. the field you want the sort to be based on (sort field), and
2. the sort direction.

SORT FIELD

A sort field is a field that determines the order in which data appears on your report. Seagate Crystal Reports sorts field data using rules specific to the Country you select in the International section of the Windows Control Panel (Windows 95 and Windows 98, Windows NT 3.51 or 4.0) or the Regional section (Windows 3.x).

Any field can be used as a sort field, including formula fields. A field's data type determines the method in which the data from that field is sorted:

- String fields are sorted in the following manner:
 - Single-character values are sorted so that blanks have the lowest value, then punctuation, then numbers, then uppercase letters, and finally lowercase letters.
 - Next two-character values are sorted, then three, etc., using the same rules. As a result:
 - “BOB” comes before “bob”,
 - “123” comes before “124”,
 - “ ” (blank) comes before “a”, and
 - “aa” comes before “aaa”.
- Currency fields are sorted in numeric order.
- Number values (120 or 5555) are sorted in numeric order.
- Date fields are sorted in chronological order.
- DateTime fields are sorted in chronological order by date and same-date values are then sorted by time.
- Time fields are sorted in chronological order.
- Boolean comparison fields are sorted so that False values (0) come first, then True values (1).

When a sort field is selected, the program sorts the values from that field.

SORT DIRECTION

Direction refers to the order in which the values are displayed, once sorted.

- **Ascending**
Ascending order means smallest to largest (1 to 9, A to Z, False to True). The program sorts the records in ascending order based on the values in the sort-and-group-by field you select, and then it begins a new group whenever the value changes (from Adams to Brown, for example).
- **Descending**
Descending order means largest to smallest (9 to 1, Z to A, True to False). The program sorts the records in descending order based on the values in the sort-and-group-by field you select, and then it begins a new group whenever the value changes.

When data is grouped, two more sort direction options are available:

- **Original**
Original order is the order the data was originally saved in the database. The program leaves the records in the order in which

they appear in their originating database table, and begins a new group whenever the value changes in the sort-and-group-by field you select.

- **Specified order**

Specified order is a user-defined order. The program puts each record into the custom group you specify, and it leaves the records in each group in original order or it sorts them in ascending or descending order, depending on your instructions. See *Creating custom groups*, Page 250.

Single field sorts

In single field sorts all the records used in the report are sorted based on the values in a single field. Sorting an inventory report by stock number or sorting a customer list by customer number are examples of single field sorts. See *Results using different sorting and grouping operations*, Page 248, and *How to do a single field sort*, Page 253.

Multiple field sorts

In multiple field sorts, Seagate Crystal Reports first sorts the records based on the values in the first field selected, putting them in ascending or descending order as specified. When two or more records have the same field value in the first sort field, the program then sorts those records based on the value in the second sort field. For example, in a sort on last name and then first name (in ascending order), “Smith, Bob” would be returned before “Smith, John” no matter which way the fields are listed in the database. The program follows a similar process for three field sorts, four field sorts, and so on. See *Results using different sorting and grouping operations*, Page 248, and *How to do a multiple field sort*, Page 256.

Sorting and grouping

Seagate Crystal Reports has the most powerful sorting and grouping capabilities of any Windows based report writer. When you select a grouping option, the program automatically sorts the data as part of the grouping operation. See *Results using different sorting and grouping operations*, Page 248.

Results using different sorting and grouping operations

The following chart shows how data would appear after being manipulated using different sorting and grouping operations.

1	2	3	4	5	6	7	8	9
CO	AZ	WA	AZ	WA	CO	WA	CA	WA
WA	CA	WA		WA		CA	CA	WA
CA	CA	WA	CA	WA	WA	CA	CA	WA
CA	CA	CO	CA			CA	CA	CA
CA	CA	CO	CA	CO	CA	WA	CA	CA
AZ	CA	CA	CA	CO	CA	WA	WA	CA

1	2	3	4	5	6	7	8	9
WA	CO	CA	CA		CA	CA	WA	CA
WA	CO	CA		CA		CA	WA	CA
CA	WA	CA	CO	CA	AZ			
CA	WA	CA	CO	CA		CO	AZ	CO
CO	WA	AZ		CA	WA	AZ	CO	CO
			WA	CA	WA	CO	CO	AZ
			WA					
			WA	AZ	CA			
					CA			
					CO			

- **Column 1**

The data as it appears in the database table.

- **Column 2**

The data from Column 1 sorted in ascending order (A to Z, 1 to 9). There is no grouping.

- **Column 3**

The data from Column 1 sorted in descending order (Z to A, 9 to 1). There is no grouping.

- **Column 4**

The data grouped in ascending order. The program automatically sorts the data in ascending order and then inserts a group break whenever the value changes.

- **Column 5**

The data grouped in descending order. The program automatically sorts the data in descending order and then inserts a group break whenever the value changes.

- **Column 6**

The data grouped in original order. The data is not sorted before it is grouped. The program inserts a group break whenever the group value changes. Note that similar values may appear in more than one group (for example, CA and CO have more than one group).

- **Column 7**

The data grouped in specified order. This is one of thousands of possible custom groupings. In this example, the first group consists of Pacific states and the second group consists of Mountain states. The records in each group are sorted in original order.

- **Column 8**

The same specified order grouping as Column 7, but the records in each group are sorted in ascending order.

- **Column 9**

The same specified order grouping as Column 7, but the records in each group are sorted in descending order.

The way you sort and group data can have a major impact on the way it appears on a report.

Creating custom groups

Most of the time, data is sorted based on the values from a field in the report. For example, if you have a customer list and you want to sort-and-group-by state, the program first sorts the list by state. Then it breaks the list into state groups whenever the value in the State field changes.

Sometimes, however, you may not want to group based on the values found in one of the fields on your report. For example, the report:

- May not contain the field you want to group on. For instance, your report may contain a City field and a State field but no Country field, although you need to group by country.
- May contain the field you want to group on, but you may not be happy with the grouping based on the values in that field. For example, you may have a Color field on your report that includes specific color names (Logan Green, Sky Blue, Emerald Green, Navy Blue, etc.) but you want all shades of each color to appear as a single group (Greens, Blues, Reds, etc.). In this case you can build custom groups and manually assign the records you want to be in each group.
- May contain the field you want to group on, but you want to select specific values or ranges of values for each group. For example, you might want one group to contain records where gross sales are less than a certain value, a second group where gross sales are greater than a certain value, and a final group where gross sales fall between two values. In this case, you can build your groups using the same range of selection facilities that are available to you for building record selection queries.

Specified order grouping provides a solution to these custom sorting and grouping challenges. Specified order grouping enables you to create both the customized groups that will appear on your report and the records that each group will contain. Your only real limitation is that a record can be assigned to only one group.

To create a custom group using specified order grouping, you select *in specified order* as your sort option. The program gives you the *in specified order* option whenever you:

- create groups using the GROUP, SUBTOTAL, or SUMMARY command on the Insert Menu,
- create groups while building a report using one of the Report Creation Experts, or
- choose the CHANGE GROUP EXPERT command from the Report Menu.

Summarizing group values

One of the primary purposes for breaking data into groups is so that you can run some calculations on each group of records instead of on all the records in the report. When you do this, the program evaluates all the values in each group and then summarizes them. For example:

- For a customer list report, you might want to determine the number of customers in each state. The summary would consist of counting the distinct customers in each state group.
- For an order report, you might want to determine the average order placed each month. The summary would calculate the size of the average order for each month group.
- For a sales report, you might want to determine the total sales per sales representative. The summary would sum or subtotal the order amounts for each sales representative group.

As you can see, grouped data can be summarized in a variety of ways to make useful reports.

When the program summarizes data, it sorts the data, breaks it into groups, and then summarizes the values in each group. It does this all automatically; all you have to do is specify:

- the field you want summarized,
- the type of summary operation to be performed on the field,
- which field will trigger a new group whenever its value changes, and
- the sort order.

The program handles all the details.

The program includes a number of summarizing options. Depending on the data type of the field you plan to summarize, you can:

- sum the values in each group,

- count all the values or only those values that are distinct from one another,
- determine the maximum, minimum, or average value, and
- calculate up to two kinds of standard deviations and variances.



All these summaries are set up by clicking the INSERT SUMMARY button on the standard toolbar or by choosing the SUBTOTAL command from the Insert Menu. Search for *Subtotal command* and *Summary functions* in Seagate Crystal Reports online Help.

Sorting summarized group values

Summarized group values can be sorted in either ascending or descending order. For example, in an orders report, if you subtotal orders by state, you could have the group with the:

- lowest subtotal first, then the next lowest, and so forth (ascending), or
- highest subtotal first, then the next highest, and so forth (descending).

You can sort your report based on group values by using the TOPN/SORT GROUP EXPERT command on the Report Menu. For more information on TopN/BottomN sorting and grouping, see *How to select the top or bottom N groups*, Page 242.

NOTE: *To sort groups that are not summarized, choose the CHANGE GROUP EXPERT command from the Report Menu.*

HANDS-ON (Sorting, Grouping, and Totaling)

When you insert a database field into your report, the data within the fields appears in the order in which it was originally entered into the database.

Customer Name	Region	Postal Code	Country
Bike-O-Rama	MI	48358	USA
The Peddlers	IL	60148	USA
Bikes R Us	OH	43001	USA
CycleSporin	AL	35818	USA
Sporting Wheels	CA	92150	USA
Pedal Pusher Bikes	BC	V3C 1G2	Canada
SAB Mountain		3012	Switzerland
ABC Ltd.	BC	V6E 3T2	Canada
XYZ Industries	WI	53730	USA
The Bike Shop Co.	ID	83650	USA
The Cyclists Co.	BC	V6G 4V3	Canada
La Bomba de Bicicleta		28001	Spain

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

As you can see, pinpointing information in this kind of report would be difficult. It would be much easier to review or find information when you can see it sorted in a logical format. For instance, you may want to have a customer list sorted alphabetically by name or by country. That is known as a single field sort.

NOTE: To see an example of the above report, open the SGT01.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

How to do a single field sort

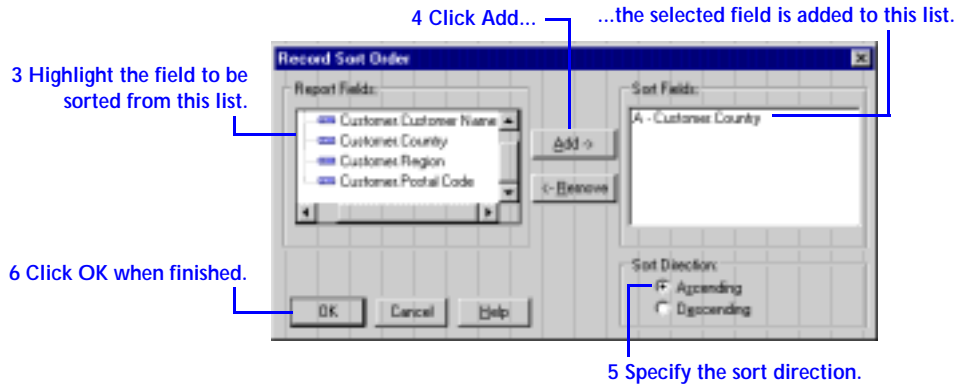
- 1 To get started, create a report using the customer table in xtreme.mdb, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}
{customer.REGION}
{customer.POSTAL CODE}
{customer.COUNTRY}
```



- 2 Click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.

NOTE: The following illustrates both a "before" and "after" state of the dialog box. Typically, any fields you move to the Sort Fields list box will no longer appear in the Report Fields list box.



Records are sorted based on the values in the sort field.

For example, if you choose to sort the {customer.COUNTRY} field in ascending order, the report would appear as follows:

The Regions within each Country remain unsorted.

Customer Name	Region	Postal Code	Country
BG Mountain Inc.	BC	V3F 2K1	Canada
Montreal Mountain	Quebec	H2Z 1S4	Canada
Hansen MTB Inc.	Quebec	H1J 1C3	Canada
Deely MTB Inc.	BC	V6Z 2H2	Canada
Bicicleta Conexion		41101	Spain
Amadablam		28001	Spain
Sierra Bicycle Group	CA	92549	USA
Mountain Toad	CA	75369	USA
Desert Mountain	NV	89117	USA
Active Outdoors	IL	56478	USA
Sierra Mountain	NV	86521	USA
SFB Inc.	CA	94117	USA
Mountain Tops Inc.	IL	54321	USA
		92007	USA

Countries are now sorted in alphabetic order.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

Notice that the records are displayed in alphabetic order by country: all of Canada, then Spain, then the United States. There is no further sorting of these records, however. If you want your customers sorted by Country and then, for example, by Region, then you need to do a multiple field sort.

NOTE: To see an example of the above report, open the SGT02.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

Introduction to Reporting, Page 85

How to do a multiple field sort, Page 256

How to sort records within groups, Page 260

How to do a multiple field sort

Using the report you created in *How to do a single field sort, Page 253*, you can further organize your data by sorting on multiple fields.



- 1 Click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.

NOTE: The following illustrates both a "before" and "after" state of the dialog box. Typically, any fields you move to the Sort Fields list box will no longer appear in the Report Fields list box.

2 Highlight the field you want the data sorted by first and click the Add button to add it to the Sort Fields list.

3 Highlight the field you want the data to be sorted by second and add it to the Sort Fields list.

The selected fields are displayed in the order by which they are sorted.

5 Click OK when finished.

4 As you add each field to the Sort Fields list, specify the sort direction.

Records are sorted by Country first and then by Region.

For example, if you choose to sort first by the {customer.COUNTRY} field and then by the {customer.REGION} field, both in ascending order, the report would appear as follows:

Countries are sorted in alphabetic order.

The Regions within each Country are sorted in alphabetic order.

Postal Codes within each Region are unsorted.

Customer Name	Region	Postal Code	Country
BG Mountain Inc.	BC	V3F 2K1	Canada
Deely MTB Inc.	BC	V6Z 2H2	Canada
Montreal Mountain	Quebec	H2Z 1S4	Canada
Hansen MTB Inc.	Quebec	H1J 1C3	Canada
Bicicleta Conexion		41101	Spain
Amadablam		28001	Spain
Sierra Bicycle Group	CA	92549	USA
Mountain Toad	CA	75369	USA
SFB Inc.	CA	94117	USA
Active Outdoors	IL	56478	USA
Mountain Tops Inc.	IL	54321	USA
Sierra Mountain	NV	86521	USA
Desert Mountain	NV	89117	USA
		39227	USA

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

Notice that the data is organized alphabetically by Country, and where a country has customers in different regions, those regions are sorted in alphabetic order as well.

NOTE: To see an example of the above report, open the SGT03.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

Introduction to Reporting, Page 85

How to do a single field sort, Page 253

How to sort records within groups, Page 260

How to group data

Sometimes sorting is not enough. You may want to break data into meaningful groups. Seagate Crystal Reports allows you to group data in one easy step.

NOTE: It is unnecessary to sort data before you group it. The program does the necessary sorting automatically, as part of the grouping procedure. To sort data, follow the sorting procedures outlined in How to do a single field sort, Page 253, and How to do a multiple field sort, Page 256.

- 1 To get started, create a report using the sample data, `xtreme.mdb`, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.POSTAL CODE}  
{customer.COUNTRY}
```

You will use this same data for the topic *How to sort records within groups*, Page 260, as well.



- 2 Click the INSERT GROUP button on the supplementary toolbar. The Insert Group dialog box appears.

3 Select the field you want your data grouped by from this drop-down list.

4 Next, specify the sort direction.

5 Click OK when finished.

Customer Name	Region	Postal Code	Country
BG Mountain Inc.	BC	V3F 2K1	Canada
Montreal Mountain	Quebec	H2Z 1S4	Canada
Hansen MTB Inc.	Quebec	H1J 1C3	Canada
Deely MTB Inc.	BC	V6Z 2H2	Canada
Bicicleta Conexion		41101	Spain
Amadablam		28001	Spain
Sierra Bicycle Group	CA	92549	USA
Mountain Toad	CA	75369	USA
Desert Mountain	NV	89117	USA
Active Outdoors	IL	56478	USA
Sierra Mountain	NV	86521	USA
		94117	USA
		54321	USA

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

Notice that the values are grouped by Country, and that the Country groups appear in ascending (A to Z) order. Notice too, however, that the records within each group remain unsorted. To remedy this, you need to sort the records within each group. See *How to sort records within groups*, Page 260.

NOTE: To see an example of the above report, open the SGT04.RPT file in the \CRW directory (16-bit), or \Program Files\Seagate Crystal Reports directory (32-bit).

Related Topics

Introduction to Reporting, Page 85

How to sort records within groups, Page 260

How to group based on the first letter of a company name, Page 274

How to group data in intervals, Page 277

How to create group headers, Page 285

How to sort records within groups

Once you have grouped your data, you can easily sort the records within the groups to further organize the information. For this tutorial, you must first group your data using the technique in *How to group data*, Page 258.



- 1 Once the data is grouped, click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.

NOTE: The following illustrates both a "before" and "after" state of the dialog box. Typically, any fields you move to the Sort Fields list box will no longer appear in the Report Fields list box.

2 Highlight the field you want the records in the groups sorted by and click the Add button...

NOTE: This field specifies the sort done automatically when you grouped the data. It can't be moved.

...the selected fields are displayed in the order by which they are to be sorted.

4 Click OK when finished.



3 Specify the sort direction.

The customers within each country are sorted.

Customer Name	Region	Postal Code	Country
BG Mountain Inc.	PQ	H1J 1C3	Canada
Deely MTB Inc.	BC	V6Z 2H2	Canada
Hansen MTB Inc.	BC	V3F 2K1	Canada
Montreal Mountain	PQ	H2Z 1S4	Canada
Amadablam		28001	Spain
Bicicleta Conexion		41101	Spain
Active Outdoors	IL	56478	USA
Desert Mountain	CA	89117	USA
Mountain Toad	NV	75369	USA
SFB Inc.	CA	94117	USA
Sierra Bicycle Group	CA	92549	USA
		86521	USA

The data is grouped by Country.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the previous report, open the SGT05.RPT file in the \CRW directory (16-bit), or \Program Files\Seagate Crystal Reports directory 32-bit).

Related Topics

Introduction to Reporting, Page 85

How to do a single field sort, Page 253

How to do a multiple field sort, Page 256

How to summarize grouped data

Often, you will want to summarize the data in each group and then print the summaries in your report. You can use summaries to:

- count the number of values in a group,
- calculate the sum, average, standard deviation, or variance of values in a group, or
- identify the minimum or maximum value in a group.

For more information on summarizing your data, search for *Summary functions* in Seagate Crystal Reports online Help.

For example, you may want to count the number of customers within each country. To do this, the data must be broken into country groups, and then the records in each group must be counted. Instead of grouping the data manually and then summarizing it, you can let the program group and summarize in a single step.

- 1 To get started, create a report using the sample data, xtreme.mdb, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.POSTAL CODE}  
{customer.COUNTRY}
```



- 2 Click the Customer Name field (the field you want to summarize) and click the SUMMARY button on the standard toolbar. The Insert Summary dialog box appears.

3 Select the desired summary operation from this drop-down list.

4 Highlight the field you want the data to be grouped by.

5 Specify the sort direction.

6 Click OK when finished.

Customer Name	Region	Postal Code	Country
BG Mountain Inc.	BC	V3F 2K1	Canada
Montreal Mountain	PQ	H2Z 1S4	Canada
Hansen MTB Inc.	PQ	H1J 1C3	Canada
Deely MTB Inc.	BC	V6Z 2H2	Canada
Number of customers in country			4
Sierra Bicycle Group	CA	92549	USA
Mountain Toad	CA	75369	USA
Desert Mountain	NV	89117	USA
Active Outdoors	IL	56478	USA
Sierra Mountain	NV	86521	USA
SFB Inc.	CA	94117	USA
Number of customers in country			6

The data is broken into Country groups.

This will count the records in each group.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the previous report, open the *SGT06.RPT* file in the *\CRW16* directory (16-bit), or *\Program Files\Seagate Software\Crystal Reports* directory (32-bit).

Related Topics

Introduction to Reporting, Page 85

How to subtotal grouped data, Page 264

How to create multiple levels of subtotals, Page 270

How to extend prices and then subtotal the extensions, Page 266

How to calculate a percentage of the grand total, Page 282

How to create group headers, Page 285

How to subtotal grouped data

A subtotal is a special kind of summary. It totals or sums numeric values in a group. Like any summary, the program groups and subtotals in a single step. For more information on summary functions, search for *Summary functions* in Seagate Crystal Reports online Help.

In this example you will group the data by Country and subtotal Last Year's Sales by Country. To get started, create a report using the sample data, *xtreme.mdb*, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.POSTAL CODE}  
{customer.COUNTRY}  
{customer.LAST YEAR'S SALES}
```

- 1 Right-click the Last Year's Sales field and choose **INSERT SUBTOTAL** from the shortcut menu. The Insert Subtotal dialog box appears with the chosen field listed at the top of the dialog box.

2 Choose the field you want the data grouped by, specify a sort direction, then click OK when finished.

The field you selected to be subtotaled.

Data is broken into Country groups.

Customer Name	Region	Postal Code	Country	Sales
BG Mountain Inc.	BC	V3F 2K1	Canada	\$29,485.95
Montreal Mountain	PQ	H2Z 1S4	Canada	3,818.25
Hansen MTB Inc.	PQ	H1J 1C3	Canada	33,180.30
Deely MTB Inc.	BC	V6Z 2H2	Canada	
Subtotal				\$66,484.50
Sierra Bicycle Group	CA	92549	USA	
Mountain Toad	CA	75369	USA	
Desert Mountain	NV	89117	USA	\$18,778.80
Active Outdoors	IL	56478	USA	624.30
Sierra Mountain	NV	86521	USA	
SFB Inc.	CA	94117	USA	
Mountain Tops Inc.	IL	54321	USA	
Subtotal				\$19,403.10

The values in each group are now subtotaled.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT07.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory 32-bit).

Related Topics

How to summarize grouped data, Page 262

How to create multiple levels of subtotals, Page 270

How to extend prices and then subtotal the extensions, Page 266

How to calculate a percentage of the grand total, Page 282

How to create group headers, Page 285

How to sort based on summarized group values



- 1 Click the TOP N button on the supplementary toolbar. The Top N Sort Group Expert appears with a tab for each of the groups in the report.
- 2 Click the tab for the group you want to sort.
- 3 Select the *Sort All* option from the drop-down list on the left.
- 4 From the top-right drop-down list, select the summary you want to sort by (when you have more than one summary in the group section - for example, you might have both a sum and an average summary in a section).
- 5 Click the option button to specify the sort direction.
- 6 To select a second sort group, repeat Steps 2-5.

When you run the report, the program will sort your data based on the group order(s) specified.

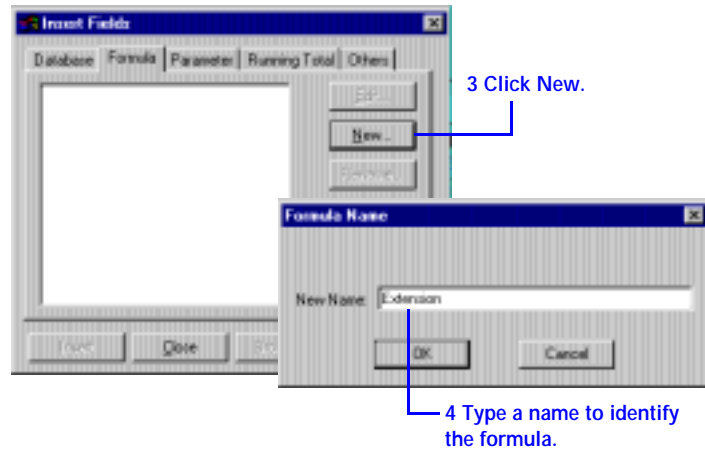
How to extend prices and then subtotal the extensions

In an orders report or invoice, you may need to extend the prices for individual line items and then subtotal the extensions. You do this by using a simple formula to extend the prices, and then you subtotal the formula field.

- 1 To get started, create a report using the Customer, Orders, and Orders Detail tables in xtreme.mdb, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER ID}  
{orders detail.PRODUCT ID}  
{orders detail.QUANTITY}  
{orders detail.UNIT PRICE}
```

- 2 To create the formula for extending the prices, click the Formula Tab in the Insert Fields dialog box to activate it.



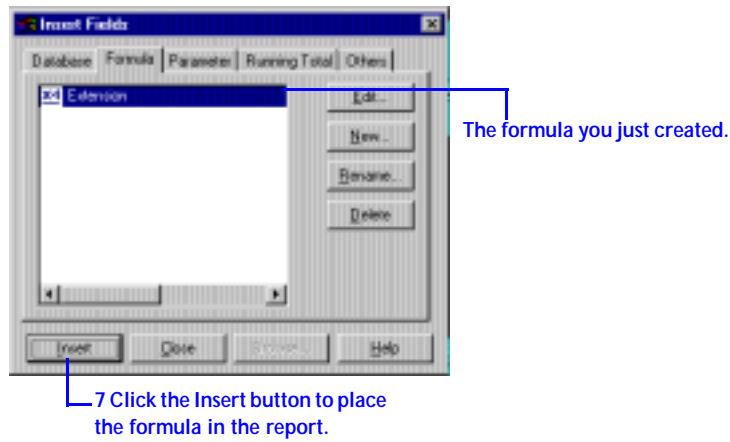
- 5 Click OK. The Formula Editor appears. Enter the following formula into the *Formula* text box:

```
{orders detail.QUANTITY} *  
{orders detail.UNIT PRICE}
```

See *Introduction to Formulas, Page 291*, for more information on formulas.



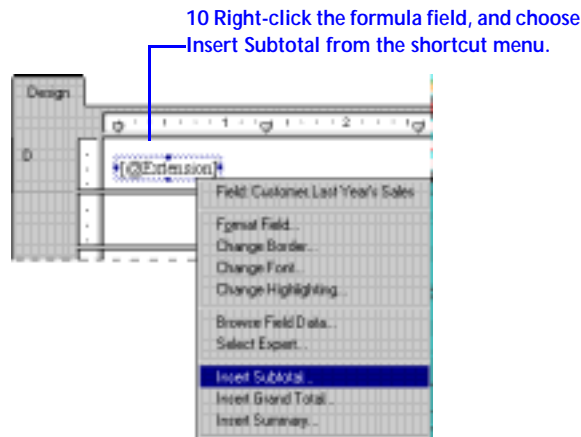
- 6 Click the SAVE AND CLOSE button when finished. The Formula Editor disappears and the program returns you to the Insert Fields dialog box with the name of your formula highlighted in the list box.



- 8 Place the formula field to the right of the Unit Price field in the Details section of the report.
- 9 Click *Close* to close the Insert Fields dialog box.

Next you will subtotal the extensions.

NOTE: *The menus have been shortened by removing some of the commands that are unrelated to the current discussion.*



The Insert Subtotal dialog box appears, already set to subtotal @Extension (the extended price field). For more information on summary functions, search for *Summary functions* in Seagate Crystal Reports online Help.

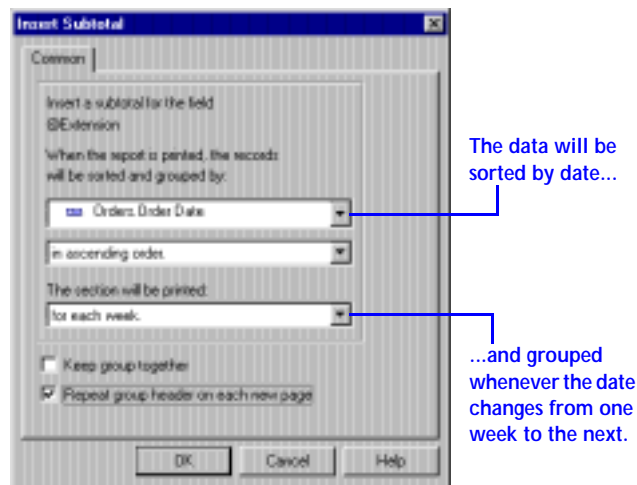
You are interested in weekly sales, so you want to create a subtotal whenever the values in the Order Date field change from one week to the next.

- 11 Choose {orders.ORDER DATE} as the sort-and-group-by field, and choose *for each week* as the date change that is going to trigger the grouping.

NOTE: *In order to do this, the Orders table must be linked to the Orders Detail table before you preview the report. Search for Visual Linking Topics Index in Seagate Crystal Reports online Help.*

NOTE: *The Section will be printed drop-down box will not be activated until you choose the Order Date field.*

The dialog box should look like this:



When you click **OK**, the program inserts the subtotal in the report.

Your final report should look similar to the following:

<i>Customer ID</i>	<i>Product ID</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Amount</i>
2	102181	1	\$1,739.85	\$1,739.85
	103171	1	\$899.85	\$899.85
	202201	2	\$539.85	\$1079.70
			Sales for Week	\$3,719.40
2 5	101172	1	\$2,939.85	\$2,939.85
	402001	2	\$274.35	\$548.70
	301161	2	\$764.85	\$1,529.70
	102151	1	\$1,739.85	\$1,739.85
			Sales for Week	\$6,758.10
3	102171	1	\$1,739.85	\$1,739.85
	103181	1	\$899.85	\$899.85
	101182	1	\$2,939.85	\$2,939.85
			Sales for Week	\$5,579.55

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT08.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory(32-bit).

Related Topics

How to summarize grouped data, Page 262

How to subtotal grouped data, Page 264

How to calculate a percentage of the grand total, Page 282

How to create group headers, Page 285

How to create multiple levels of subtotals

Sometimes one level of subtotals will not do. For example, you may not only want to see the sales for each region subtotaled, but also the sales for each sales representative or each postal code within each region. The program enables you to create these multiple subtotals with ease.

There are two keys to effective reporting using multiple subtotals:

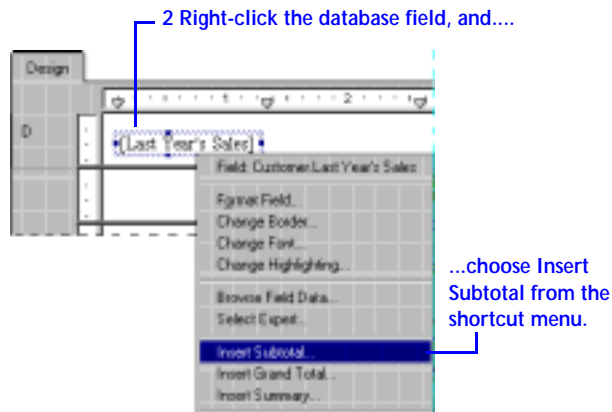
1. First, make sure the subtotals are entered in the correct order. The rule to follow is to go from general to specific. For example, to subtotal both by country and by region, enter the country subtotal first and then the region subtotal.
2. The other key is to make sure you label the subtotals for clarity. With multiple subtotals, it can be difficult to tell which is which unless they are labeled properly.

Here is how you subtotal Last Year's Sales by Country and then by Region:

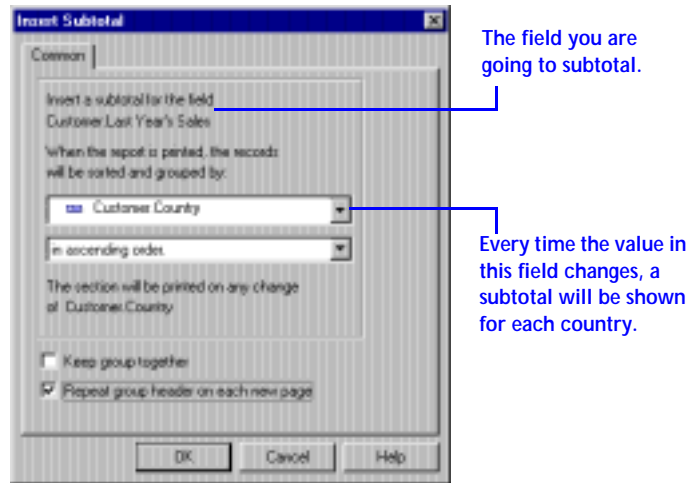
- 1 To get started, create a report using the sample data, xtreme.mdb, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.COUNTRY}  
{customer.LAST YEAR'S SALES}
```

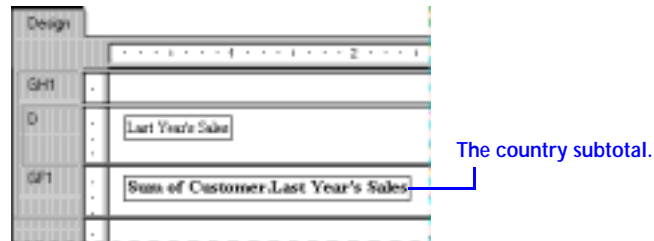
NOTE: The menus below have been shortened by removing some of the commands that are unrelated to the current discussion.



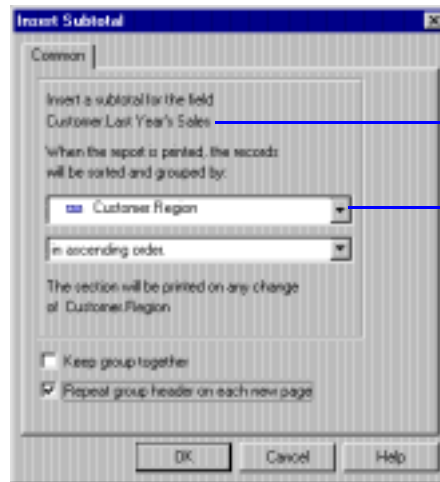
- 3 When the Insert Subtotal dialog box appears, select Country as your sort-and-group-by field and click OK.



The program creates a group section (GH1, GF1) and places the subtotal in the Group Footer.



- 4 Now right-click the Last Year's Sales field again and choose INSERT SUBTOTAL from the shortcut menu.



You are subtotaling the same field.

A subtotal for each region will be shown.

- 5 This time, select Region as your sort-and-group-by field and click OK. The program creates a second group section (GH2, GF2) and places this subtotal in the second Group Footer (GF2). See *How to group data*, Page 258.



The region subtotal.

The country subtotal.

Your report should look similar to the following:

This report contains multiple levels of subtotals.

Customer Name	Region	Country	Sales
BG Mountain Inc.	BC	Canada	\$29,485.95
Deely MTB Inc.	BC	Canada	\$3,818.25
Total for BC			\$33,304.20
Allez Distribution	PQ	Canada	\$33,180.30
Montreal Mountiain	PQ	Canada	
Hansen MTB Inc.	PQ	Canada	\$5,579.55
Total for PQ			\$38,759.85
Total for Canada			\$72,064.05

Each region is subtotaled.

So is each country.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT09.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

For more information on summarizing your data, search for *Summary functions* in Seagate Crystal Reports online Help.

How to group based on the first letter of a company name

You might want to break your data into groups based on the first letter of the company name. For example, in a customer list you might want all the “A” customers in a group, then all the “B” customers, and so forth. To do this requires the use of a formula.

Do not worry if you are unfamiliar with formulas. This text will show you what formula you need here and how to enter it.

You can learn more about creating and editing formulas in *Introduction to Formulas, Page 291*.

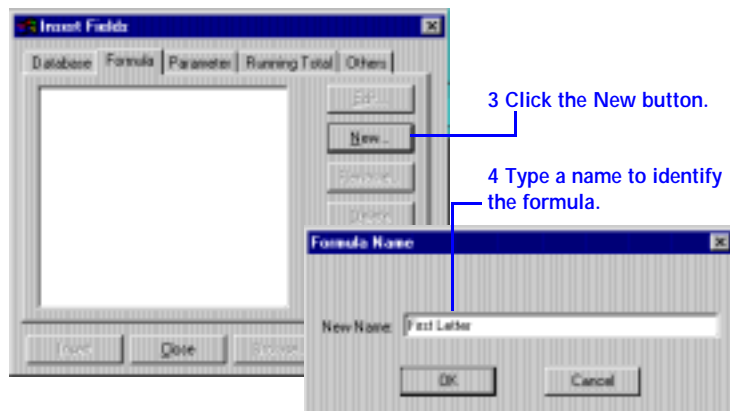
You are going to create a formula that will extract the first letter of each customer's name. Then you will group the data using that formula field as the sort-and-group-by field. The program will sort the data based on the first letter of each customer name and start a new group whenever that letter changes.

- 1 To get started, create a report using the sample data, *xtreme.mdb*, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}
{customer.REGION}
{customer.POSTAL CODE}
{customer.COUNTRY}
```



- 2 Click the INSERT FIELDS button on the standard toolbar. When the Insert Fields dialog box appears, click the Formula Tab to activate it.



- 5 When you click *OK*, the Formula Editor appears. Type the following formula into the *Formula text* box:

```
{customer.CUSTOMER NAME}[1]
```

- 6 Click the *SAVE AND CLOSE* button. The Formula Editor disappears and you are returned to the Insert Fields dialog box. The name of the formula is now highlighted in the list box.
- 7 Click the *INSERT* button to place the formula object in the report.

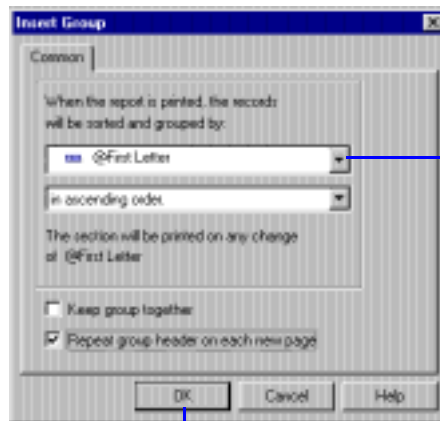


- 8 Place the formula object temporarily in the Page Header section of the report.

You are going to move the formula object into a Group Header section, but the report does not have one yet. As soon as you group the data, you can move the formula object into the desired section.



- 9 Click the Insert GROUP button on the supplementary toolbar. The Insert Group dialog box appears.



10 Select the formula field as the field you want your data grouped by.

11 Click OK when finished.

You are returned to your report with the data grouped by the formula field as specified.

- 12 Finally, move the formula field into the Group Header #1 (GH1) section where it will serve as a live group header, changing according to the value returned by the formula calculation. For more information on live headers, see *Live headers*, Page 286.

Your report should look similar to the following:

The data is broken into groups based on the first letter of the Customer's Name.

Customer Name	Region	Postal Code	Country
A			
Active Outdoors	IL	56478	USA
Allez Distribution	PQ	V6M 4G6	Canada
Amadablam		28001	Spain
B			
BG Mountain Inc.	BC	V3F 2K1	Canada
Bicicleta Conexion		41101	Spain
D			
Deely MTB Inc.	BC	V6Z 2H2	Canada
Desert Mountain	NV	89117	USA

The formula also provides a live header for every group.

NOTE: This sample report has been designed to illustrate concepts only, not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT10.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

Introduction to Formulas, Page 291

Introduction to Reporting, Page 85

How to group data, Page 258

How to group data in intervals, Page 277

How to create group headers, Page 285

How to group data in intervals

You may want to group your data into intervals. Age groups, time periods, and sales categories are some of the interval groupings that can be created using the process you will learn here. In this example, you will rank customers by the amount of business they did in the previous year.

This example uses specified order grouping. This kind of grouping lets you specify the records that will be included in each group. You define the intervals you want and the program will do the rest.

- 1 To get started, create a report using the sample data, `xtreme.mdb`, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.POSTAL CODE}  
{customer.COUNTRY}  
{customer.LAST YEAR'S SALES}
```

- 2 Right-click the Last Year's Sales field and choose INSERT SUBTOTAL from the shortcut menu. The Insert Subtotal dialog box appears. You want to set up intervals based on the previous year's sales so select Last Year's Sales as the sort-and-group-by field (the top drop-down list).



- 3 Select *in specified order* from the second drop-down list. The Specified Order Tab appears in the dialog box.



- 4 Click the NEW button. The Define Named Group dialog box appears.



- 5 Type "Less than \$10,000" in the *Group Name* edit box. This is the name that will appear as the Group Name field value for the group.
- 6 Since the first group is to contain only those records that have a Last Year's Sales figure of less than \$10,000, set the three edit boxes so your condition reads:

is less than 10000



7 Click OK to return to the Specified Order Tab.

- 8 Click NEW again, and the Define Named Group dialog box reappears. This time set up a second group that contains values between \$10,000 and \$25,000.
- 9 Type “\$10,000 to \$25,000” in the *Group Name* edit box.
- 10 Set the first two edit boxes so the condition reads:

is between

The program creates a fourth edit box. There are now two edit boxes on the right, one above the other, with the word “and” separating them. Use the drop-down lists on these boxes to specify a range of values.

- 11 To specify the range:
 - type “10000” in the top edit box, and
 - type “25000” in the bottom edit box.

You have now set up the group to contain all values between \$10,000 and \$25,000.

- 12 Click OK to return to the Specified Order Tab.
- 13 To set up the final group (all values over \$25,000), click the NEW button again.
- 14 When the Define Named Group dialog box appears, type “Over \$25,000” in the *Group Name* edit box.
- 15 Set the three edit boxes so the condition reads:

is greater than 25000

- 16 Click OK to return to the Specified Order Tab.
- 17 Immediately to the right of the Specified Order Tab is the Others Tab.



Use this tab to specify how you want to handle all values that do not fit into any of the groups. Since all of the values in the Last Year's Sales field fall into one of the three groups, you will not have to worry about your settings here, so click *OK*. The program returns you to your report.

Only one other thing remains in setting up your interval report and that is to insert group headers in order to identify each of the groups. If you insert the Group Name field into the Group Header (GH) section of your report, then the program will use the name you assigned to each group to identify those groups in the report.



18 Click the **INSERT FIELDS** button on the standard toolbar. The Insert Fields dialog box appears.

19 Click the **Others** Tab. There should only be one group name in the list: Group #1 Name.

20 Drag that name into the Group Header section.

Your report should look similar to this:

This report is grouped by interval in a specified order.

Customer Name	Region	Postal Code	Country	Sales
Less than \$10,000				
Active Outdoors	IL	56478	USA	\$624.30
Deely MTB Inc.	BC	T2F 8M4	Canada	\$3,818.25
Montreal Mountain	PQ	H2Z 1S4	Canada	\$4,918.00
Hansen MTB Inc.	PQ	H1J 1C3	Canada	\$5,579.55
\$10,000 to \$25,000				
Sierra Mountain	NV	86521	USA	\$11,842.95
Desert Mountain	NV	89117	USA	\$18,778.80
Over \$25,000				
BG Mountain Inc.	BC	V3F 2K1	Canada	\$29,485.95
Hansen MTB Inc.	PQ	H1J 1C3	Canada	\$33,180.30

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT11.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

- Introduction to Reporting, Page 85
- How to group based on the first letter of a company name, Page 274
- How to create group headers, Page 285

How to calculate a percentage of the grand total

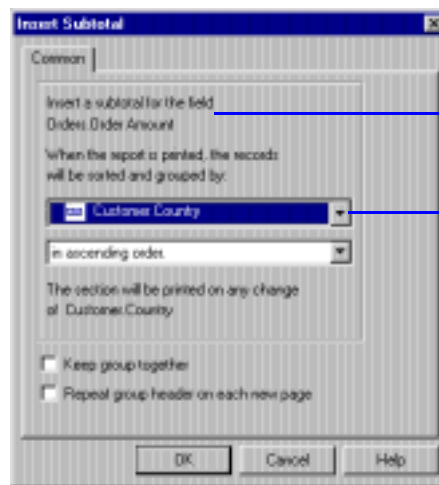
In some reports, you want to see what percentage of the grand total each group contributes. In this example, you will create a report that subtotals orders by country and then determines what percentage of total worldwide sales each country generated. The process is simple and straightforward. It uses built-in subtotaling techniques plus one simple formula.

- 1 To get started, create a report using the sample data, xtreme.mdb, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.COUNTRY}  
{orders.ORDER AMOUNT}
```

- 2 Right-click the Order Amount field and choose INSERT SUBTOTAL from the shortcut menu.
- 3 When the Insert Subtotal dialog box appears, specify Country as your sort-and-group-by field and click OK.

This calculates the sales for each country. It breaks the data into country groups and subtotals each group.

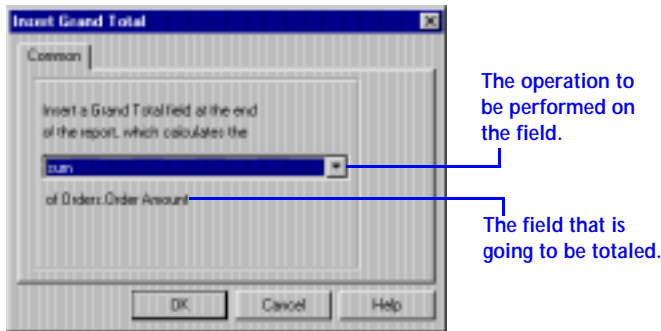


This field will be subtotaled...

...whenever the value in this field changes.

- 4 Right-click the Order Amount field again and choose INSERT GRAND TOTAL from the shortcut menu. When the Insert Grand Total dialog box appears, make sure that the function is set to *sum* and then click OK. Search for *Summary functions* in Seagate Crystal Reports online Help.

This calculates world-wide sales, the total of all sales in the report.



Now you need to determine the percentage of worldwide sales generated by each country. To do this, you will create a simple formula.

- 5 Open the Formula Editor and enter the following formula in the *Formula text box*:

`Sum ({orders.ORDER AMOUNT}, {customer.COUNTRY}) / Sum ({orders.ORDER AMOUNT}) * 100`

See *Introduction to Formulas, Page 291*.

- 6 Place the formula in the Group Footer section of the report, just to the right of the Country subtotal.

After you add labels, headers, and formatting, and you run the report, the Design Tab should look similar to this:



Your report should look similar to the following:

The program calculates the percentage of total sales contributed by each customer and each country.

Customer Name	Region	Country	Amount
SFB Inc.	CA	USA	\$7,911.80
			\$12,093.60
			\$9,606.30
			\$4,739.55
Subtotal for SFB Inc.	\$34,351.25	8.53% of total orders	
Sierra Bicycle Group	CA	USA	\$19,766.20
			\$12,763.95
			\$8,398.50
Subtotal for Sierra Bicycle	\$40,928.65	10.16% of total orders	
Sierra Mountain	NV	USA	\$8,233.50
			\$3,609.45
			\$13,543.05
Subtotal for Sierra Mountain	\$25,386.00	6.30% of total orders	
Subtotal for USA	\$259,024.65	64.33% of total orders	

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of the finished report.

NOTE: To see an example of the above report, open the SGT12.RPT file in the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).

Related Topics

Introduction to Formulas, Page 291

How to create group headers

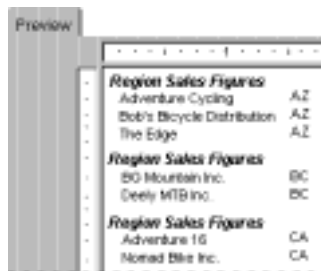
Whenever you create a group, a subtotal, or a summary, the program creates both a Group Footer (GF) section (where it places any subtotal or summary value), and a Group Header (GH) section (where it automatically places the group name/header). Group Headers are useful, even necessary, if you want your report data to be clear and easily

understood. Though the program creates a group header automatically, you may find that you would like to change/modify the header to suit your needs. In this tutorial, you will learn how to create the five most common kinds of group headers:

- *Standard headers, Page 286,*
- *Live headers, Page 286,*
- *Live headers for groups based on a formula, Page 288, and*
- *Headers for custom groups, Page 289.*

Standard headers

A standard header is a block of text that is used to identify each group in a rather generic kind of way. “Customer,” “State,” and “Monthly Orders” are all examples of this kind of header.



While the header is somewhat descriptive (“Region Sales Figures” clearly means it is a regional group), you never know what region is in the group without first looking at the details in the group.

Nonetheless, this kind of header has its place and it is easy to create.



- 1 To create a standard header, click the INSERT TEXT OBJECT button on the standard toolbar.
- 2 When the object pointer appears, move the object frame into the Group Header section.
- 3 When the Text Object is positioned, the program automatically selects the frame for editing. Enter the text you want to use for the header.
- 4 Click outside the frame when finished to complete the process. Now when you run the report, the same header will appear at the beginning of each group. See *How to insert text objects, Page 108.*

Live headers

A live header is a header that changes based on the content of the group. If the data is subtotaled by region, for example, a live header would typically identify the region detailed in each group. Thus, the Arizona group would have a header identifying the data as Arizona data, the

California group would have a header identifying the data as California data, and so on.

NOTE: When creating a group, the program automatically inserts a group name field in the Group Header section unless you have toggled the option off using the **OPTIONS** command on the **File Menu**. The information that follows details how to manually insert such a section (if you do not have the program insert one automatically) and how to create different kinds of live headers for different needs.

GROUP NAME ONLY

The easiest live header to create is an identifying field value. To create this type of live header for region groups, for example, simply insert a Group Name field in the Group Header section. This prints Arizona (or AZ) at the beginning of the Arizona group, California (or CA) at the beginning of the California group, and so on.



- 1 Click the **INSERT FIELDS** button on the standard toolbar. The Insert Fields dialog box appears.
- 2 Click the **Others** Tab to activate it.
- 3 Select the **Group Name** field that matches the group you are working with and drag it into the **Group Header** section for that group.
- 4 Format the field as desired.

Now, when you run the report, the region identifier will appear as the group header for each region group.

GROUP NAME WITH TEXT

A more complex type of live header combines a field value and text. A typical group header of this kind for data broken down by region would be, “Sales for California” or “Customers in Postal Code 60606”. Creating these headers involves three steps:

1. Insert a text object in the **Group Header** section.
2. Type in the text you want to appear.
3. Enter the **Group Name** field in the text field where you want it to appear in the **Group Header**.

For example, if you want your header to read “Sales for” and then the name of the region in the current group (Sales for AZ, Sales for CA, and so forth), follow these steps:



- 1 Click the **INSERT TEXT OBJECT** button on the standard toolbar.
- 2 Place the object frame into the **Group Header** section for the group.



- 3 When the TEXT OBJECT is positioned, the program automatically selects the frame for editing. Type in “Sales for” with a space after it.
- 4 Click the INSERT FIELDS button on the standard toolbar. The Insert Field dialog box appears.
- 5 Click the Others Tab to activate it.
- 6 Select the Group Name Field that matches the group, and drag it into the text object, immediately after the text and the space you entered.
- 7 Format the text object as you want it to appear.

Now, when you run the report, the program will create a live header (with text) for each of your groups.

Preview

Sales for A-Z	
Adventure Cycling	AZ
Bob's Bicycle Distribution	AZ
The Edge	AZ
Sales for B-C	
BO Mountain Inc.	BC
Deely MTB Inc.	BC
Sales for C-A	
Adventure IS	CA
Nonnel Bike Inc.	CA

Live headers for groups based on a formula

When you create a group and use a formula field as a sort-and-group-by field, the program automatically creates a group name field based on the value returned by the formula.

For example, if you create this formula:

```
{customer.CUSTOMER_NAME}[1]
```

and then group on the formula, the program will group your data based on the first letter in the Customer Name field.

To create a live group header for a group based on a formula, simply insert the group name field in the Group Header section.

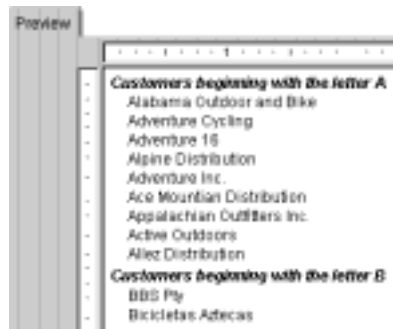
When you run the report, the “A” group will have the letter “A” as a header, the “B” group will have the letter “B”, and so on. For more information, see *How to group based on the first letter of a company name*, Page 274.



To create a more descriptive header such as “Customers beginning with the letter B”, you simply follow these four steps:

- 1 Insert a text object in the Group Header section.
- 2 Type in this text:
Customers beginning with the letter
- 3 Add a space.
- 4 Insert the group name field into the text object and place it right after the space.

NOTE: If the program automatically inserted a group name field in the Group Header section, you will need to delete that field so you will not have duplicate headers.



Headers for custom groups

The final type of header is a header for the types of custom groups created when things are grouped in a specific order. When using specified order grouping, both the name for each group and the records that belong in it are specified. As in the other grouping situations, the program creates a group name field for each group based on the group names specified.



- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Field dialog box appears.
- 2 Click the Others Tab to activate it.
- 3 Select the Group Name field for the custom group and drag it into the Group Header section for that group.

The program automatically applies each of the group names you assigned to the appropriate groups.

NOTE: Make certain that when you assign the names to the groups using the Define Named Group dialog box, the names you assign are the names you want to appear as group headers.

Preview

	1	2
\$10,000 or less		
Active Outdoors		\$824.30
Bicicletas Atleticas		\$8,599.10
Deely MTB Inc.		\$3,818.25
Hansen MTB Inc.		\$0.00
La Bomba de Bicicleta		\$1,358.20
Montreal Mountain Sports		\$5,579.55
Between \$10,001 and \$25,000		
Desert Mountain Bikes		\$18,778.80
Sierra Mountain		\$11,842.95
\$25,001 or more		
Alecz Distribution		\$33,180.30
BO Mountain Inc.		\$29,485.95

13

Introduction to Formulas

What you will find in this chapter...

What are formulas?, Page 292

How formulas are created: an introduction to the Formula Editor, Page 296

Other formula conventions, Page 304

Formula syntax, Page 306

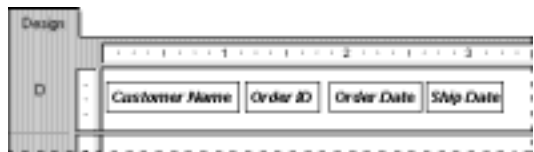
How formulas are evaluated - order of precedence, Page 309

HANDS-ON (Formulas), Page 309

What are formulas?

In many cases, the data needed for a report already exists in database table fields. To prepare an order list, for example, you simply need to place the appropriate fields on the report.

By placing these fields...



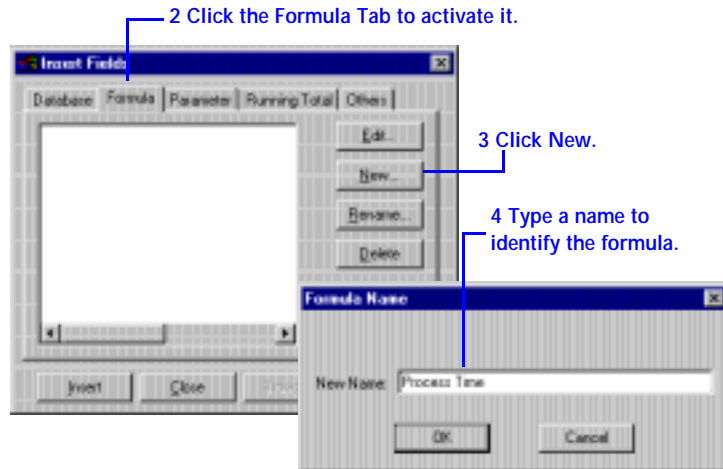
...you get this kind of report.

<i>Customer Name</i>	<i>Order ID</i>	<i>Order Date</i>	<i>Ship Date</i>
Bike-O-Rama	1143	1/30/95	1/30/95
ABC Incorporated	1092	2/16/95	2/16/95
The Pedallers	1296	2/27/95	2/28/95
The Cyclists Company	1366	3/1/95	3/1/95
Sporting Wheels Inc.	1387	6/14/95	6/15/95
CycleSporin	1717	6/24/95	6/30/95
Ride 'Em Cowboy	1763	8/8/95	8/9/95
Bob's Bikes Inc.	1952	9/1/95	9/2/95

Sometimes, however, you need to put data on the report that does not exist in any of the data fields. In such cases, you need to create a formula. For example, to calculate the number of days it takes to process each order, you need a formula that determines the number of days between the order date and the ship date. Seagate Crystal Reports makes it easy for you to create such a formula.



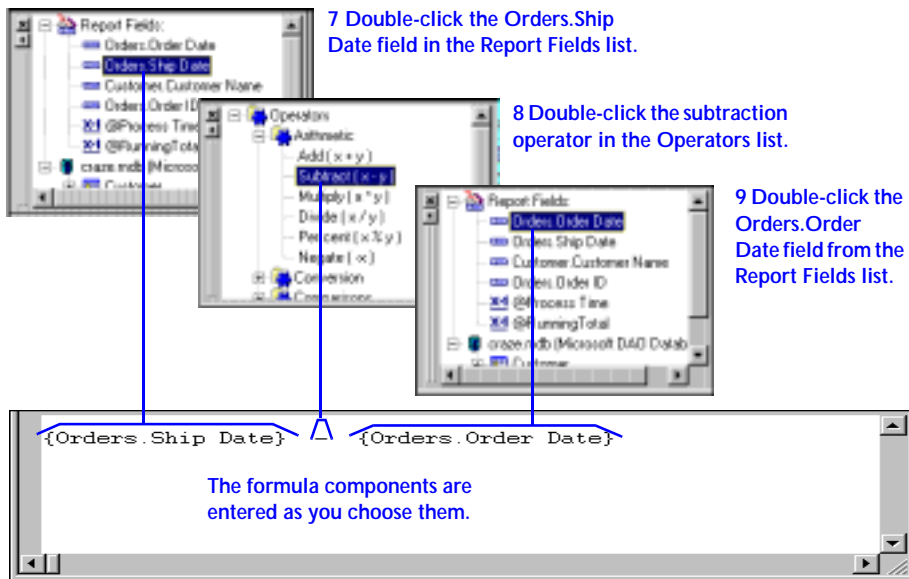
- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears.



- 5 When you click *OK* in the Formula Name dialog box, the Formula Editor appears. Use the Formula Editor to create, test, and modify the formula.

For more information on the Formula Editor, see *How formulas are created: an introduction to the Formula Editor*, Page 296.

- 6 To build the processing time formula, enter the Ship Date field, the Subtraction operator, and the Order Date field.



NOTE: When you double-click an item in the Fields, Functions, or Operators tree, it is placed in the Formula text box complete with the brackets, punctuation, and other syntax items the Formula Editor needs to process them correctly (see Formula syntax, Page 306).

NOTE: The list of values in the Browse Field Data dialog box represents only a subset of the available records.



10 When you are finished, click the CHECK button. The program checks the formula syntax.



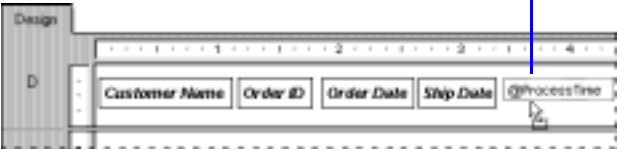
11 If the syntax is correct, click the SAVE AND CLOSE button. The Formula Editor closes and you are returned to the Insert Fields dialog box.

NOTE: If you use the SAVE AND CLOSE button, your personalized settings will be saved. The next time the Formula Editor is opened, it will appear with the settings you specified. However, if you use the SAVE button to save the formula, and later use the CANCEL button any resizing or customizing performed in the Formula Editor will be lost. The next time the Formula Editor is opened, it will appear with its default settings active.

NOTE: Other formulas can also be edited from within the Formula Editor. To do this, select the formula you want to edit from the drop-down list at the top of the Formula Editor.

12 Click the *Insert* button to place the formula field object in the report.

13 When the object frame appears, place it where you want the formula to appear in the report.



You get this kind of report:

The formula subtracts the Order Date from the Ship Date and then prints the result here.

Customer Name	Order ID	Order Date	Ship Date	Process Time
Bike-O-Rama	1143	1/30/95	1/30/95	0
ABC Incorporated	1092	2/16/95	2/16/95	0
The Peddlars	1296	2/27/95	2/28/95	1
The Cyclists Company	1366	3/1/95	3/1/95	1
Sporting Wheels Inc.	1387	6/14/95	6/15/95	4
CycleSporin	1717	6/24/95	6/30/95	6
Ride 'Em Cowboy	1763	8/8/95	8/9/95	1
Bob's Bikes Inc.	1952	9/1/95	9/2/95	1

This is just one example of how formulas can be used to create powerful reports.

Some of the other typical uses for formulas are:

- creating calculated fields to add to your report

`{orders detail.UNIT PRICE}*.85`

«Calculates a price discounted 15%.»

- formatting text on a report

`UpperCase ({customer.CUSTOMER NAME})`

«Changes all the values in the Customer Name field to uppercase. See *How to format text with formulas*, Page 318.»

- pulling out a portion, or portions, of a text string,

```
{customer.CUSTOMER NAME} [1]
```

«Extracts the first letter of the customer name. See *How to group based on the first letter of a company name*, Page 274, and search for *Subscript* in Seagate Crystal Reports online Help.»

- pulling out a portion of a date

```
Month ({orders.ORDER DATE})
```

«Determines what month an order was placed.»

These examples just scratch the surface. If you have a need for specialized data manipulation, chances are you can do it with a formula.

Related Topics

Advanced Formulas, Page 315

How formulas are created: an introduction to the Formula Editor

Creating a formula in Seagate Crystal Reports is much like creating one in any spreadsheet application. You can use:

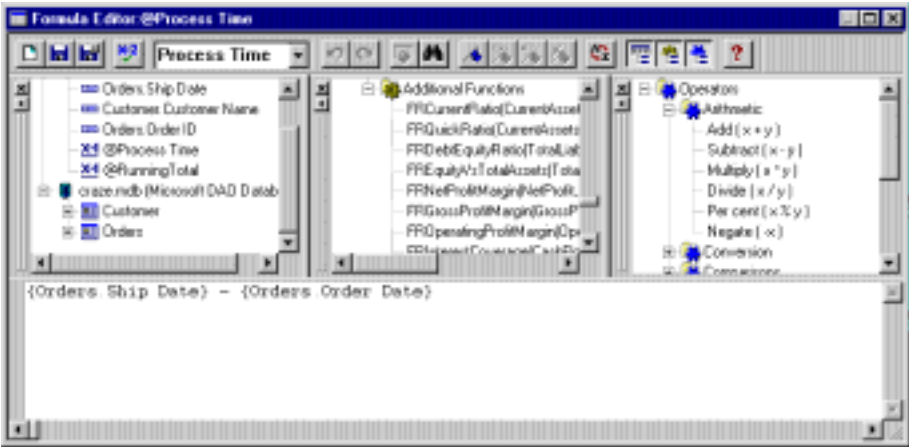
- **fields:**
({customer.CUSTOMER LAST NAME}, {customer.LAST YEAR'S SALES}, etc.),
- **numbers:**
(1, 2, 3.1416, etc.),
- **text:**
("Quantity", " ", ":", 'your text', etc.),
- **operators:**
(+, -, etc.),
- **functions:**
(TrimRight (x), Length (x), etc.),
- **group field values:**
(Average (fld, condFld), Sum (fld, condFld, "condition"), etc.), or
- **other formulas:**
(@GrossProfit, @QUOTA, etc.).

The Formula Editor is used to combine these components into working formulas. The Formula Editor allows you to type the components into the formula directly, or, in the case of fields, functions, operators, group field values, and other formulas, to select them from lists of those items that are available.

The Formula Editor requires you to enter the various components according to a specific set of rules called syntax, such rules as:

- text enclosed in quotation marks,
- arguments enclosed in parentheses (where applicable),
- referenced formulas identified with a leading @ sign,
- and so on.

The Formula Editor checks the syntax and helps you debug (fix) problems before you enter the formula into the report.



The Formula Editor combines elements to create a working formula. The three drop-down lists at the top of the Formula Editor contain the primary formula components.

**Formula Editor
Toolbar**

The formula editor toolbar enables you to access many popular options with the click of a button or a selection from a drop-down list. One drop-down list is available on the toolbar.



Use this drop-down list to select a formula to create for the report you are currently working on.

The buttons on the Formula Editor toolbar perform the following functions:



Creates a new formula.



Saves the formula.



Saves the formula and closes the Formula Editor.



Tests the syntax of the formula for errors.



Undoes an action.



Repeats an action.



Views the data in that data field.



Finds/Replaces.



Bookmarks the current line of the selected formula or removes the bookmark from the current line.



Jumps to the next bookmark.



Jumps to the previous bookmark.



Clears all bookmarks.



Arranges directories alphabetically in the field, function, and operator trees.



Hides or views the Field Tree.



Hides or views the Function Tree.



Hides or views the Operator Tree.

NOTE: The Formula Editor has drag-and-drop capability.

NOTE: The Options dialog box (File menu) allows you to change the font size and the background/foreground color of text, comments, and keywords in the Formula Editor.

Formula Editor Key Controls

The Formula Editor accepts the following key controls:

<i>Keyboard Combination</i>	<i>Action Performed</i>
Alt-T	Shows toolbar (when it has been closed).
Ctrl-A	Selects all.
Ctrl-C	Copies.
Ctrl-End	Goes to the end of the last line of the formula.
Ctrl-F	Opens the Find dialog box (same as clicking the find button).
Ctrl-F2	Sets bookmark.
Ctrl-F3	Finds Next (based on the last search performed using the Find/Replace function).
Ctrl-Home	Goes to the beginning of file.
Ctrl-Left Arrow	Goes to the beginning of the left work (+Shift key will do the selection).
Ctrl-M	Sets focus to formula name combination box.
Ctrl-N	Creates a new formula.
Ctrl-Right Arrow	Changes focus to next control box (reverse order of Ctrl-Tab).
Ctrl-S	Saves and closes formula.
Ctrl-Shift-Tab	Changes focus to next control box (reverse order of Ctrl-Tab).
Ctrl-Tab	Changes focus to next control box.
Ctrl-V	Pastes.

<i>Keyboard Combination</i>	<i>Action Performed</i>
Ctrl-X	Cuts.
Ctrl-Z	Undoes an action.
Ctrl-Shift-Z	Redoes an action.
End	Goes to end of line.
Enter	Copies a selected object from a tree to the formula text box.
F2	Goes to next bookmark.

Bookmarks

Bookmarks make it easy to navigate through long formulas, allowing you to write and edit complex formulas efficiently. For example, bookmarks can be used to mark:

- frequently edited parts of a formula, so you can find them easily when you want to revise the formula;
- major sections of a formula, so you can quickly navigate through long formulas; and
- the beginning of each new if-then statement, so you can easily jump to the next if-then statement.

As an example, consider a long formula that calculates a salesperson's salary based on a minimum base pay value from a database, a variable related to length of service, a formula that calculates commission based on sales, and other considerations. Imagine that this formula is quite lengthy, contains multiple if-then statements, and includes frequent comments. Each time you edit this formula, you might have to spend time to reacquaint yourself with its structure. However, if you use bookmarks to mark key sections in your formula, you can quickly jump to the important parts.

HOW TO USE BOOKMARKS IN A FORMULA

You can place bookmarks on formulas that you create or edit in the Formula Editor and the Format Formula Editor.

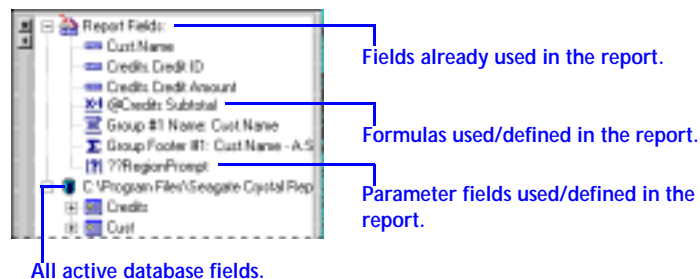
- 1 To place a bookmark, position the insertion point in the line of text which you want to mark with a bookmark.
- 2 Click the TOGGLE BOOKMARK button on the Formula Editor toolbar. A blue dot appears in the gray column left of the text line, indicating that the line is now bookmarked.
- 3 Repeat Steps 1 and 2 for each bookmark you want to place.

Once bookmarks are placed on a formula, you can quickly jump between bookmarks by using buttons on the Formula Editor toolbar. Click the *Next Bookmark* and *Previous Bookmark* buttons to jump to the next and previous bookmark, respectively. When you click these buttons, the insertion point moves to the beginning of the line marked by the next or previous bookmark.

You can easily delete bookmarks that you don't need. Simply position the insertion point in the line of text which is marked with a bookmark and click the *Toggle Bookmark* button. The blue dot disappears from the gray column left of the text line, indicating that the line is not bookmarked. To remove all bookmarks from your formula, click the *Clear All Bookmarks* button on the Formula Editor toolbar.

Fields tree

The *Fields* tree contains all the fields you can use as formula arguments.



NOTE: The *Fields* tree is resizable. It is also dockable; you can right-click within the tree to toggle the dockable property on/off. You can also right-click and choose *Hide* from the shortcut menu to hide the tree box.

HOW TO INSERT FIELDS INTO A FORMULA

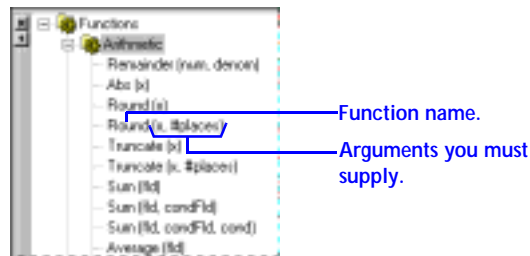
Fields can be inserted into a formula in two ways:

1. by placing the I-beam cursor where you want the field to appear in the *Formula text* box of the Formula Editor, setting the insertion point and then double-clicking the desired field in the *Fields* tree, or
2. by placing the I-beam cursor where you want the field to appear in the *Formula text* box and then typing it in manually.

NOTE: Be sure to review the correct syntax for using fields in your formulas. If you fail to include the file name, include the separating period, or surround the field in braces, the program will generate a *Formula Compiler Error* message detailing your error. See *Formula syntax*, Page 306, and search for *Error Messages and Formula Compiler Warnings* in *Seagate Crystal Reports online Help*.

Functions tree

The *Functions* tree lists the dozens of functions that are included with Seagate Crystal Reports. These functions are prebuilt procedures that return values. They perform such calculations as average, sum, count, etc. All functions available are listed with their arguments and are arranged by their use.



NOTE: The *Functions* tree is resizable. It is also dockable; you can right-click within the tree to toggle the dockable property on/off. You can also right-click and choose *Hide* from the shortcut menu to hide the tree box.

HOW TO INSERT FUNCTIONS INTO A FORMULA

Functions can be inserted into a formula in the same manner as fields:

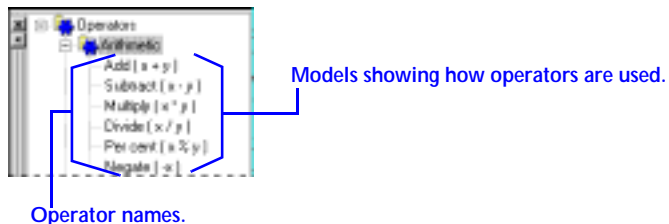
- via the *Functions* tree, or
- by typing them in manually.

See *HOW TO INSERT FIELDS INTO A FORMULA*, Page 301.

NOTE: Be sure to review the correct syntax for using functions in your formula. If a function has required arguments, all arguments must be entered. If any required arguments are not entered, the program will generate a *Formula Compiler Error* message detailing the error. See *Formula syntax*, Page 306, and search for *Error Messages* and *Formula Compiler Warnings* in *Seagate Crystal Reports online Help*.

Operators tree

The *Operators* tree lists the “action verbs” you can use in your formulas. Operators include such things as + (add), / (divide), -x (negate), etc. Search for *Operators and Variables* in Seagate Crystal Reports online Help.



Formula text box

NOTE: The *Operators* tree is resizable. It is also dockable; you can right-click within the tree to toggle the dockable property on/off. You can also right-click and choose *Hide from the shortcut menu* to hide the tree box.

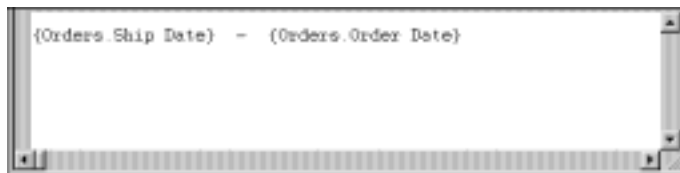
HOW TO INSERT OPERATORS INTO A FORMULA

Operators can be inserted into formulas in the same manner as fields and functions:

- via the *Operators* tree, or
- by typing them in manually.

See *HOW TO INSERT FIELDS INTO A FORMULA*, Page 301.

The *Formula text* box is where you actually enter the formula.



You can:

- use the keyboard to enter the formula manually,
- choose the formula components from the *Fields*, *Functions*, and *Operators* trees, or
- combine the two methods, choosing some of the components from the list boxes and entering other parts of the formula manually.

HOW TO INSERT TEXT AND NUMBERS INTO A FORMULA

Insert text and numbers into formulas by typing them directly into the *Formula text* box of the Formula Editor. You can also click the *Browse Field Data* button, highlight the value you want to insert from the list that appears, and select *Paste* to paste the value into your formula. See *HOW TO INSERT FIELDS INTO A FORMULA*, Page 301.

NOTE: Be sure to review the correct syntax for text and numbers in formulas. See *Formula syntax*, Page 306.

HOW TO SEARCH AND REPLACE IN THE FORMULA EDITOR



Click the **FIND/REPLACE** button to open a Find dialog box. From this dialog box, you can search and replace text within the *Formula text* box. Click the **MARK ALL** button to mark all occurrences of the search text. Click the **REPLACE ALL** button to replace all occurrences of the search text with the contents of the *Replace with* text box.

You can also search (but not replace) within any of the Formula Editor trees (use the *Search* options to specify which tree boxes you are searching). The MARK ALL, REPLACE, and REPLACE ALL buttons become inactive when you specify a search within a tree box.

Other formula conventions

The following is a description of the remaining elements available for use in assembling a formula.

Other formulas

Just as you can insert fields into formulas, you can also insert other formulas within formulas. Seagate Crystal Reports performs the calculations in the inserted formula, and then uses the value returned by the referenced formula in the same way it uses any other value.

For example, the formula:

$$1 * (2 + 4 * 6 / 3 - 7 * 12 - 8) + 2 * (2 + 4 * 6 / 3 - 7 * 12 - 8) + 3 * (2 + 4 * 6 / 3 - 7 * 12 - 8) + 4 * (2 + 4 * 6 / 3 - 7 * 12 - 8) = -820$$

includes the expression $(2 + 4 * 6 / 3 - 7 * 12 - 8)$ repeated many times.

If you create a formula for the repeated expression ($@F = (2 + 4 * 6 / 3 - 7 * 12 - 8)$) and then reference that formula instead of entering the expression itself, you will get the same result.

$$1 * \{ @F \} + 2 * \{ @F \} + 3 * \{ @F \} + 4 * \{ @F \} = -820$$

Every time the program sees the formula $@F$, it performs the $@F$ calculation and returns the value -82, just as the expression underlying the formula $(2 + 4 * 6 / 3 - 7 * 12 - 8)$ returns the value -82. See *How formulas are evaluated - order of precedence*, Page 309.

HOW TO INSERT FORMULAS INTO OTHER FORMULAS

Formulas can be inserted into other formulas in the same manner as you did other fields:

- via the *Fields* tree, or
- by typing them in manually.

See *HOW TO INSERT FIELDS INTO A FORMULA*, Page 301.

NOTE: Be sure to review the correct syntax for using formula fields in your formula. See *Formula syntax*, Page 306.

Group field values

Group field values are values that summarize a group (a group subtotal, a group average, etc.). You can use them in formulas for a variety of

Formula comments

purposes. For example, you could use group field values to find the percentage of the grand total contributed by each group. For instance, you may want to know what percentage of the \$2,300,000 U.S. sales figure the Western Region generated.

HOW TO INSERT GROUP FIELD VALUES INTO FORMULAS

Group field values can be inserted into formulas in the same way you inserted other fields:

- via the *Fields* tree, or
- by typing them in manually.

NOTE: *Due to the syntax complexity of some group fields, it is recommended that you enter group fields by selecting them from the Fields tree instead of manually typing them in. See Formula syntax, Page 306.*

Formula comments are notes included with a formula to explain its design and operation.

Comments do not print and they do not affect the formula, but they appear in the Formula Editor. It is always a good idea to include comments with complex formulas for other users of your reports, especially those formulas that will be used again and again.

HOW TO INSERT COMMENTS INTO FORMULAS

Type your comments into the *Formula text* box in the Formula Editor. A comment must be preceded by two slashes (//). The comment can be above or below the formula, or it can even follow the formula on the same line.

Any of the following three placements are acceptable:

```
//This is an acceptable
//position for a comment.
//Note that when you force the line break,
//you have to begin each new line
//with double slashes. These comments
//refer to the formula below.
```

```
If {orders.ORDER AMOUNT} in (100.00 to 250.00) Then
    .10 * {orders.ORDER AMOUNT}
Else
    0
```

```
//This is also an acceptable comment position
//for detailing the formula above.
```

```

If {orders.ORDER AMOUNT} > 10.00 Then
    " " //This position is also acceptable.
Else
    "Flag"

```

Formula comment considerations

The following are considerations when including comments with formulas:

- The proper syntax for a comment is two forward slashes (//) followed by the comment. When the program sees the two slashes, it realizes that the text that follows for the rest of the line is comment only and not to be evaluated as part of the formula itself.
- Seagate Crystal Reports treats everything that follows the slashes on the same line as a comment.
- If a comment is long and automatically wraps to the next line, no additional slashes are necessary; the program treats it as one continuous comment.
- If the Enter key is used to break the comment into two or more lines, each new line must begin with two slashes. If each new line does not begin with two slashes (//), the program treats each unslashed line as part of the formula itself and displays an error message when you check the formula syntax.

Formula syntax

Seagate Crystal Reports requires the various components of a formula to be entered according to a specific set of rules called syntax. Learning and perfecting syntax, like the grammar of any language, takes practice. Formula components must be written in a specific way and entered in specific order. The program uses syntax items (quotation marks, brackets, parentheses, etc.) to identify the various formula components, so it is very important that you stick to the rules in order for the program to recognize your formulas as well as have them work as you plan.

The various components of formulas, and their syntax, are listed below:

Text

"Text" or 'Text'

When using text in formulas, it must be enclosed within single (') or double (") quotes. Whatever text is within those quotes will be printed. If your text includes an apostrophe, you must use double quotes.

CORRECT

`"Last Year's Sales"`

INCORRECT

`'Last Year's Sales'`

Numbers

`23134.7`

When using numbers in formulas, they must be entered without any comma separators or currency symbols.

Fields

`{table.FIELD}`

When using fields in formulas, they must be enclosed within French braces `{ }`. Enter the table name to identify which database table you are referring to, followed by a period and then enter the field name within that table.

EXAMPLE

`{customer.REGION}`

This identifies the Region field from the Customer table.

Operators

`1+1`

When using operators in formulas, you simply type in the operator where desired. You may place a space before and after the operator if you desire, but it is not required (i.e., `1 + 1`).

Functions

`FunctionName(x)`

When using functions in formulas, you simply type the function and supply the arguments (if any) as specified in the parentheses. For example, the Average (x) function requires a field or formula as its (x) argument.

EXAMPLE

`Average({order.AMOUNT})`

This formula will calculate the average of all values in the Amount field.

Brackets in formulas

Seagate Crystal Reports uses three different types of brackets in formulas. Each one has a specific purpose and can be used only with certain formula elements.

- `{ }` are called French braces and are placed around database, formula, and parameter fields:

{customer.REGION}, {@sum}, {?Region}

- [] are called Square brackets and are placed around the Subscript or Array Operator:

{customer.CUSTOMER NAME} [1]

- () are called Parentheses and are placed around the arguments of a function:

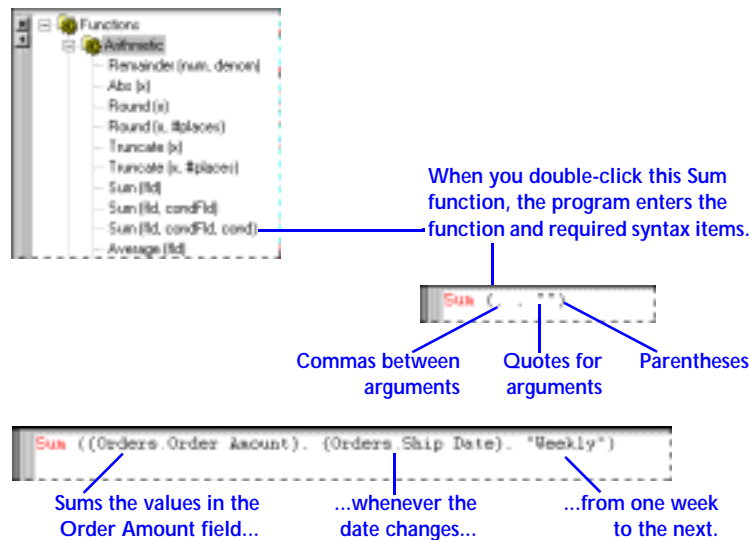
Round(x, # places), Abs(x)

NOTE: Parentheses can also be used to control the order in which the formula elements are evaluated. See *How formulas are evaluated - order of precedence*, Page 309.

HINT: Here is a useful way to remember when to use different types of brackets:

- French { } = Fields
- Square [] = Subscript (and Array)
- Parentheses () = Parameters

Whether the formula is entered manually or by selecting formula components from the component list boxes, the correct syntax must be used in order for the formula to work.



How formulas are evaluated - order of precedence

When you are creating formulas that contain different types of operators, it is important to consider the order by which the program evaluates the separate elements of your formula. This order is called order of precedence.

Simple order of precedence follows basic math rules of precedence. Multiplication and division are performed first, from left to right; then addition and subtraction are performed. For example:

$$5 + 10 * 3 = 35$$

The multiplication $10 * 3$ is performed first to get 30. Then, 30 is added to 5 to arrive at the final answer, 35.

Now, if your intention is to add 5 to 10 and then multiply the sum by 3, you have to modify the order of precedence by using parentheses. You can do that as follows:

$$(5 + 10) * 3 = 45$$

It is clear that parentheses have a higher precedence than the add, subtract, multiply, and divide operators. They redirect the order of calculation.

NOTE: *When a formula contains other formulas such as:*

`@Extension * 107.5%`

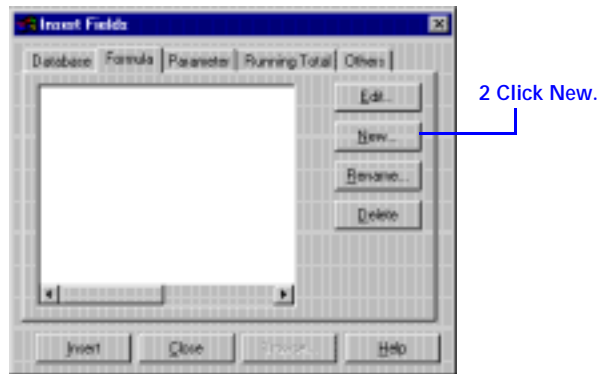
the program first evaluates the embedded formula, @Extension, following order of precedence rules and then evaluates the rest of the primary formula.

HANDS-ON (Formulas)

How to insert a formula into a report



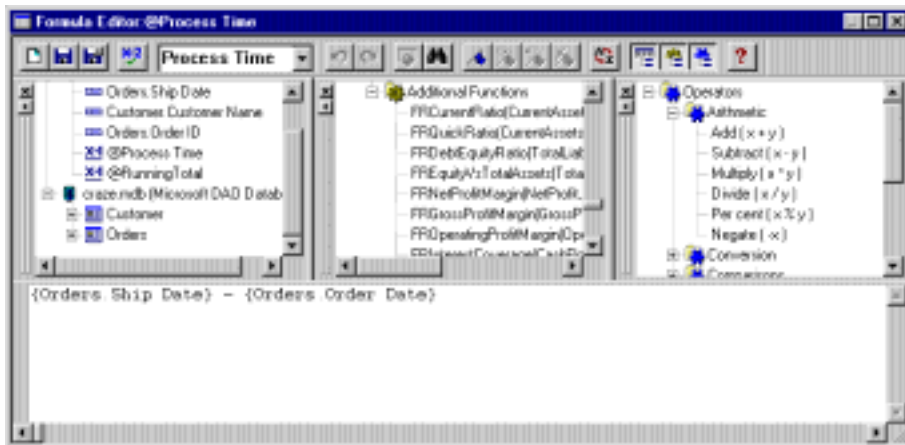
- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears with the Database Tab active. Click the Formula Tab to activate it.



The Formula Name dialog box appears.



The Formula Editor appears.



5 Enter the formula by typing in the components or selecting them from the trees.



- 6 When finished, click the CHECK button to check the syntax in the formula, then fix any syntax errors the Formula Checker identifies.
- 7 When the formula has the correct syntax, click the SAVE AND CLOSE button to return to the Insert Fields dialog box. Your formula appears in the *Formula Name* list box.

NOTE: When you click either the SAVE or SAVE AND CLOSE button, Seagate Crystal Reports automatically checks the syntax of the formula before allowing you to place it in the report.

- 8 Highlight the formula and click the INSERT button to place the formula in the report.
- 9 When the cursor is placed over the report, an object frame appears. Click once to set the field in the desired position.

How to delete formulas from a report

When a formula is created and added to a report, Seagate Crystal Reports:

- stores the specification for creating the formula, using the name you assigned to it, and
- places a working copy of that formula at the point you specify in the report. A working copy is any occurrence of the formula in the report.

In order to delete formulas, you must delete the specification and all working copies of the formula.

NOTE: You can not delete the specification without deleting all working copies of the formula.

Deleting individual working copies of a formula

- 1 Select the formula copy you want to delete from the report.
- 2 Press the Delete key.

NOTE: Even after all of the working copies of a formula have been deleted from the report, the formula specification remains unchanged. The specification is listed in the Formula Tab of the Insert Fields dialog box, and it is available for immediate use should you wish to enter the formula in the report again. Search for Insert Fields dialog box in Seagate Crystal Reports online Help.

Deleting the formula specification



NOTE: This step can only be completed after you have deleted all working copies of the formula from your report.

- 1 Once you have deleted all working copies of the formula, click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears with the Database Tab active.
- 2 Click the Formula Tab to activate it.
- 3 Highlight the formula specification you want to delete in the *Formula name* list.
- 4 Click the DELETE button, and the program deletes the formula specification.

NOTE: If the formula is being used in another formula the program will delete the specification nonetheless.

NOTE: If you have not deleted all working copies of the selected formula, the program displays the message: *Formula Name in use. It can not be deleted.*

How to copy formulas from online Help

Windows allows you to copy text from online Help topics to the Clipboard. You can then paste this text wherever it is needed. Since the formulas you develop using the Formula Editor are simply text, you can save yourself a lot of time by copying useful formulas directly into the Formula Editor and then modifying them to fit your needs.

- 1 With the Formula Editor open, activate the online Help in any of the standard ways (Help menu, F1 function key, etc.).
- 2 Regardless of the topic that first appears, use the Search or Find facility to locate the topic that contains the formula of interest.
- 3 Scroll through the topic until you locate the formula you want to copy.
- 4 Highlight the formula by dragging the I-beam cursor over it, and then choose the COPY command from the Edit menu or press Ctrl-C. Windows puts a copy of the selected text on the Clipboard.
- 5 Place the insertion point where you want the text to appear in the *Formula text* box of the Formula Editor and press Ctrl-V to paste the text from the Clipboard.
- 6 Modify the formula by changing the fields, formulas, group fields, conditional statements, and text strings as necessary for use with the data in the new report.

How to copy formulas from one report to another

You may find yourself wanting to copy a formula created in one report for use in another report. Copying formulas from one report to another is a simple procedure, but it requires careful attention to detail.

Since formulas are stored as text, it is a simple matter to copy the text formula from one report to another via the Clipboard.

- 1 Select the formula field you want to copy in the report.
- 2 Choose the COPY command from the Edit menu or press Ctrl-C.
- 3 Open the report you want to copy the formula to.
- 4 Choose the PASTE command from the Edit menu or press Ctrl-V.
- 5 When the program displays the object frame, drag the formula to the new location.
- 6 Change the fields, formulas, group fields, conditional statements, and text strings (if necessary) for use with the data in this report.

To make these changes, right-click the formula and choose EDIT FORMULA from the shortcut menu. The Formula Editor appears.

- 7 Delete the old values and type in the new values, or select them from the *Fields*, *Functions*, and/or *Operators* trees. When making changes, use the following points as a guide:
 - All fields, formulas and group fields referenced in the formula copy must actually exist in the new report. This means that any database referenced in the original formula (or a database with the same structure, field names, and alias) must be active in the new report.
 - If such a database is not active, you must change the field, formula, and group field references in the formula copy to correspond to elements in your new report.
 - If the formula contains conditional elements, make certain that the conditions apply to the data in the new report. For example, if the formula in your old report performed an action when the quantity was greater than 100, make sure that the greater than 100 condition makes sense in the new formula. When modifying a formula, you may find that greater than 10 or greater than 2000 makes more sense with your new data.
 - If you are using the formula with new data, and if your report contains statements similar to the following:

```
If {file.FIELD} = "text string"
```

Make sure that the text strings used in the formula match values that actually exist in the new data.

8 Click the **SAVE AND CLOSE** button when finished.

Related Topics

HOW TO INSERT FIELDS INTO A FORMULA, Page 301

HOW TO INSERT FUNCTIONS INTO A FORMULA, Page 302

HOW TO INSERT OPERATORS INTO A FORMULA, Page 303

What you will find in this chapter...

How to create If-Then-Else formulas, Page 316

How to print Time or dateTime values conditionally, Page 317

How to create multi-condition If-Then-Else formulas, Page 317

How to format text with formulas, Page 318

How to use variables in formulas, Page 319

How to declare a variable, Page 322

How to assign a value to a variable, Page 323

How to combine a variable declaration and assignment expression, Page 325

How to declare and assign values to multiple variables, Page 325

How to conditionally assign values to variables, Page 325

How to use an array in a formula, Page 326

How to use a range in a formula, Page 328

How to use semicolons in formulas, Page 331

How to fine-tune group selection formulas, Page 331

How to fine-tune record selection formulas, Page 333

How to debug a formula, Page 336

How to create If-Then-Else formulas

If-Then-Else formulas are conditional formulas: if a condition is met, then a certain consequence (an action) takes place. If the condition is not met, then a different action takes place. If-Then-Else formulas are created using the If-Then-Else operator. Search for *If-Then-Else* in Seagate Crystal Reports online Help.

Examples

- If a sales representative has already earned the maximum allowable bonus, print the amount of the maximum bonus allowed; if he has not yet earned the maximum, calculate the bonus actually earned and print it.
- If the value in the title field is "Mr.", print "Dear Mr." as the beginning of the salutation; if it is not "Mr.", print "Dear Ms." as the salutation.
- If the quantity on hand of a certain part is greater than or equal to the reorder amount, reorder according to the reorder instructions; if the quantity is less than the reorder amount, do nothing.

These are just a few of the kinds of conditional formulas you can create using the If-Then-Else operator.

When using the If-Then-Else operator, remember that there must be three separate elements to any If-Then-Else formula:

1. **If**
This portion sets the condition.
2. **Then**
This portion sets the action that takes place when the *If* condition is met.
3. **Else**
This portion sets the action that takes place when the *If* condition is not met.

NOTE: *The data types (text, number, currency, date, time, dateTime, or Boolean) for the Then and Else parts of the formula must be the same.*

Thus, if the action that takes place when the condition is met (*Then*) is to print a text string, the action that takes place when the condition is not met (*Else*) must also be to print a text string, even if that text string is empty. For example:

```

If {file.FIELD} = 5 Then
    "Text String"
Else
    "Another Text String"

```

OR

```

If {file.FIELD} = 5 Then
    0
Else
    1

```

NOTE: *If-Then-Else formulas that use a Time or dateTime data type as a Then action and a null or empty Time or dateTime as an Else action can not be created because there are no null or empty values for those data types. However, Time or dateTime values can be printed conditionally. See How to print Time or dateTime values conditionally, Page 317.*

How to print Time or dateTime values conditionally

To print Time or dateTime values conditionally (print a field if the condition is met, print a field in another color if the condition is met, etc.), you can not do it using an If-Then-Else formula because there is no such thing as an empty or null value for the Time or dateTime data type. Instead, you insert the field itself in the report and set its *Suppress* property conditionally.



- 1 Place the dateTime field where you want it to print on the report.
- 2 Select the field and click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears.
- 3 Click the Common Tab to activate it.
- 4 Click the FORMULA button to the right of the *Suppress* property.
- 5 Type the following formula into the Formula Editor when it appears.

```
{employee.LAST NAME} <> "Fuller"
```

Now when you run the report, the program will print the dateTime field whenever the employee last name is Fuller and it will suppress the field when the last name is anything but Fuller.

How to create multi-condition If-Then-Else formulas

The If-Then-Else operator can be used to create powerful multi-condition formulas.

Multi-condition and nested If-Then-Else formulas can be set up in this general pattern:

- If the X (first) condition is met, *Then*, go to the Y (second) condition.
- If the Y condition is met, *Then* perform the Y action.
- If the Y condition is not met (*Else*), perform the Y alternative.
- If the X condition is not met (*Else*), perform the X alternative. Thus:

```
If {file.FIELD1} = "X" Then
    If {file.FIELD2} = "Y" Then
        "Y Action"
    Else
        "Y Alternative"
Else
    "X Alternative"
```

See *How to create If-Then-Else formulas*, Page 316.

This formula checks the field FIELD1 first.

- If the value of that field is "X," the FIELD2 field is checked.
 - If the value of that field is "Y," then "Y Action" is printed.
 - If the value of FIELD2 is not "Y," then "Y Alternative" is printed.
- If the value of FIELD1 is not "X," then "X Alternative" is printed.

While multi-condition formulas look complex at first, after you have worked through one or two you will find that they are not as intimidating as they seem, especially considering their usefulness.

How to format text with formulas

You can use formulas to format text. For instance, functions are included with the program for removing unnecessary leading or trailing spaces from text strings as well as converting text entirely to upper or lower case.

Examples

```
TrimLeft(" A1/4520/B12")
```

«Returns "A1/4520/B12".»

```
TrimRight("A1/4250/B12 ")
```

«Returns "A1/4250/B12".»


```
LowerCase( "Ronald Black" )
```

«Returns "ronald black".»

Related Topics

Formatting, Page 209

How to use variables in formulas

Variables can be used to solve many formula problems, but they have two primary uses:

1. streamlining formulas, and
2. expanding formula capabilities.

Unlike a constant value, which is fixed and unchanging, a variable can be repeatedly assigned different values. You assign a value to a variable and the variable maintains the value until you later assign a new value. Then the variable maintains the new value until you later assign yet another new value, and so on.

Using variables to streamline formulas

With variables, you can write formulas much more efficiently than you can without them. For example, to evaluate the {customer.FAX} field to determine if the area code is for Washington state (206, 360, 509) or British Columbia, Canada (604, 250), without the benefit of variables, you must write a formula similar to the following:

```
If {customer.FAX}[1 to 3] = "604" or
   {customer.FAX}[1 to 3] = "250"
Then
    "BC"
Else
    If {customer.FAX}[1 to 3] = "206" or
       {customer.FAX}[1 to 3] = "509" or
       {customer.FAX}[1 to 3] = "360" Then
        "WA"
    Else
        ""
```

See *How to create If-Then-Else formulas, Page 316*, and search for *Subscript* in Seagate Crystal Reports online Help.

You have to write out the instructions for extracting the area code from the telephone number field ({customer.FAX} [1 to 3]) every time you want the formula to use the area code from the current record.

By using a variable (for example, AreaCode), you write those instructions only one time. Using those instructions, the program automatically extracts the area code from the {customer.FAX} field, and stores it in the variable each time it reads a new record. You simply reference the variable AreaCode whenever you want to use the area code from the current record in your formula. Here's an example of the same formula, this time using the AreaCode variable:

```
StringVar AreaCode:={customer.FAX}[1 to 3];
If AreaCode = "604" or AreaCode = "250"
Then
    "BC"
Else If AreaCode = "206" or AreaCode = "509" Then
    "WA"
Else
    ""
```

Not only does the streamlined version take less time to write, but it takes less time to process as well, so your report prints more quickly.

Using variables to expand formula capabilities

Besides their ability to streamline formulas, variables allow you to expand your formula writing capabilities. Before discussing the specifics of using variables in formulas, it is important to understand how the Formula Editor reads formulas.

SPECIAL REQUIREMENTS FOR USING VARIABLES IN FORMULAS

In the discussion thus far, formula requirements have been narrowly defined:

- a given operator only works in certain situations and with certain kinds of text and/or data,
- a function only works with a specific number of arguments, and each argument must be a specific data type, and
- If-Then-Else formulas work only if the data type of the *Else* part of the formula matches the data type of the *Then* part.

Such narrow definitions allow you to create formulas, in many cases, simply by filling in the blanks, with the formula checker pointing out any mistakes you make.

Variables, however, are not so narrowly defined. They are extremely flexible; you make them what you want them to be. You create them at will, and include them in formulas as needed.

Because of this flexibility, it is necessary for you to define the variables before using them so that the program:

- is aware of them,
- understands how you intend to use them, and
- can set up the memory space they require.

You also need to assign values to the variables so the program knows what values they are to return.

Seagate Crystal Reports knows only what you tell it about the variables. The fail-safe formula-checker routines that work automatically with the other formula elements work with variables only after you define them.

To use a variable in a formula, you must do three things:

1. declare the variable,
2. set the value of the variable, and
3. enter the variable in the formula.

Declaring the variable

Seagate Crystal Reports requires you to declare all variables prior to using them. When you declare a variable, you tell the program:

- the name you intend to use for the variable, and
- the type of data you want the variable to contain.

The program uses this information to set aside memory for receiving and storing the values that are assigned to the variable.

NOTE: *If you declare a variable with the same name and data type in two or more formulas, then the formulas share the same variable. Thus, if one formula sets the value of the variable, the variable in the second (and additional formulas) reflects the change.*

Naming the variable

You can name the variable anything you wish with the following qualifications:

- the variable name must not exceed 254 characters, and
- it can not have the same name as an operator or a built-in function. Search for *Functions and Operators and Variables in Seagate Crystal Reports online Help*.

NOTE: *As a general rule, you are probably better off if you keep the variable name short, easy to remember, and unique (not so close to the name of another variable as to cause confusion).*

Variable data types

The data type of a variable determines the type of data that can be stored as a value in that variable. You can create a variable with one of seven data types:

1. number (100000)
2. currency (\$30,000.00)
3. Boolean (TRUE)
4. date (January 1, 1996)
5. string ('Hello')
6. time (11:59:01)
7. dateTime (96/12/31 11:59:59 P.M.)

How to declare a variable

You must declare a variable at the beginning of the formula that uses the variable.

NOTE: *Variables can not be declared globally. If you are using a variable that was declared in another formula, you must declare it again.*

NOTE: *If you declare a variable with the same name and data type in two or more formulas, the formulas share the same variable. Thus, if one formula sets the value of the variable, the variable in the second (and additional formulas) reflects the change.*

To declare a variable you must enter:

- the data type and the variable name,
- followed by a semicolon to mark the end of the declaration.

For example, to declare a number variable named Amount, enter the following declaration statement:

```
NumberVar Amount ;
```

To declare a Boolean variable named Outstanding, enter the following declaration statement:

```
BooleanVar Outstanding ;
```

To declare more than one variable, you can list them. Each variable is separated by a semicolon. For example:

```
NumberVar Amount ;  
BooleanVar Outstanding ;  
DateVar MonthEnd ;
```

The program uses your declaration statement to set aside a block of memory that holds each of the variable values and assigns a default value

to each memory block. The default value assigned depends on the data type you declare for the variable. The default values assigned are as follows:

<i>Data type</i>	<i>To</i>	<i>Default value</i>
number	NumberVar	0
currency	CurrencyVar	0
Boolean	BooleanVar	False (No, 0)
date	DateVar	date (0, 0, 0)
string	StringVar	empty string (" ")
dateTime	DateTimeVar	No default ¹
time	TimeVar	No default ¹
¹ Since Time (00:00:00) is midnight, you can not use 00:00:00 as a default time or as part of a default dateTime either. Thus, a default is not assigned here.		

How to assign a value to a variable

You assign a value to a variable using an assignment statement. The assignment statement consists of:

- the variable name,
- the assignment operator, and
- the value you want assigned to the variable.

Variable name

The variable name is the name used to declare the variable.

Assignment operator

The assignment operator is a colon followed by an equals sign (:="). Search for *Assignment operator* in Seagate Crystal Reports online Help.

Variable value

The variable value can be any value that matches the data type of the variable. For example, you can assign a number to a number variable. You can also assign an expression that results in a number or even a sequence of expressions. For a string variable you could assign a character, a word, a sentence, or an expression that results in a string. A variable value can be a constant, an expression, or a sequence of expressions.

EXAMPLE ASSIGNMENT STATEMENTS

Following are the assignment statements for assigning different kinds of values to variables:

```
Amount:= 0
```

«Assigns (initializes) the variable Amount to zero.»

```
Amount:= 100
```

«Assigns the value 100 to the variable Amount.»

```
Amount:= Amount + {orders detail.QUANTITY}
```

«Assigns the result of a calculation to the variable Amount. The calculation adds the value of the quantity field ({orders detail.QUANTITY}) to the current value of the Amount variable.

```
Amount:= {file.QUANTITY1} + {file.QUANTITY2} +  
{file.QUANTITY3}
```

«Adds the three quantity fields and assigns the result to the variable Amount.»

```
Customer:= "Westside Motors"
```

«Assigns the string "Westside Motors" to the variable Customer.»

```
Customer:= {customer.FIRST NAME} + {customer.LAST  
NAME}
```

«Adds (concatenates) two string fields and assigns the concatenated value to the variable Customer.»

```
Customer:= TrimRight({customer.FIRST NAME}) +  
{customer.LAST NAME}
```

«Trims the trailing blanks from the First Name field ({customer.FIRST NAME}), concatenates that field to the Last Name field ({customer.LAST NAME}), and assigns the concatenated value to the variable Customer.»

```
Customer:= "Mr. " + {customer.LAST NAME}
```

«Concatenates the string "Mr. " with the value of the Last Name field {customer.LAST NAME}, and assigns the concatenated value to the variable Customer.»

```
Amount:= 100;
```

```
Customer:= "Westside Motors";
```

«Assigns the constant 100 to the number variable named Amount, and assigns the string "Westside Motors" to the variable Customer. You can assign values to multiple variables by separating the assignment statements with semicolons.»

How to combine a variable declaration and assignment expression

For efficiency, you can declare a variable and assign it a value in a single line of formula code. To do this, simply declare the variable, allow a blank space, enter the assignment operator, and then assign the value.

For example, to declare a currency variable `SellPrice` and assign the value of the `Cost` field (`{product.PRICE (SRP)}`) times two (a 100% markup), use the following expression:

```
CurrencyVar SellPrice:={product.PRICE (SRP)} * 2;
```

To declare a Boolean variable `OverQuota` and assign the result of the comparison `{file.SALES}>{file.QUOTA}`, use the following expression:

```
BooleanVar OverQuota:= {file.SALES}>{file.QUOTA};
```

How to declare and assign values to multiple variables

There may be times when you want to declare multiple variables and assign values to each of them. To do this in the most efficient manner, simply chain the declaration/assignment expressions together, separating them with semicolons.

For example, to declare two variables (a number variable `Quantity`, and a currency variable `SellPrice`) and then assign values to each variable (the number 5 to the variable `Quantity`, and `{file.COST} * 2` to the variable `SellPrice`), use expressions similar to the following:

```
NumberVar Quantity:= 5;  
CurrencyVar SellPrice:= {file.COST} * 2;
```

How to conditionally assign values to variables

Seagate Crystal Reports formula language gives you the ability to assign different values to variables based on whether or not conditions are met. Consider the following formula:

```
NumberVar Total;  
NumberVar Result;  
  
Total:= Total + {invoices.ITEM TOTAL};
```

```

If Next ({invoices.CUST#})<>{invoices.CUST#} Then
    (Result:= Total; Total:= 0)
Else
    Result:= 0;
Result;

```

The If-Then-Else part of this formula says that when the *If* condition is met (if the customer numbers [{invoices.CUST#}] are not equal), the program is to do two separate things:

1. Assign the value stored in the variable Total (the running total) to the variable Result, and
2. Reset the value in the variable Total to 0.

When the *If* condition is not met (if the customer numbers are equal), the program is to assign the value 0 to the variable Result.

How to use an array in a formula

An array is a special type of variable that can hold several values at once. The entire array can be passed to a summary function for evaluation, or separate elements of the array can be extracted using the Subscript operator. Search for *Subscript* in Seagate Crystal Reports online Help.

A common use for an array is to store the names of the days of the week:

```

StringVar array Weekdays:= ["Sunday", "Monday",
    "Tuesday", "Wednesday", "Thursday", "Friday",
    "Saturday"];

```

There are five parts to declaring an array variable:

1. A variable declaration operator specific to the type of data the array will hold, StringVar in this example.
2. The word *array* follows the variable declaration operator.
3. The name you assign to the array follows the word *array* - Weekdays in this example.
4. The Assignment operator follows the name and is used to assign values to the array variable.
5. Square brackets follow the assignment operator and are used to enclose the values (elements) stored by the array. Each element is separated by a comma.

Search for *Assignment* in Seagate Crystal Reports online Help.

An index value is assigned to each element in the array according to the sequence of the elements.

- The first element is assigned index 1,
- The second element is assigned index 2, and so on.

To extract an element from the following array in your code:

```
StringVar array Weekdays:= ["Sunday", "Monday",  
"Tuesday", "Wednesday", "Thursday", "Friday",  
"Saturday"];
```

use the Subscript operator with the index number for the element you want to extract:

```
Weekdays[5]  
«Returns "Thursday".»
```

Negative numbers can also be used to extract array elements:

```
Weekdays[-4]  
«Returns "Wednesday".»
```

An array of values can be created for any valid data type. However, arrays have the following restrictions:

- All elements must be of the same data type.
- You must declare the array with one of the variable declaration operators.
- An array is limited to 100 elements.
- Each element in an array of string values is limited to 254 characters (the standard limit of any string value in Seagate Crystal Reports).

Examine the following examples of array declarations to become more familiar with arrays:

```
NumberVar array x := [1, 10, 44];  
  
CurrencyVar array Cost := [$19.95, $79.50, $110.00,  
$44.79, $223.99];  
  
DateVar array PayDays := [Date(1999, 05, 15),  
Date(1999, 05, 31)];
```

Arrays can also be used without being assigned to array variables. For example:

```
[ "One" , "Two" , "Three" ][2]
```

«Returns "Two" because it is the second item in the array.»

In some situations, you may wish to use arrays dynamically in this fashion. However, most formula situations that require arrays can be handled more easily by defining the array as an array variable.

Using arrays with summary functions

Summary functions accept arrays as parameters without requiring the array be declared as a variable. For example:

```
Average([5, 10, 15]) = 10
```

Use the square brackets to indicate that an array is being used with the function. Search for *Summary Functions* in Seagate Crystal Reports online Help.

A sample formula

To better understand how arrays can be used in formulas, examine the following sample formula:

```
StringVar array Weekdays := [ "Sunday" , "Monday" ,  
"Tuesday" , "Wednesday" , "Thursday" , "Friday" ,  
"Saturday" ] ;
```

```
Weekdays[DayOfWeek({orders.SHIP DATE})]
```

«If DayOfWeek is 2, Monday will be returned because it is the second item in the array.»

This formula prints the name of the day of the week that each order was shipped. First, the Weekdays array is declared and is assigned string values for each day of the week. Search for *DayOfWeek* in Seagate Crystal Reports online Help.

Next, the DayOfWeek function evaluates the date stored in the {orders.SHIP DATE} field and returns a number representing the day of the week (1 for Sunday, 2 for Monday, etc.).

Finally, the Subscript operator is used with the Weekdays array to retrieve the name of the day of the week, according to the number returned by the DayOfWeek function. The name of the day is then returned by the formula and appears in the report. Search for *Subscript* in Seagate Crystal Reports online Help.

How to use a range in a formula

A range is designed to conveniently handle an entire spectrum of values—values that fall between a minimum and a maximum value.

For example, you would declare a number range variable as follows:

```
NumberVar Range GradeA;
```

A range variable is declared much like an array:

- A variable declaration operator appropriate to the type of values stored by the range, *NumberVar* in this example.
- The word *Range* follows the variable declaration operator.
- The name of the range variable follows the word *Range* - *Grade A* in this example.
- The Assignment operator, which follows the name, is used to assign the range of values which the range variable will store.

Search for *Assignment* in Seagate Crystal Reports online Help.

To indicate range, type the Make Range operator, followed by a minimum and maximum value for the range.

Search for *Make Range* in Seagate Crystal Reports online Help.

Ranges have two principle uses:

1. To extract a range of values from a list of all possible values, and
2. To extract a range of characters from a string value.

Extracting a range of values

Consider the following example:

```
NumberVar Range GradeA := 90 to 100;  
NumberVar Range GradeB := 80 to 89;  
NumberVar Range GradeC := 70 to 79;  
NumberVar Range GradeD := 60 to 69;  
  
If {student.TEST SCORE} in GradeA Then  
    "A"  
Else If {student.TEST SCORE} in GradeB Then  
    "B"  
Else If {student.TEST SCORE} in GradeC Then  
    "C"  
Else If {student.TEST SCORE} in GradeD Then  
    "D"  
Else  
    "F"
```

This formula starts by creating four range variables. Each contains a range of possible test scores. Notice that, unlike an array, no brackets are used to set off the range of values assigned to each range variable. Only the Make Range operator is used, along with the minimum and maximum test scores for each range.

Extracting a range of characters

The multiple If-Then-Else statement repeatedly evaluates the value in the {student.TEST SCORE} field to determine if it falls within a specific grade range. The formula then prints letter grades in the report appropriate to the test scores received by each student.

See *How to create multi-condition If-Then-Else formulas*, Page 317.

The following formula demonstrates how to use ranges to extract characters from a string value:

```
StringVar AreaCode := {customer.FAX}[1 to 3];  
  
If AreaCode = "604" Then  
    "BC"  
Else If AreaCode = "206"  
    or AreaCode = "509"  
    or AreaCode = "360" Then  
    "WA"  
Else  
    ""
```

This formula creates a variable that holds the first three characters in the string value of the {customer.FAX} field. For instance, if the value in {customer.FAX} is "6045551234", then:

```
{customer.FAX}[1 to 3]  
  
«Returns "604". Notice that square brackets are used to indicate a  
range of characters in a string (unlike the range of numeric values  
seen in the previous example).»
```

The variable AreaCode is assigned the value "604". The multiple If-Then-Else statement evaluates the value in the AreaCode variable to determine in which region the fax number is located.

A range can be applied to a constant string value, as well:

```
"6045551234"[1 to 3]  
  
«Returns "604".»
```

When referring to characters in a string, negative numbers can also be used:

```
"abcdef"[-3 to -1]  
  
«Returns "def".»
```

NOTE: A range can not be used as an element or as part of an element in an array.

See *How to create If-Then-Else formulas*, Page 316, and search for *Subscript* in Seagate Crystal Reports online Help.

How to use semicolons in formulas

In a formula with multiple statements, the result of the final statement is the result that is returned (gets printed). When you have multiple statements in a formula, you must separate the statements using semicolons so that the program knows where one statement ends and the next begins. Without semicolons, the entire formula is treated as a single statement. In a multiple statement formula, this can result in an incorrect result or an error message.

How to fine-tune group selection formulas

In some cases, no values will print when using a group selection formula, even though there are values that match the selection criteria. Typically, in these cases:

- the group selection formula references another formula, and
- the referenced formula is one that calculates the value of each group as a percentage of the total value of all groups (i.e., a subtotal as a percentage of a grand total).

1 Use `xtreme.mdb` to create a report that includes the following fields:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{orders.ORDER ID}  
{orders.ORDER AMOUNT}
```

For each order, the report shows the company that placed the order, the state in which that company is located, the order ID number, and the amount of the order.

- 2 Subtotal the `{orders.ORDER AMOUNT}` field using `{customer.REGION}` as the sort-and-group-by field to see the orders coming from each state (the program sorts the data by state and calculates a subtotal in the `{orders.ORDER AMOUNT}` field every time the state changes). See *How to subtotal grouped data, Page 264*.
- 3 Insert a grand total on the `{orders.ORDER AMOUNT}` field to see the total value of all orders placed.
- 4 Create a formula (Percent) that calculates each subtotal as a percentage of the grand total to see the value of the orders for each state group as a percentage of all orders placed. Place the formula in the Group Footer section of the report.

```
Sum( {orders.ORDER AMOUNT}, {customer.REGION}) %  
Sum( {orders.ORDER AMOUNT} )
```

- 5 Reference the formula (@Percent) in a group selection formula that selects only those groups for which the percentage (of subtotal to grand total) is less than 5% in order to find out which states individually contributed less than 5% of total sales:

```
{@Percent} < 5
```

When you click the *Check* or *Accept* button you will receive the following error message:

This formula can not be used because it must be evaluated later.

How to correct this problem

The problem can be corrected easily. Instead of using the formula name (in this case @Percent) in the group selection formula, enter the formula itself (the formula named @Percent). Thus, instead of using the group selection formula:

```
{@percent} < 5
```

use the group selection formula:

```
Sum( {orders.ORDER AMOUNT}, {customer.REGION}) %  
Sum( {orders.ORDER AMOUNT} ) < 5
```

Now when you print, only the states that contributed less than 5% will print.

Speeding up the process

To speed the process and minimize the chance for mistakes, you can copy the formula into the group selection formula using Windows' Copy and Paste commands.

- 1 Select the formula you want to use in the group selection formula.
- 2 Choose the FORMULA command from the Edit Menu. The Formula Editor appears with the formula in the *Formula text* box.
- 3 Copy the formula to the Clipboard using the Copy command (Ctrl-C).
- 4 Click the SAVE AND CLOSE button to close the Formula Editor.
- 5 Choose the GROUP command from the Report | Edit Selection Formula Menu. The Formula Editor appears.
- 6 Paste the formula into the *Formula text* box using the Paste command (Ctrl-V).



Add additional formula elements as needed.

How to fine-tune record selection formulas

You may encounter a situation in which you create a record selection formula (using the RECORD command on the Report | Edit Selection Formula Menu), and, while header and footer information prints on your report, no detail information appears. The problem is a selection formula that is rejecting all records, and this usually occurs because of some inadvertent error in the creation of the selection formula.

There are several potential causes of your problem in the selection formula:

- *Uppercase/lowercase inconsistencies, Page 333*
- *Number in text object not in quotes, Page 334*
- *Unwanted spaces appear in selection formula, Page 334*

Uppercase/ lowercase inconsistencies

Record selection formulas are case sensitive. That is, “Bob” matches only with “Bob”. It does not match with “bob”, “BOB”, “BoB”, “bOB”, “boB”, or “BOb”. Thus, if your selection formula is set to include only those records with “BOB” in the {customer.CONTACT FIRST NAME} field, but all the entries in the {customer.CONTACT FIRST NAME} field are mixed case (“Bob”, for example), the selection formula will find no matches and thus will not print any details for the report.

You can solve this problem by using the UpperCase (str) or LowerCase (str) functions in your selection formula to convert field data to a consistent case before the program begins its selection. For example, if you were using this formula:

```
{customer.CONTACT FIRST NAME} = "BOB"
```

you can change the formula to this:

```
UpperCase({customer.CONTACT FIRST NAME}) = "BOB"
```

This second formula first converts the value of the {customer.CONTACT FIRST NAME} field to upper case characters and then checks to see if the value in that field is equal to “BOB”. Using this formula, any instance of the three letters “b,” “o,” and “B” will be a match, regardless of case, because the case will be converted to uppercase.

You could use the LowerCase function in a similar manner to match with “bob.”

Check your selection formula closely and make sure you have the correct case for any text you are trying to match. If in doubt, use the UpperCase (or LowerCase) function to assure consistency and proper matching.

Another formula which performs much the same functions is the following:

```
"BOB" in UpperCase({customer.CONTACT FIRST NAME})
```

Number in text object not in quotes

When a number is stored in a text object, it is considered text even though it *looks* like a number. Whenever a value from a text object is used in a record selection formula, you must surround the value with single or double quotation marks. If your selection formula is set to look for a number in a text object and you fail to place the number in quotes in the selection formula, the selection formula will find no matches and thus will not print any details for the report.

For example, this selection formula

```
{customer.CUSTOMER ID} = 12345
```

will not find any matches, even though the value 12345 appears in the {customer.CUSTOMER ID} field of many records.

To select records with the characters 12345 in a string field, you must put quotes around the characters you are attempting to match, like this:

```
{customer.CUSTOMER ID} = "12345"
```

Check your selection formula closely, and make sure that any numbers you are attempting to match within a text object are surrounded by single or double quotation marks.

Unwanted spaces appear in selection formula

Spaces are characters, and when you include spaces in the search key of a record selection formula, the formula looks for records with the exact match in the selected field, spaces and all. For example, the following formula:

```
"Mr . " in {customer.TITLE}
```

will not find any matches with the form of address "Mr." because there is an extra space in the search key between the letter "r" and the period. Likewise, "Ph. D" will not match "Ph.D".

Check your selection formula closely, and make sure that the spaces in the selection formula match the spaces in the fields you are trying to match.

Troubleshooting record selection formulas

To troubleshoot your selection formula, you should first begin by making sure that all of the fields referenced in the selection formula are placed on your report. Then delete the selection formula and test it as you rebuild it, step by step.

- 1 Write down the record selection formula on paper. You will use this written copy to help you reconstruct the selection formula one step at a time.



- 2 Remove the record selection formula from your report by deleting the formula from the *Formula text* box in the Formula Editor.
- 3 Click the SAVE AND CLOSE button when finished.
- 4 Make certain that all fields referenced in the record selection formula (the selectors) are on the report physically and are not hidden.

For example, if one of the selectors is:

```
{customer.POSTAL CODE} > "80000"
```

but the {customer.POSTAL CODE} field is not used on your report (as in the case of a sales report that uses the zip code to define territories but does not include the postal code in the report data), then insert the {customer.POSTAL CODE} field into the report.

Or, if one of the fields referenced in the selection formula is on the report but is hidden, unhide it by toggling the *Hide when Printing* option off in the Format Editor for that field.

- 5 Print the report and make certain that the data in those fields which are referenced in the selection formula print satisfactorily. Make certain that all the data prints. For example, if there are *x* total records in the database you should have *x* records printing for each of the referenced fields. This establishes a baseline against which you can compare the results of printing with the selection formula.
- 6 When you are sure that you are getting satisfactory results without using the selection formula, you can enter the selection formula using only one of the selectors.

For example, to use this as the final selection formula:

```
{customer.POSTAL CODE} > "80000" and  
{customer.CONTACT LAST NAME}[1] = "C" and  
{customer.LAST YEAR'S SALES} >= 5000
```

this formula will select all of those records that show a Postal code greater than 80000, a value in the {customer.CONTACT LAST NAME} field beginning with "C", and a value in the {customer.LAST YEAR'S SALES} field greater than or equal to 5000.

You might start with this as the first test selection formula:

```
{customer.POSTAL CODE} > "80000"
```

Print the report and evaluate the data that prints when you have only one selector activated. Does the {customer.POSTAL CODE} field show only ZIP codes greater than 80000?

- If it does, then you know that this part of the selection formula is working.

- If it does not, then troubleshoot this part of the selection formula.
- 7 Once the selection formula with one selector activated is working properly, add a second selector. For example, the new selection formula might look like this:


```
{customer.POSTAL CODE} > "80000" and
{customer.CONTACT LAST NAME}[1] = "C"
```
 - 8 Print the report and evaluate the data that prints when you have two selectors activated. Evaluate the data in the {customer.CONTACT LAST NAME} field (since you already evaluated {customer.POSTAL CODE} in the last step).

Does the {customer.CONTACT LAST NAME} field show only text strings beginning with the letter "C"?

 - If it does, then this part of the selection formula is working.
 - If it does not, then troubleshoot this part of the selection formula.
 - 9 Once the selection formula with two selectors activated is working properly, add a third selector, then a fourth, etc., until you have tested each selector in the selection formula. By the time you have troubleshooted the entire selection formula, you should have uncovered the source of the problem and the formula should select records according to your wishes.

How to debug a formula

Follow the example below to learn the necessary steps for debugging a formula. After completing this exercise, use the same principles to debug your own formulas.

NOTE: This tutorial uses the *xtreme.mdb* sample database located either in the *\CRW16* directory (16-bit), or *\Program Files\Seagate Software\Crystal Reports* directory (32-bit), or the directory in which your program was installed.

The following formula is the formula you will test for errors:

```
If ({customer.CUSTOMER NAME} [1 to 2 = "Bi" and
ToText({customer.CUSTOMER ID}) [1] = "6") Or
({customer.CUSTOMER NAME} [1] = "Ro" and
ToText({customer.CUSTOMER ID}) [1] = "5")
    "PREFERRED CUSTOMER"
Else
    "DOES NOT FIT CRITERIA"
```

If correct, this formula should pick out all customers whose names begin with “Bi” and whose customer IDs begin with “6” as well as those companies whose names begin with “Ro” and whose customer IDs begin with “5”. When printing the field, those selections will read “PREFERRED CUSTOMER”, while the rest will read “DOES NOT FIT CRITERIA.”

You will now break down the formula to check and see that each condition of the formula is working individually.

Formula1

- 1 To get started, create a report using the Customer table in *xtrme.mdb* and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER ID}  
{customer.CUSTOMER NAME}
```

To test each portion of the formula, you will place a new formula field next to these two fields in the report.

- 2 Create a new formula called *Formula1*.
- 3 Type the following in the *Formula text* box of the Formula Editor:

```
If {customer.CUSTOMER NAME} [1 to 2 = "Bi" Then  
    "TRUE"  
Else  
    "FALSE"
```



- 4 Click the CHECK button to test for errors. You will receive the following error message:

The] is missing.

- 5 Correct the formula by inserting the missing “] ” after the 2.

- 6 Click the CHECK button again. You will receive the following message:

No errors found.



- 7 Click the SAVE AND CLOSE button to return to the Insert Fields dialog box.

- 8 Insert the corrected formula field to the right of the two data fields in the Details section of your report.



- 9 Click the PRINT PREVIEW button on the standard toolbar to check the values in the report and compare the fields to see if the field values returned by *@Formula1* are correct.

You will find “TRUE” listed next to the customer names that begin with “Bi” and “FALSE” next to all the others. Now you will check the other portions of the formula. Create Formula2, Formula3, and Formula4, by following Steps 1 - 9, using the formulas specified below for each. Insert each formula field on the same line of the Details section for easy comparison. Check each one for errors, fix as needed, and make sure the values returned are correct before moving on to the next formula.

Formula2

- 1 Create a new formula called Formula2.
- 2 Type the following in the *Formula text* box of the Formula Editor:

```
If ToText({customer,CUSTOMER ID}) [1] = "6" Then
    "TRUE"
Else
    "FALSE"
```



- 3 Click the CHECK button to test for errors. You will receive the following error message:

This field name is not known.

- 4 Correct the formula by replacing the comma (,) in the field name with a period (.).
- 5 Click the CHECK button again. The formula should now be error-free.
- 6 Place the formula to the right of the @Formula1 field.



- 7 Click the PRINT PREVIEW button on the standard toolbar to check the values in the report and compare the fields to see if the field values returned by @Formula2 are correct.

You should see “TRUE” next to all customer numbers that begin with 6 and “FALSE” next to all customer numbers that do not begin with 6.

Formula3

- 1 Create a new formula called Formula3.
- 2 Type the following in the *Formula text* box of the Formula Editor:

```
If {customer.CUSTOMER NAME} [1 to 2] = 'Ro" Then
    "TRUE"
Else
    "FALSE"
```



- 3 Click the CHECK button to test for errors. You will receive the following error message:

The matching ' for this string is missing.

- 4 Correct the formula by changing the single quote (') before Ro to a double quote (").



- 5 Click the CHECK button again. The formula should now be error-free.
- 6 Place the formula to the right of the @Formula2 field.
- 7 Click the PRINT PREVIEW button on the standard toolbar to see the values in the report and compare the fields to check if the field values returned by @Formula3 are correct.

You should see “TRUE” next to all Customer names that begin with “Ro” and “FALSE” next to all Customer names that do not begin with “Ro”.

Formula4

- 1 Create a new formula called Formula4.
- 2 Type the following in the *Formula text* box of the Formula Editor:

```
If ToText({customer.CUSTOMER ID}) [1] = "5"
    "TRUE"
Else
    "FALSE"
```



- 3 Click the CHECK button to test for errors. You will receive the following error message:

The word 'then' is missing.

- 4 Correct the formula by typing in the word “Then” at the end of the first line after “5”.
- 5 Click the CHECK button again. The formula should now be error-free.
- 6 Place the formula to the right of the @Formula3 field.



- 7 Click the PRINT PREVIEW button on the standard toolbar to see the values in the report and compare the fields to check if the field values returned by @Formula4 are correct.

You should see “TRUE” next to all Customer IDs that begin with 5 and “FALSE” next to all Customer IDs that do not begin with 5.

Now that the formulas are error-free and the field values returned are correct, you will create a formula that links the separate components together. You will begin by linking the first two formulas (@Formula1 and @Formula2) and then you will add @Formula3 and @Formula4 to create the final formula @FinalFormula.

Formula1+2

- 1 Create a new formula called Formula1+2.
- 2 Type the following in the *Formula text* box of the Formula Editor:

```

If {customer.CUSTOMER NAME} [1 to 2] = "Bi" and
ToText({customer.CUSTOMER ID}) [1] = "6" Then
    "TRUE"
Else
    "FALSE"

```

- 3 Place the formula to the right of the @Formula4 field.

You should see "TRUE" next to each customer whose name begins with Bi and Id begins with 6, and "FALSE" next to all Customer IDs that do not meet this criteria.

If this formula is working correctly, you can create one last formula adding the code from @Formula3 and @Formula4.

FinalFormula

- 1 Create a new formula called FinalFormula.
- 2 Type the following in the *Formula text* box of the Formula Editor:

```

If ({customer.CUSTOMER NAME} [1 to 2] = "Bi" and
ToText({customer.CUSTOMER ID}) [1] = "6") or
({customer.CUSTOMER NAME} [1 to 2] = "Ro" and
ToText({customer.CUSTOMER ID}) [1] = "5") Then
    "PREFERRED CUSTOMER"
Else
    "DOESN'T FIT CRITERIA";

```

- 3 Place the formula where you want it to appear in the Details section of the report. You can now delete all other formula fields from the report. See *How to delete formulas from a report*, Page 311.

You can use this same process of condition-by-condition testing for any formulas as a means of systematically checking them.

15

Running Totals

What you will find in this chapter...

Introduction, Page 342

HANDS-ON (Running Totals), Page 343

Seagate Crystal Reports introduces a new type of field, the Running Total field. Running Total fields are similar to summary fields but allow more control over how the total is calculated and when it is reset. Running Total fields are specifically suited to perform the following totaling functions:

- to see the value of a total accumulate as it is calculated record by record,
- to total a value independent of the report's grouping,
- to total a value conditionally,
- to total a value after a group selection formula has been applied, and
- to total a value from the driving table in a one to many linking relationship.

A Running Total field is created with the Running Total Expert. The Running Total Expert creates a Running Total Field by asking you to select a field to summarize, the summary operation to use, a condition upon which to base the evaluation, and a condition upon which to reset the evaluation.

Once you create a Running Total field you can insert it into the report just like a Database field or you can refer to it in a formula. The calculation of a Running Total field is not affected by where it is placed in a report, its performance is entirely dependent upon the settings established in the Running Total Expert. While a Running Total field can be used to calculate a total on any database or formula field it can not be used to calculate the total of a print time formula.

The topics covered in this chapter include advanced techniques. Before starting, familiarize yourself with designing reports in Seagate Crystal Reports, grouping values in a report, and summarizing data.

Related Topics

Sorting, Grouping, and Totaling, Page 245

HANDS-ON (Running Totals)

How to maintain running totals in a list

Running totals are totals that are displayed generally on a record by record basis. They total all records (in the report, in the group, etc.) up to and including the current record. For example, if your first three records have values of 2, 4, and 8, the running total for each of the three records would be as follows:

<i>Values</i>	<i>Running Total</i>
2	2 = 0 + 2
4	6 = 2 + 4
8	14 = 6 + 8

The most basic form of a running total is a single running total maintained throughout a list. In this tutorial you create this kind of report by setting up a running total for a list of order amounts.

NOTE: *Running total fields are prefixed by the # sign.*

- 1 To get started, create a report using the sample database `xtreme.mdb`, link the Customers and Orders tables, and then place the following fields from left to right in the Details section:


```
{customer.CUSTOMER NAME}  
{orders.ORDER ID}  
{orders.ORDER AMOUNT}
```
- 2 Choose **RUNNING TOTAL FIELD** from the Insert Menu. The Insert Fields dialog box appears.
- 3 Click **NEW**. The Create Running Total Field dialog box appears.
- 4 Enter the name "TotalOrders" in the *Running Total Name* text box.
- 5 Select `{orders.ORDER AMOUNT}` from the *Available Tables and Fields* list box, and use the first arrow button to enter that field in the *Field to summarize* text box.
- 6 Select **sum** from the *Type of summary* drop-down list.
- 7 In the Evaluate section of the dialog box, click the *On change of field* option, and select `{orders.ORDER ID}` as the "change of" field. The running total will execute each time this field changes.

- 8 In the Reset section of the dialog box, click the *Never* option (this gives you a running total that never resets; that is, the running total continues throughout the report).
- 9 Click *OK* to save the running total field. The program returns you to the Insert Fields dialog box.
- 10 Insert the running total field in the Details section of the report, just to the right of {orders.ORDER AMOUNT}.

The value in each record is added to the sum of the previous value in the report.

Customer Name	OrderID	Amount	Running Total
Allez Distribution	1044	\$1,439.55	\$1,439.55
Allez Distribution	1044	\$1,439.55	\$2,879.10
Allez Distribution	1044	\$1,439.55	\$4,318.65
Allez Distribution	1044	\$1,439.55	\$5,758.20
Allez Distribution	1044	\$959.70	\$6,717.90
Allez Distribution	1044	\$959.70	\$7,677.60
Allez Distribution	1044	\$959.70	\$8,637.30
Allez Distribution	1044	\$959.70	\$9,597.00
Allez Distribution	1044	\$1,529.70	\$11,126.70
Allez Distribution	1044	\$1,529.70	\$12,656.40
Allez Distribution	1044	\$1,529.70	\$14,186.10
Allez Distribution	1044	\$1,529.70	\$15,715.80
Allez Distribution	1044	\$1,529.70	\$17,245.50
		\$658.00	\$17,903.50

The total continues, unbroken, throughout the running list.

Related Topics

How to create a running total for a group, Page 345

Introduction to Reporting, Page 85

How to create a running total for a group

Another common use for running totals is tallying items in a group. The running total starts with the first item in the group and ends with the last. Then it starts all over again for the next group, then the next, and so on.

In this tutorial, you will create a report that:

- maintains a running total of customer orders,
- groups customer orders and resets the running total for each group, and
- displays the subtotal for each order (the last running total for that order).

To set up this report, create a running total that resets for each new group so that you have a subtotal for each group. This subtotal will take the last value in the running total field and display that value on the report (for example, if the numbers 2, 4, and 8 were tallied by the running total, the subtotal will be 14). This will give you a running total and a subtotal for each group.

- 1 To get started, create a report using the sample data, *xtreme.mdb*. Link the Customers and Orders tables and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{orders.ORDER ID}  
{orders.ORDER AMOUNT}
```

- 2 Group on the {customer.CUSTOMER NAME} field.
- 3 Choose RUNNING TOTAL FIELD from the Insert Menu. The Insert Fields dialog box appears.
- 4 Click NEW. The Create Running Total Field dialog box appears.
- 5 Enter the name "GroupRunningTotal" in the *Running Total Name* text box.
- 6 Select {orders.ORDER AMOUNT} from the *Available Tables and Fields* list box, and use the first arrow button to enter that field in the *Field to summarize* text box.
- 7 Select sum from the *Type of summary* drop-down list.
- 8 In the Evaluate section of the dialog box, click the *For each record* option.
- 9 In the Reset section of the dialog box, choose to reset on change of Group #1.

- 10 Click *OK* to save the running total field. The program returns you to the Insert Fields dialog box.
- 11 Place the running total field in the Details section of your report, just to the right of the {orders.ORDER AMOUNT} field.

How to create a conditional running total

There may be times when you have a list of ungrouped values, and you only want to subtotal some of the values in the list. For example:

- you have a list that contains both Canadian and U.S. customers,
- you want to keep customer records sorted alphabetically based on customer name,
- you do not want to break the data into groups based on the country, but
- you want a total of the values from just the Canadian records, and
- you also want a total of the values from just the U.S. records.

To accomplish this, create two running totals, one to keep a running total of the U.S. records, and one to keep a running total of the Canadian records.

- **USTotal**
Maintains a running total of the U.S. records.
- **CanadaTotal**
Maintains a running total of the Canadian records.

- 1 To get started, create a report using the sample data, xtreme.mdb. Place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.COUNTRY}  
{customer.LAST YEAR'S SALES}
```



- 2 Sort the records based on the {customer.CUSTOMER NAME} field.
- 3 Choose **RUNNING TOTAL FIELD** from the Insert Menu. The Insert Fields dialog box appears.
- 4 Click **NEW**. The Create Running Total Field dialog box appears.
- 5 Enter the name "USTotal" in the *Running Total Name* text box.
- 6 Select {Company.LAST YEAR'S SALES} from the *Available Tables and Fields* list box, and use the first arrow button to enter that field in the *Field to summarize* text box.

- 7 Select sum from the *Type of summary* drop-down list.
- 8 In the Evaluate section of the dialog box, click the *Formula* option button and then click the *Formula* button. The Running Total Condition Formula Editor appears.
- 9 Enter the following formula in the *Formula text* box:

```
{Customer.Country} = "USA"
```

This tells the program to evaluate the running total each time it comes to a record where {Customer.COUNTRY} is equal to "USA." The running total will ignore all other records (such as records for Canada).

- 10 In the Reset section of the dialog box, click the *Never* option.
- 11 Click *OK* to save the running total field. The program returns you to the Insert Fields dialog box.
- 12 Place the running total field in the Details section of your report.
- 13 Now create the *CanadaTotal* running total field using the process outlined in steps 3-11. The only difference is that this time you will set the Evaluate formula to:

```
{Customer.Country} = "Canada"
```

- 14 When you are finished, place the *#CanadaTotal* field in the Details section of your report, just to the right of the {Customer.LAST YEAR'S SALES} field.
- 15 Place the two running total fields you created in the Report Footer section of your report.

Your report should look similar to the following:



NOTE: *This sample report has been designed to illustrate concepts only, not the actual look of the finished report.*

Customer Name	Country	Last Year's Sales
The Cyclists Co.	Canada	\$38,199.10
The Pedallers Co.	USA	\$25,162.05
Ride 'Em Cowboy	USA	
Bob's Bikes Ltd.	USA	\$28,190.52
CycleSporin	USA	\$28,681.53
Bike-O-Rama	Canada	\$38,280.53
Biking's It	Canada	\$30,348.92
USA Total		\$82,034.10
Canada Total		\$68,548.02

How create a running total in a one to many linking relationship

The term A to B, A to C report is used to refer to any report in which a primary table is linked to two lookup tables (see *Methods of looking up tables (direct access databases)*, Page 524). However, in a true A to B, A to C link, a single field in the primary table is used to link to both of the lookup tables.

In a true A to B, A to C relationship, one of the two lookup tables usually has more records than the other. If you group these records based on a field in the primary table, values in the smaller lookup table are repeated for each value in the larger lookup table. The following table shows data for an A to B, A to C relationship. The Customer table is linked to the Credits table and again to the Orders table. Notice that Jones has only one Credit ID, but the credit and its amount are repeated, once for each of Jones' two orders.

<i>Name</i>	<i>Credit ID</i>	<i>Credit Amount</i>	<i>Order ID</i>	<i>Order Amount</i>
Jones	1	-10.00	1	10.00
Jones	1	-10.00	2	12.00
Smith	2	-23.00	3	20.00

<i>Name</i>	<i>Credit ID</i>	<i>Credit Amount</i>	<i>Order ID</i>	<i>Order Amount</i>
Smith	3	-45.00	4	30.00

In this example, a standard subtotal is used for both the Order Amount field and the Credit Amount field. Thus, Jones' single credit is counted twice, and the subtotal displays an inaccurate value of -20.00.

<i>Name</i>	<i>Credit ID</i>	<i>Credit Amount</i>	<i>Order ID</i>	<i>Order Amount</i>
Jones	1	-10.00	1	10.00
Jones	1	-10.00	2	12.00
		-20.00		22.00
Smith	2	-23.00	3	20.00
Smith	3	-45.00	4	30.00
		-68.00		50.00

NOTE: Notice that the total Credit Amount for Jones is incorrect.

This problem also occurs in the Order Amount field if Jones had two different Credit Amounts and only one Order Amount. Avoid this problem by creating a running total for each field you want subtotaled.

- 1 To get started, create a report using the sample data, ORDRCCR.MDB. Place the following fields from left to right in the Details section:

```
{cust.NAME}
{credits.CREDIT ID}
{credits.CREDIT}
{orders.ORDER ID}
{orders.ORDER AMOUNT}
```

NOTE: The sample data in ORDRCCR.MDB has been specially designed to demonstrate a true A to B, A to C link. Use the Visual Linking Expert to make sure that the {credits.CUST} field is linked to both the {orders.CUSTOMER} and {cust.NUMBER} fields.



- 2 In the Design Tab, highlight the {orders.ORDER AMOUNT} field and insert a subtotal, grouping on the {cust.NAME} field.
- 3 Choose RUNNING TOTAL FIELD from the Insert Menu. The Insert Fields dialog box appears.
- 4 Click NEW. The Create Running Total Field dialog box appears.



- 5 Enter the name "CreditsSubtotal" in the *Running Total Name* text box.
- 6 Select {credits.CREDIT} from the *Available Tables and Fields* list box, and use the first arrow button to enter that field in the *Field to summarize* text box.
- 7 Select sum from the *Type of Summary* drop-down list.
- 8 In the Evaluate section of the dialog box, click the *On change of field* option and choose the field {credits.CREDIT ID}.

NOTE: *For customer Jones there is only one Credit ID, so the running total will take the credit amount of \$10.00.*

- 9 In the Reset section of the dialog box, click the *On change of field* option and choose the field {cust.NAME}.

NOTE: *The Running Total resets for the second customer (Smith). For Smith there are two Credit ID's (2 and 3), so the running total sums the credit amounts (\$23.00 and \$45.00).*

- 10 Click *OK* to save the Running Total field. The program returns you to the Insert Fields dialog box.
- 11 Place the running total in the Group Footer section of the report.

Related Topics

Introduction to Reporting, Page 85

16

Parameter Fields

What you will find in this chapter...

Parameter field objects overview, Page 352

Multiple parameter fields, Page 353

Parameter field considerations, Page 353

HANDS-ON (Parameter Field Objects), Page 354

Parameter field objects overview

Parameter fields are fields that prompt you to specify a value each time you refresh the data in a report. When you supply a value, the program runs the report using that value. By using parameter fields in formulas, selection formulas, and in the report itself, you can create a single report that you can modify whenever your needs change. Parameter Fields can also be used in subreports and compiled reports. See *Introduction to Formulas, Page 291*.

For example, you may create a report in which you want to include only California records. Without parameter fields, you could enter a record selection formula similar to this:

```
{customer.REGION} = "CA"
```

This formula tests the records in the {customer.REGION} field to see if they contain the value "CA." If a record contains that value, the formula prints that record in the report. If a record does not contain the value, then the formula rejects that record. The report runs exactly the way you want it to - if you always want to run reports using only California records. However, to run reports using records from other states, you have to edit the formula and hard code your changes. For example, if you want to run the report using Arizona records, you would have to change "CA" to "AZ" in the Record Selection Formula Editor or the Select Expert. See *How to set up record selection using the Select Expert, Page 238*.

Using a parameter field in place of the state field value allows you to make changes "on the spot," without hard coding a new value. Here is how it works:

- 1 Let's say you set up a parameter field by choosing the PARAMETER FIELD command from the Insert Menu. For the purpose of this example, call this parameter field *Region*.
- 2 Then choose the parameter field in their selection formula, instead of using the formula:

```
{customer.REGION} = "CA",
```

create a formula similar to this:

```
{customer.REGION} = {?Region}
```

NOTE: {?Region} is the parameter field created in Step 1. The program uses the {?ParameterFieldName} format for parameter fields in formulas and Experts.

- 3 Whenever you refresh the data in the report, the program prompts them to either supply a value for the parameter field or accept the default value. The program selects the records for the report using the value specified.

With parameter fields, you can create a single report that can be customized quickly to meet a variety of needs.

Multiple parameter fields

Formulas and record selection formulas can contain multiple parameter fields. When this is the case, the program prompts you for each parameter before it refreshes the data. So, you could use a selection formula similar to the following:

```
{customer.REGION} = {?Region} AND {customer.LAST  
YEAR'S SALES} <= {?Sales}
```

This particular formula will prompt you first for the region you want to report on, and then for the amount against which you want to compare last year's sales. This means that the Enter Parameter Values dialog box will contain multiple tabs, one for each parameter field.

When you supply the parameter values, the selection formula will then limit the report to records in which the region is equal to the value you specified for the {?Region} parameter field, and in which last year's sales is equal to the value you specified for the {?Sales} parameter field.

Parameter field considerations

There are a number of things to keep in mind when working with parameter fields:

- A parameter field does not have to be placed in a report in order to be used in a record or group selection formula. You just create the parameter field and then enter it in your formula as you would any other field.
- The program supports parameter fields in the following data types: String, Number, Currency, Boolean, Date, Time, and DateTime.
- Parameter field prompting text can be up to two lines long with approximately 40-50 characters per line (depending on character width, up to the 255 character limit). The program performs automatic word wrap on prompts more than one line long.

- You can create a pick list for the user to choose the parameter value rather than enter it manually.
- In compiled reports, parameter fields can be used to prompt for record selection criteria for which you would not normally be prompted. In this way, the program allows you the opportunity to specify, in report selection formulas, values that contain only fields and operators. However, if you place a parameter field in your selection formula, the program will prompt you for its value - even if that value is not a field.

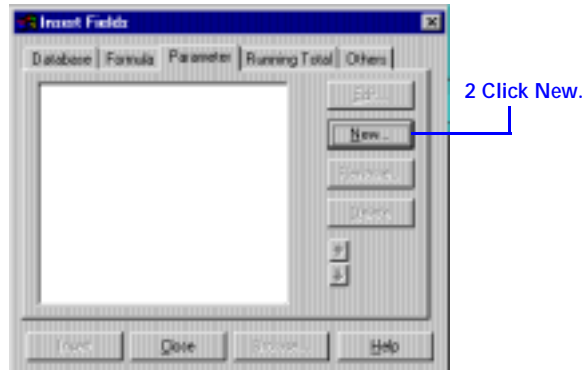
HANDS-ON (Parameter Field Objects)

This section includes Hands-On tutorials for performing a number of different tasks involving parameter fields. *How to create a parameter field, Page 354, How to use a parameter field in a formula, Page 362, and How to respond to parameter field prompts, Page 362*, are sequential; they provide an overview of typical processes involving parameter fields. The remaining tutorials can be read individually, as needed.

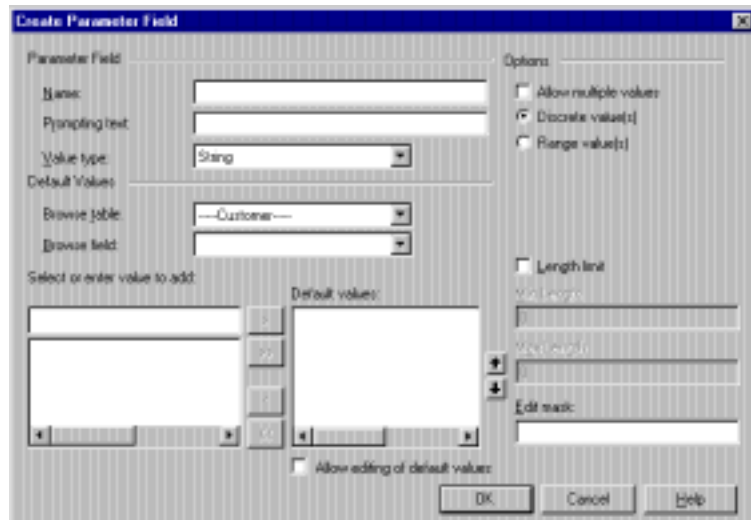
How to create a parameter field



- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears. Click the Parameter Tab to activate it.



The Create Parameter Field dialog box appears.



- 3 Enter a name for the parameter field in the *Name* text box, for example Region, Country, Employee, etc. (up to 35 alphanumeric characters).
- 4 Enter the desired prompting text in the *Prompting Text* text box (up to 255 alphanumeric characters). The prompting text is the text that appears when the program prompts you for a parameter value.
- 5 Select the data type of the parameter field from the *Value Type* drop-down list.

NOTE: If you select *Boolean*, the dialog box changes. You can then choose the default value (*True/False*) from the *Default Value* drop-down list, and (optionally) use the *Options* section of the dialog box to place the parameter field in a group. Click *OK* to proceed. If, on the other hand, you select *String*, the *Length Limit* check box and the *Edit Mask* text box appear. If you select a *Currency*, *Date*, *DateTime*, *Number*, or *Time* data type, the *Range Limited Field* check box appears.

- 6 Toggle the *Allow multiple values* check box on or off to designate whether the parameter field can accept multiple values.
- 7 Click either the *Discrete value(s)* option or the *Range value(s)* option to specify whether the parameter field will accept a range of values.
 - If you click *Discrete value(s)*, the parameter field will accept single values (rather than ranges of values).

- If you click *Range value(s)*, then when you are prompted for parameter values, you can enter a start value and an end value, and the report will then display all records within that range. For example, if you enter the values "5" and "10", the range is 5-10, and the report will display all records with values between 5 and 10. This also works for string parameter fields. With a start value of "A" and an end value of "E", the report will display all records within an alphabetical range of A-E.

NOTE: *If Allow multiple values is toggled on, and the Discrete value(s) option is selected, the parameter field will accept multiple single values. In this case, you can enter more than one value, but these values will be evaluated individually and will not be interpreted as a range. So you could enter "CA" and "WA" for a {?Region} parameter field, and the report would display all the records for the states of California and Washington. If Allow multiple values is toggled on, and the Range value(s) option is selected, the parameter field will accept multiple ranges.*

- 8 If applicable, toggle the *Length Limit* check box on or off to designate whether the length of the parameter values must fall within a certain range. If you toggle *Length Limit* on, the *Min Length* and *Max Length* text boxes become active; use these text boxes to specify the mandatory range. These options are only available if you are creating a string parameter field.
- 9 If applicable, toggle the *Range Limited Field* check box on or off to designate whether the parameter field is a range limited field. This check box is only available if you are creating a parameter field that does not have string values. If you toggle *Range Limited Field* on:



NOTE: *Range Limited only appears in the professional edition.*

- for a Currency or Number parameter field, the *Min Value* and *Max Value* text boxes appear;
 - for a DateTime or Time parameter field, the *Beginning* and *Ending* text boxes appear;
 - for a Date parameter field, the *First Date* and *Last Date* text boxes appear.
- 10 To specify range limitations, use one of the following pairs of text boxes:
 - *Min Value/Max Value* (currency/numeric): Enter the minimum and maximum values allowed.
 - *Min Length/Max Length* (string): Enter the minimum and maximum number of alphanumeric characters allowed.

- *Beginning/Ending* (DateTime/Time): Enter a time range in Time (hour, minute, second) format, or a DateTime range in DateTime (day, month, year/ hour, minute, second) format.
- *First Date/Last Date* (Date): Enter the earliest and latest dates allowed.

NOTE: For Date, Time, and DateTime fields, the dialog box provides a DateTime Picker to help you enter these ranges quickly. The DateTime Picker consists of, where applicable, a text box with arrows for selecting a time, and a calendar for selecting a date (the calendar appears when you click the arrow button to the right of the date entry text box).

- The Browse Table drop-down list can be used to specify a default table.
- The Browse Field drop-down list can be used to specify a default field.

NOTE: If you specify range limitations after selecting a default table and default field, the Values to be added list will be modified so that only those values that are within the range appear on the list.

11 For a string parameter field, you can choose to enter an Edit Mask in the *Edit Mask* text box, rather than specifying a range. The Edit Mask can be any of a set of masking characters used to restrict the values you can enter as parameter values (the edit mask also limits the values you can enter as default prompting values). You can enter any of the following masking characters, or any combination of them:

- “A” (allows an alphanumeric character and requires the entry of a character in the parameter value)
- “a” (allows an alphanumeric character and does not require the entry of a character in the parameter value)
- “0” (allows a digit [0 to 9] and requires the entry of a character in the parameter value)
- “9” (allows a digit or a space, and does not require the entry of a character in the parameter value)
- “#” (allows a digit, space, or plus/minus sign, and does not require the entry of a character in the parameter value)
- “L” (allows a letter [A to Z], and requires the entry of a character in the parameter value)
- “?” (allows a letter, and does not require the entry of a character in the parameter value)
- “&” (allows any character or space, and requires the entry of a character in the parameter value)

- “C” (allows any character or space, and does not require the entry of a character in the parameter value)
- “. , ; - /” (separator characters)
 - Inserting separator characters into an edit mask is something like hard coding the formatting for the parameter field. When the field is placed on the report, the separator character will appear in the field object frame, like this: LLLL/0000. This example depicts an edit mask that requires four letters followed by four numbers.
- “<” (causes subsequent characters to be converted to lowercase)
- “>” (causes subsequent characters to be converted to uppercase)
- “\” (causes the subsequent character to be displayed as a literal. For example, the Edit Mask “\A” would display a parameter value of “A.” If the Edit Mask is “00\A00,” then a valid parameter value would consist of two digits, the letter “A,” and then two additional digits).
- “Password”
 - If you set the Edit Mask to “Password,” you can create conditional formulas specifying that certain sections of the report become visible only when certain user passwords are entered.

NOTE: *Some of the Edit Mask characters require that you enter a character in their place (when entering a parameter value), while others allow you to leave a space, if needed. For example, if the Edit Mask is 000099, you can enter a parameter value with four digits, five digits, or six digits, since the ‘9’ Edit Mask character does not require the entry of a character. However, since ‘0’ does require such an entry, you could not enter a parameter value with less than four digits.*

NOTE: *When you enter an Edit Mask, the range text boxes become inactive.*

- 12 Enter the default prompting values by adding or selecting values from the "Select or enter value to add" list and using the *Add (>)* and *Add All (>>)* buttons to add these values to the *Default Values* list. You can use the *Remove (<)* and *Remove All (<<)* buttons to remove prompting values from the list. The program will populate a drop-down list on the Enter Parameter Values dialog box with the default prompting values you specify.

NOTE: *If you selected Range Limited Field, the values you can enter in the prompting box are limited to that range.*

- 13 When you have more than one item in the *Default values* list box, the *Allow Editing of default values* check box appears. This check box is

toggled on by default to specify that you can edit or enter new values when prompted for parameter values. Toggle this check box on or off as needed.

NOTE: *This check box is inactive until you enter at least two default prompting values.*

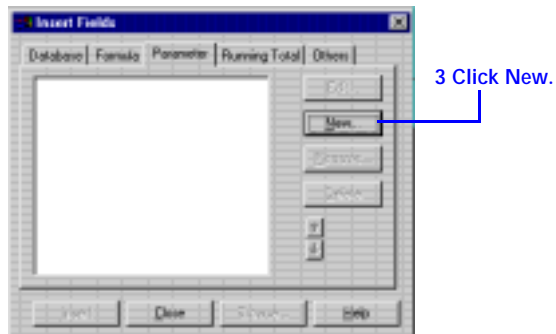
- 14 Click **OK**. The parameter field is saved, and the parameter field name appears in the list on the **Parameters** Tab of the **Insert Fields** dialog box. Use the priority arrow buttons on the tab to determine the order in which the parameter fields appear when prompted for parameter values.

How to set record selection using parameter fields

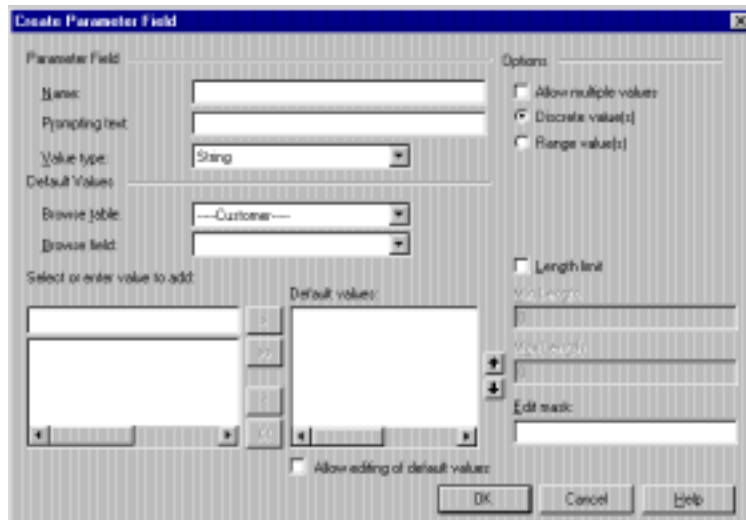
You can easily use parameter fields for record selection. In this tutorial, you will create a parameter field that selects regions to be included in the report.

- 1 To get started, create a report using the **Customer** table in **xtrme.mdb**. Place the following fields from left to right in the **Details** section:

`{customer.CUSTOMER NAME}`
`{customer.LAST YEAR'S SALES}`
- 2 With the **Insert Fields** dialog box still active, click the **Parameter** Tab.



The **Create Parameter Field** dialog box appears.



4 Enter the following information into the corresponding edit boxes:

- Type “Region” in the *Parameter Name* text box.
- Type “Enter the region you would like to see sales for” in the *Prompting Text* text box.
- Select String from the *Value Type* drop-down list.
- Select Customer from the *Browse Table* drop-down list.
- Select Region from the *Browse Field* drop-down list.

- Either select “CA” as the sole default prompting value, or select a number of regions as the default prompting values by repeatedly clicking the *Add (>)* arrow button or by clicking the *Add All (>>)* button. If you select a number of regions, the user will be able to choose a value from a pick list of the values you supply. For details on selecting default prompting values, see *How to create a parameter field, Page 354*.

- 5 You may also specify an edit mask restricting the type and number of characters that can enter as parameter values. For information about edit masking, see Step 11 and the table following that step in *How to create a parameter field, Page 354*.
- 6 Click *OK*. You are returned to the Insert Fields dialog box. The parameter field you have just created now appears in the list box.



- 7 Click the *SELECT EXPERT* button on the standard toolbar.

The Choose Field dialog box appears.

- 8 Select Region and click *OK*. The Select Expert appears.

NOTE: *If a field is selected in the Design Tab, the Select Expert appears in place of the Choose Field dialog box. Click an empty section of the Design Tab to deselect all fields and repeat Step #5.*

- 9 Leave the first drop-down list set to *is*. Choose *equal to* from the second drop-down list. A third drop-down list appears.
- 10 Click the arrow on the drop-down list to display the list of regions. The prompting variable that you created, {?Region}, now appears at the top of the list.
- 11 Select the prompting variable from the list and click *OK*.

Now, when you refresh your data, the program will prompt you for the parameter values and will base record selection on the values you provide. See *How to create a record or group selection formula, Page 240*.

NOTE: *If you base record selection on a parameter field that accepts range values (a parameter field for which the Range Value(s) option is selected in the Create Parameter Field dialog box), you could create a selection formula like {Orders.Orders Date} in {?pDateRange}, where {?pDateRange} is a parameter field that allows range values. Then you can enter a range value when prompted, and the report will display all records in which {Orders.Orders Date} falls within that range.*

How to use a parameter field in a formula

- 1 Click the Insert Fields button on the standard toolbar the insert field dialog box appears.
- 2 In the Insert Fields dialog box, click the Formula Tab to activate it.
- 3 Click the NEW button. Type a name for the formula in the Formula Name dialog box.
- 4 Click *OK* when finished. The Formula Editor appears.
- 5 Create a formula using the parameter field as you would any constant value. For example, rather than creating a formula that hard-codes the region name:

```
{customer.REGION} = "CA"
```

Use a parameter field instead of "CA":

```
{customer.REGION} = {?[Name of Parameter Field]}
```

- 6 Click the SAVE AND CLOSE button. The program returns you to the Insert Fields dialog box. The name of the formula you have just created is highlighted in the *Formula* list box.
- 7 Click the INSERT button and place the formula where you want it to appear in the report.
- 8 Click CLOSE to exit the Insert Fields dialog box.
- 9 To see how this field works, click either the PRINT PREVIEW button or the REFRESH button on the standard toolbar.



A dialog box appears, prompting you for values. See *How to respond to parameter field prompts*, Page 362.

NOTE: The program automatically puts a question mark before the field name to identify it as a parameter field. See *Introduction to Formulas*, Page 291.

How to respond to parameter field prompts

Previewing a report for the first time

When you preview a report for the first time, the Enter Parameter Values for Main Report dialog box appears, prompting you for a value.

- If you specified a default value when you created the parameter field, the program will use that value unless you specify a new one.

- If you did not specify a default value, then the program will not refresh the data until you supply a new value.

Refreshing report data

When you refresh data from the Preview Tab, the Refresh Report Data dialog box appears.

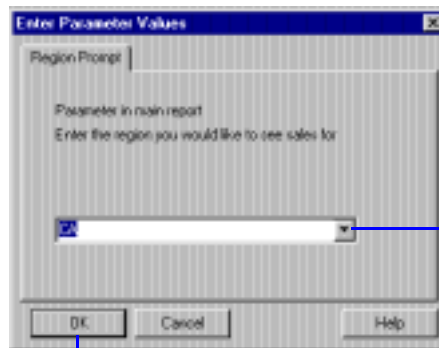


- Click *Use current parameter values* to use the current parameter value.
- Click *Prompt for new parameter values* to enter a new parameter value. If you click this option and click OK, the Enter Parameter Values dialog box appears.
 - Enter String values exactly as they will appear in the field. If the parameter field allows multiple values, you can enter additional parameter values using the ADD button.
 - Enter Boolean values using the following format: TRUE or FALSE.
 - Enter Number values exactly as they will appear in the field.
 - Enter Currency values exactly as they will appear in the field.
 - Enter Date values using the following format: Date (Year/Month/Day). For example, Date (1997/5/21). You can also enter Date values in the format used for the Windows short date settings (which are specified on the Date Tab of the Regional Settings dialog box, in the Control Panel). To use the Date Picker to enter Date values, activate the Date Picker by toggling the *Pick from defaults* check box off. The Date Picker appears in place of the list when you click the drop-down list arrow.
 - Enter Time values using the following format: Time (Hour: Minutes: Seconds AM/PM). For example, Time (04:32:12 AM). You can also enter Time values in the Windows time style (which is specified on the Time Tab of the Regional Settings dialog box, in the Control Panel). To use the Time Picker to enter Time values, activate the Time Picker by toggling the

Pick from defaults check box off. The Time Picker appears to the right of the drop-down list.

- Enter DateTime values using the following format: Date (Year/Month/Day), Time (Hour: Minutes: Seconds AM/PM). For example, Date (1997, 5, 21), Time (04:32:12 AM). You can also enter DateTime values in the format used for the Windows time style and short date settings (which are specified on the Time Tab and the Date Tab of the Regional Settings dialog box, in the Control Panel). To use the DateTime Picker to enter DateTime values, activate the DateTime Picker by toggling the *Pick from defaults* check box off. The time picker appears to the right of the drop-down list. The date picker appears in place of the list when you click the drop-down list arrow.

NOTE: The Date/Time/DateTime Picker is only available if you have the correct version of comctl32.dll (there is a separate install program for this on Seagate Crystal Reports installation disk).



To use a value other than the default, select a new value from this drop-down list or, if permitted, enter a new value in the text box.

To use the default value, simply click OK.

NOTE: If the parameter field is range limited, then you can only enter values within a certain range.

The program now runs the report using the new value(s) you specified.

How to conditionally format using parameter fields

Parameter fields can be used to create conditional formatting formulas. You can customize these formulas whenever you refresh the report data. A conditional formatting formula could be used for color-flagging data that meets certain conditions. For example:

- sales representatives who sell more than 10% over quota,
- customers who have not ordered in the last quarter, and
- inventory items that have not had any movement in the last month.

If the conditions under which you flag these items never change, you do not need to use parameter fields. You can just use formulas (for text flags) or conditional formatting (for border flags). However, to change the conditions from report to report, you need to use parameter fields in formulas and conditional formatting formulas.

- 1 Create the parameter field in the data type you need for the formula.
- 2 Create the formula and use the parameter field in place of the fixed value you would normally use.
- 3 For example, to be prompted for all the customers whose last year's sales were over a certain value and to print their names in red, then select the Last Year's Sales field and click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears.
- 4 Click the *Conditional formula* button next to the *Color* property on the Font Tab, and format the field using a conditional formatting formula like this:



```
If {customer.LAST YEAR'S SALES} >
  {?ParameterFieldName} Then
  Red
Else
  Black
```

Now, when you refresh the data, the program will prompt you for the value that triggers the color flag (known as the threshold value). It then runs the report and flags all the customers that had sales last year above the threshold figure. You can change the figure each time you run the report and the program will flag a different set of Customer Names.

Related Topics

How to create If-Then-Else formulas, Page 316

Conditional attribute properties, Page 213

Conditional formatting, Page 212

How to format objects conditionally, Page 204

How to create a report title using parameter fields

Seagate Crystal Reports allows you to use parameter fields to create a Report Title that can be changed each time the report is refreshed.

- 1 From the Insert Fields dialog box, click the Parameter Tab to activate it.
- 2 Click the NEW button. The Create Parameter Field dialog box appears.
- 3 Type a name for the parameter field in the *Name* edit box. Type in any prompting text you wish in the *Prompting Text* edit box. Select String in the *Value Type* drop-down box.
- 4 To specify a default title, type the desired text into the *Select or enter value to add* text box and click the ADD (>) button to add the title to the *Default Values* list box.

NOTE: Repeat Step 4, as needed, to enter more than one default title. In this case, the program will prompt you with a list of default titles when you run the report.

- 5 Click OK when finished. You are returned to the Insert Fields dialog box. The parameter field you created appears in the list.
- 6 Select the parameter field and click the INSERT button.
- 7 Place the parameter field in the Page Header section of the report to have the title appear on every page, or in the Report Header section if you want the title to appear on only the first page of the report.

Now, when you refresh the data, the program will prompt you for a report title. If you wish, you can change the title each time you run the report.

How to set sort order using parameter fields

To set the sort order using parameter fields, you need to first create a formula that includes a parameter field and then sort based on that formula. For example, assume that you have a customer list report based on the Customer table. For each customer, you show the Customer Name, City, Region, Country, and Phone Number. You want to be able to sort the report by Country, by Region, or by City, depending on your needs at the time.

- 1 Create a parameter field and name it *SortField*. See *How to create a parameter field*, Page 354.
- 2 In the *Prompting Text* edit box, enter a prompt similar to this:

Type R to sort by Region or C to sort by City; otherwise, data will be sorted by Country.

- 3 Select String from the *Value Type* drop-down list.
- 4 You may want to limit the number of characters the user can type to one. To do this, toggle the *Length Limit* check box on, and type the numeral 1 into the *Max Length* text box. Now the parameter field will only accept single-character values. The field will accept "C" as a value, but not "City."
- 5 Create a formula similar to this and call it *Sort*:

```
If {?SortField} = "C" Then
    {customer.CITY}
Else
    If {?SortField} = "R" Then
        {customer.REGION}
    Else
        {customer.COUNTRY}
```

«This formula prompts for a value for the parameter field {?SortField}. If you enter "C", the formula will sort by the City field. If you enter "R" it will sort by the Region field. If you enter anything else, or do not enter anything at all, the formula will sort by the Country field. See *How to create multi-condition If-Then-Else formulas*, Page 317.»



- 6 Place the formula in the Report Header section of the report and toggle its *Suppress* option on in the Section Expert so that it does not print. Search for *Section Expert* in Seagate Crystal Reports online Help.



- 7 Click the SORT RECORDS button on the standard toolbar. Choose your formula, @Sort, as your sort field. See *How to do a single field sort*, Page 253.

Now when you run the report, the program will prompt you for a sort field, the formula will return a value based on your selection, and the sort facility will use that value as your sort field.

What you will find in this chapter...

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Where to place a chart, Page 373

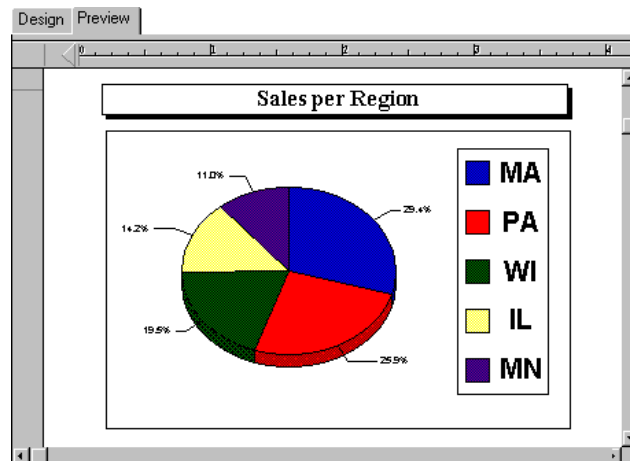
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Charting Overview

Seagate Crystal Reports enables you to include sophisticated, colorful charts in your reports. You can use charts any time you want to improve the usefulness of a report. For example, you can use charts to show 1996 fiscal results or the sales within the fiscal quarters.



Choosing a chart type

Seagate Crystal Reports provides 12 chart types to make data visually accessible in reports. These include common chart types like the Bar and Pie charts, as well as 3-D Surface, XY Scatter, Radar, Bubble, and Stock charts. There is also a custom chart option and multiple templates for each chart type.

Chart layouts

The Chart Expert provides four powerful layouts. Each layout is especially useful for charting on certain sets of data. Charts can be created with any of the following layouts:

1. **Group**

The Group layout is a very simplified layout in which you show a summary on change of a geographic field (such as Region). In order to create a chart using the Group layout, you must have at least one group and at least one summary field in the report.

2. **Detail**

The Detail layout is more complex than the Group layout. Use the Detail layout when using multiple chart values, rather than only one, or when you do not have any groups or summaries in a report. You can use multiple dimensions in detail charts, a function that allows you to create a 3D group. Other specifics functions with the Detail layout include:

- charts based on a cross-tab can perform a summary function on one cell, and
- values can be grouped in ascending, descending or specified order.

3. **Cross-Tab**

Use the Cross-Tab layout to chart a cross-tab object. The cross-tab information can be used as the basis for this chart. A Cross-Tab chart does not require groups or summary fields.

4. **OLAP**

Use the OLAP layout to chart on an OLAP grid. The OLAP data can be used as the basis for this chart. An OLAP chart does not require groups or summary fields.

NOTE: *The following rules apply when changing the layout of an existing chart:*

1. A chart (or a map) based on a group layout can be changed to detail layout, and vice versa.
2. A chart (or a map) based on a cross-tab object can be changed to detail or group layout only (i.e., not to an OLAP cube), the same is NOT true in the reverse order.
3. A chart (or a map) based on an OLAP cube can be changed to detail or group layout only; the same is NOT true in the reverse order.

Chart types

Different sets of data are particularly suited to a certain chart type. The following is an overview of the main chart types and their most common uses.

● **Bar chart**

A Bar chart (also known as a Column chart) is an excellent tool for displaying or comparing several sets of data. Two very useful bar charts include the:

— Side-by-Side bar chart

A Side-by-Side bar chart displays data as a series of vertical bars. This type of chart is best suited for showing data for several sets over a period of time (for example, last year's sales figures for CA, AZ, OR, and WA).

— **Stacked bar chart**

A Stacked bar chart displays data as a series of vertical bars. This type of chart is best suited for representing three series of data, each series represented by a color stacked in a single bar (for example, sales for 1994, 1995, and 1996).

● **Line**

A Line chart displays data as a series of points connected by a line. This type of chart is best suited for showing data for a large number of groups (for example, total sales over the past several years).

● **Area**

An Area chart displays data as areas filled with color or patterns. This type of chart is best suited for showing data for a limited number of groups (for example, percentage of total sales for CA, AZ, OR, and WA).

● **Pie**

A Pie chart displays data as a pie, split and filled with color or patterns. Pie charts are typically used for one group of data (for example, the percentage of sales for the entire inventory); however, you now have the option to choose multiple pie charts for multiple groups of data.

● **Doughnut**

A Doughnut chart is similar to a pie chart, displaying data as sections of a circle or doughnut. If, for example, you charted sales by region on a particular report, you would see the total number of sales (the figure) in the center of the doughnut and the regions as colored sections of the doughnut. As with the Pie chart, you have the option to choose multiple doughnut charts for multiple groups of data.

● **3-D Riser**

A 3-D Riser chart displays data in a series of 3-dimensional objects, lined up side-by-side, in a 3-dimensional plane. The 3-D Riser chart does an excellent job of showing the extremes in your report data. For example, the difference in sales between countries is visually dynamic when presented in this chart.

● **3-D Surface**

3-D Surface charts present a topographic view of multiple sets of data. If, for example, you need a chart to show the number of sales by customer by country, in a visually dynamic and relational format, you might consider using the 3-D Surface chart.

- **XY Scatter**

An XY Scatter chart is essentially a collective of plotted points that represent specific data in a pool of information. The XY Scatter chart allows the user to consider a larger scope of data for the purpose of determining trends. For example, if you input customer information, including sales, products, countries, months, and years, you would have a collective of plotted points that represents the pool of customer information. Viewing all of this data on an XY Scatter chart would allow you to speculate as to why certain products were selling better than others or why certain regions were purchasing more than others.

- **Radar**

A Radar chart positions group data, such as countries or customers, at the perimeter of the radar. The Radar chart then places numeric values, increasing in value, from the center of the radar to the perimeter. In this way, the user can determine, at a glance, how specific group data relates to the whole of the group data.

- **Bubble**

A Bubble chart displays data as a series of bubbles, where the size of the bubble is proportional to the amount of the data. A Bubble chart would be very effective with the number of products sold in a certain region; the larger the bubble, the greater the number of products sold in that region.

- **Stock**

A Stock chart presents high and low values for data. With this ability, the Stock chart is an excellent tool for monitoring financial or sales activities.

NOTE: The Chart Expert also includes 3-D templates for Bar, Area, and Pie charts.

Where to place a chart

The placement of a chart determines which data is displayed and where it is printed. For example, if you place a chart in the Report Header section, the chart includes data for the entire report. If you place it in a Group Header or Group Footer section, it displays group specific data.

NOTE: If your report contains subreports, you can place charts in those subreports as well. See Subreports, Page 415.

Drill-down with charts

Not only is a chart a powerful way of presenting data, it is also a powerful analysis tool. When you move your mouse pointer over a segment of the chart in the Preview Tab the cursor becomes a Drill-down cursor. You can double-click to view the details supporting that section of the chart.

Analyzer Tab

Seagate Crystal Reports provides a third tab (besides the Design and Preview Tabs) specifically for advanced charting and mapping. This is the Analyzer Tab. Use this tab to organize your charts for more efficient analysis. The Analyzer Tab allows you to set the properties of an individual instance of a chart independently of the rest of the report. You can change the chart title and the titles for the X-, Y-, and Z-axes. You can also stagger labels, reverse a series or a group, and change colors. For more information, see *Analyzer Tab*, Page 65.

Data you can chart on

You can chart on the following:

- summary and subtotal fields (see *How to chart on a summary or subtotal field (group charts)*, Page 375),
- detail fields (see *How to chart on a details field*, Page 376),
- formula fields (see *How to chart on a formula field*, Page 377),
- cross-tab summaries (see *How to chart on cross-tab summaries*, Page 379), and
- OLAP data (see *How to chart on an OLAP cube*, Page 379).

Before you create a chart

You will typically chart at the group level on summary and subtotal information; exceptions include the Detail, Cross-Tab, and OLAP grid charts. Before you can create a chart at the group level, you must have at least one group and at least one summary or subtotal in your report.

For example, if you have a sales report grouped by Region with a subtotal of Last Year's Sales for each Region, you can quickly create a chart that will display sales by Region.

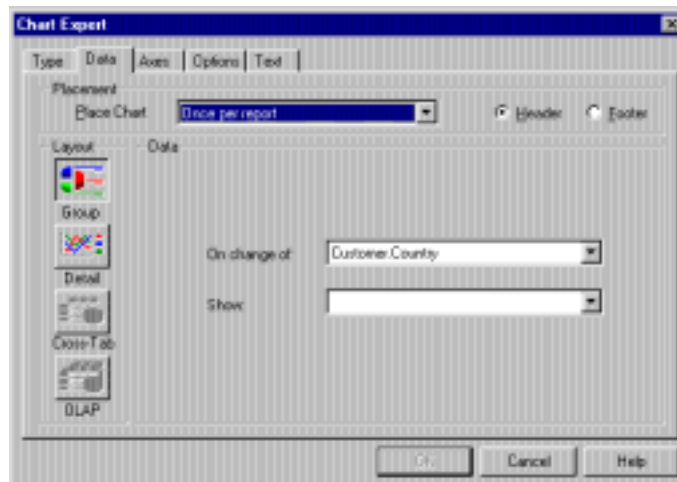
HANDS-ON (Charting)

How to chart on a summary or subtotal field (group charts)

Many of the charts you create will be based on summary or subtotals within your report. In order to create these charts, you must have a summary or subtotal already inserted into your report. For more information on inserting summaries and subtotals, see *How to summarize grouped data, Page 262* and *How to subtotal grouped data, Page 264*.



- 1 With the summary or subtotal field selected, click the INSERT CHART button on the standard toolbar. The Chart Expert appears with the Type Tab active.
- 2 Choose the type of chart that will best illustrate your data (see *Choosing a chart type, Page 370*).
- 3 Click the *Group* button on the Data Tab to specify that your chart will be based on grouped data.
- 4 Use the *Place Chart* drop-down list and the *Header* and *Footer* options to specify map placement.



NOTE: When summarizing or subtotaling a field, the data is automatically grouped. For more information, see *Sorting, Grouping, and Totaling, Page 245*.

- 5 Use the appropriate drop-down lists to specify the data on which you want to chart.
- 6 If desired, you can use the Text Tab to add text to your chart and the Axes Tab to add grid lines, data values, etc.
- 7 Click the *OK* button when you are finished. The chart automatically appears in the Report Header or the Report Footer, depending on the option you chose in the Data Tab.

NOTE: When a chart is inserted, it may cover a portion of your report. You can move and resize the chart so that it fits properly within the report.

How to chart on a details field

A Detail chart allows you to create a chart based on specific values. Charts are often created based on a summary field in your report in which the values plotted in the chart depend on the values in the summary field. With a Detail chart, you can create a chart without the need for a summary field by using values that appear in the Details section of your report.

To create a Detail chart, you need to specify two things:

1. Conditions (there can be two), and
2. Values (there can be multiple values).

Condition

The *Condition* is used to indicate **when** to plot the point. For example, a chart showing last year's sales for your customers uses the Customer Name field as the condition. Each time the condition changes (the customer name changes), a point is plotted.

Value

The Detail chart uses the *Value* to indicate **what** information is plotted as the points on your chart. For example, if you want to create a chart showing last year's sales for your customers, the Last Year's Sales field would be the value. Each time a point is plotted, it will be plotted at the point corresponding to the value in the Last Year's Sales field.

Creating and modifying your Detail chart is easy with the use of the Chart Expert. The Expert walks you through the creation of your chart step-by-step.



- 1 Highlight the details field on which you want to chart and click the INSERT CHART button on the standard toolbar. The Chart Expert appears.
- 2 Choose the type of chart you want to create by clicking the corresponding button on the Type Tab. See *Choosing a chart type*, Page 370.

- 3 Click the Data Tab to activate it.
- 4 Use the *Place Chart* drop-down list and the *Header* and *Footer* options to specify chart placement.
- 5 Click the DETAIL button to specify a Detail chart.
- 6 Select the "on change of" field (the chart values will be shown on each change of this field) from the *Data* scroll box and click the *arrow* (>) button to the left of the *On change of* text box. The field appears in that text box.
- 7 Use the Ctrl-Click combination to select the fields that you want used as chart values from the *Data* scroll box, and click the *arrow* (>) button to the left of the *Show Values* scroll box. The selected fields appear in that scroll box.
- 8 Toggle the *Don't summarize values* check box on if you do not want the program to automatically summarize the chart values.
- 9 Enter a title, headings, etc., as desired using the Text Tab.
- 10 Add a legend, grid lines, and other elements to your chart using the Axes and Options Tabs.
- 11 Click the *OK* button when you are finished. The chart automatically appears in the Report Header or the Report Footer, depending on the option you chose in the Data Tab.

NOTE: When a chart is inserted, it may cover a portion of your report. You can move and resize the chart so that it fits properly within the report.

How to chart on a formula field

Seagate Crystal Reports allows you to create a chart based on a formula field. Charting on a formula field is much like charting on a details field (see *How to chart on a details field*, Page 376).

To create a chart for a formula field you need to specify two things:

1. Condition, and
2. Value.

Condition

The *Condition* is used to indicate **when** to plot the point. For example, a chart showing last year's sales by Country uses the Country field as the condition. Each time the condition changes (the country changes), a point is plotted.

Value



The *Value* is used to indicate **what** information is plotted as points on your chart. For example, if you want to create a chart showing a calculation for last year's sales (i.e., a budget projection for next year of last year's sales plus 10%), the Last Year's Sales field would be the value. Each time a point is plotted, it will be plotted at the point corresponding to the value in the Last Year's Sales field.

- 1 Highlight the formula field on which you want to chart and click the INSERT CHART button on the standard toolbar. The Chart Expert appears.
- 2 Choose the type of chart you want to create by clicking the corresponding button on the Type Tab. See *Choosing a chart type*, Page 370.
- 3 Click the Data Tab to activate it.
- 4 Use the *Place Chart* drop-down list and the *Header* and *Footer* options to specify chart placement.
- 5 Click the DETAIL button to specify a chart for formulas.
- 6 Select the "on change of" field (the chart values will be shown on each change of this field) from the *Data* scroll box and click the *arrow* (>) button to the left of the *On change of* text box. The field appears in that text box.
- 7 Use the Ctrl-Click combination to select the fields that you want used as chart values from the *Data* scroll box, and click the *arrow* (>) button to the left of the *Show Values* scroll box. The selected fields appear in that scroll box.
- 8 Toggle the *Don't summarize values* check box on if you do not want the program to automatically summarize the chart values.
- 9 Enter a title, headings, etc., as desired using the Text Tab.
- 10 Add a legend, grid lines, and other elements to your chart using the Axes and Options Tabs.
- 11 Click the *OK* button when you are finished.

The chart automatically appears in the Report Header or the Report Footer, depending on the option you chose in the Data Tab.

NOTE: *When a chart is inserted, it may cover a portion of your report. You can move and resize the chart so that it fits properly within the report.*

How to chart on cross-tab summaries

Seagate Crystal Reports allows you to include a chart based on summary values in your cross-tab report. For example, with a cross-tab that shows the amount of a certain product sold in each region of the United States, you may want to include a chart showing the percentage of total sales provided by each region for that product.

To create a Cross-Tab chart you must first have a cross-tab in your report. For more information, see *Cross-Tab Objects*, Page 443.



- 1 With the cross-tab highlighted, click the INSERT CHART button on the standard toolbar. The Chart Expert appears with the Type Tab active.
- 2 Choose the type of chart you want to create by clicking the corresponding button on the Type Tab. See *Choosing a chart type*, Page 370.
- 3 Click the Data Tab to activate it. Notice that the *Cross-Tab Layout* button is already selected.
- 4 Use the *Place Chart* drop-down list and the *Header* and *Footer* options to specify chart placement.
- 5 Use the *Graph on* drop-down list to specify the summarized field on which you want to base your chart.
- 6 Use the *By* drop-down list to specify the primary row or column on which you want to base your chart.
- 7 If desired, specify the secondary row or column on which you want to base your chart by using the *Subdivided By* drop-down box.
- 8 Click the *OK* button when you are finished. The chart automatically appears in the Report Header or the Report Footer, depending on the option you chose in the Data Tab.

NOTE: *When a chart is inserted, it may cover a portion of your report. You will need to move the chart and possibly resize it to fit in your report the way you want.*

How to chart on an OLAP cube

The OLAP layout can be used to chart on an OLAP grid. In order to create an OLAP chart, you must first have an OLAP grid in your report. For more information, see *Reporting on OLAP data*, Page 171.

- 1 With the OLAP grid on which you want to chart selected, click the INSERT CHART button on the standard toolbar. The Chart Expert appears with the Type Tab active.
- 2 Select the chart type that will best illustrate your data (see *Choosing a chart type*, Page 370).
- 3 Click the Data Tab to activate it. Notice that the OLAP LAYOUT button is already selected.
- 4 Use the *Place Chart* drop-down list and the *Header* and *Footer* options to specify chart placement.
- 5 Use the *Options* section to specify style and formatting options related to the selected chart type.
- 6 Click the Text Tab. You can use the text boxes on this tab to specify a chart title and format information.

Click *OK* when you are finished. The program places your chart in the Report Header, Group Header, Report Footer, or Group Footer section, depending on the options you selected.

How to edit a chart using the Chart Expert

Once you have created a chart, you may want to add a title, headings, or a legend, change fonts, or even change the type of chart. Modifying charts is easy with the use of the Chart Expert.

- 1 Right-click the chart that you want edited and choose FORMAT CHART from the shortcut menu.

The Chart Expert appears with all the details of the selected chart.

- 2 Make the desired changes and click *OK* to update the chart.

How to edit charts using PGEitor

The PGEitor is a powerful chart editor that offers 80 chart types and full formatting control of every chart element. The PGEitor is commonly used to format chart titles, change chart colors, and resize portions of the chart.

A very popular feature of the PGEitor is the ability to save chart formatting templates. These templates are like stylesheets for charts. They contain custom formatting instructions that can be applied instantly to new charts. If you continually create pie charts, for example, and you

need the charts to appear in custom colors, you can create a template for those colors. Then, whenever a new chart is created, simply apply the template and the chart is formatted to the template specifications.

See SSCHART.HLP (located in the \CRW16\SSCHART directory (16-bit), or \Program Files\Seagate Software\Schart (32-bit)) for more information on the PGEitor application.

How to change chart size and position

You can use the Object Size and Position dialog box to specify the height, width, and position of a chart (in inches).

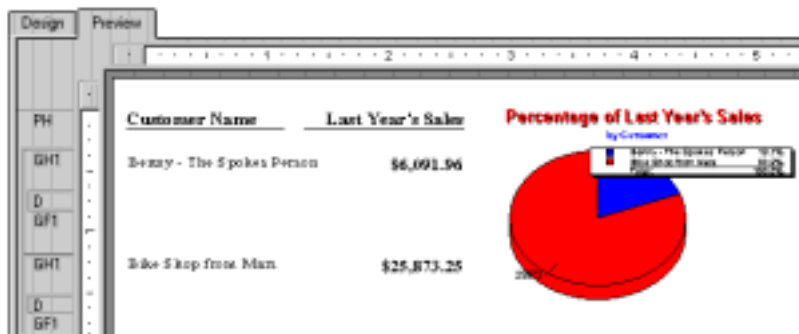
- 1 From within either the Design or Preview Tab, right-click the chart and choose OBJECT SIZE AND POSITION from the shortcut menu. The Object Size and Position dialog box appears.
- 2 In the *X Pos* text box, enter the desired distance in inches from the left edge of the chart object to the left margin of the report section. The default distance is 0.04 inches.
- 3 In the *Y Pos* text box, enter the desired distance in inches from the upper edge of the chart object to the upper margin of the report section. The default distance is 0.02 inches.
- 4 In the *Height* text box, enter the desired vertical height of the chart, in inches.
- 5 In the *Width* text box, enter the desired horizontal height of the chart, in inches.
- 6 Click OK to return to your report. The program will implement your specifications immediately.

How to change the border of a chart

- 1 From the Design or Preview Tab, right-click the chart and choose CHANGE BORDER from the shortcut menu. The Format Editor appears with the Border Tab active.
- 2 Change the border as needed.
- 3 Click OK. The program immediately implements these changes.

How to use the underlay feature with charts

Since charts can only print in certain sections of your report, the underlay feature gives you more power and control in the overall look of your report. Instead of having a chart print ahead of the data it represents, it can appear next to the data for a more comprehensible report. See *Area printing characteristics*, Page 59.



- 1 Create the chart and place it in the Report Header section. For more information see *How to chart on a summary or subtotal field (group charts)*, Page 375.
- 2 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.
- 3 Highlight the Report Header section in the *Sections* list box and toggle the *Underlay Following Sections* option on.
- 4 Click *OK*.

You are returned to your report. The chart will now underlay the sections below it. Move or resize the chart as desired.

Related Topics

How to make an object underlay a following section(s), Page 111

How to analyze a chart

The Analyzer Tab allows you to analyze charts in-depth. The commands on the Analyzer Tab shortcut menu help you customize a chart, allowing you to examine complex data and identify trends.

There are a number of operations you can perform on any chart in the Analyzer Tab, as described below. There are also a few additional commands on the shortcut menu that are chart-specific. For example, in the case of a Pie chart, you may have commands for resizing the pie and for adjusting the pie rotation. In the case of a bar chart, you may have commands for staggering the labels. In this way, the Analyzer Tab offers you maximum flexibility.

NOTE: Changes performed in the Analyzer Tab are applied to the currently selected chart or charts. You can have two charts selected in the analyzer at one time. When you try to select a third chart and bring it into the analyzer, you will be asked to discard one of the previously selected charts.

To analyze a chart in depth, right-click the chart and choose LAUNCH ANALYZER from the shortcut menu. The program opens the Analyzer Tab.

Changing the chart title

To change the chart title:

- 1 Right-click the chart and choose CHANGE CHART TITLE from the shortcut menu. The Change Label dialog box appears.
- 2 Enter a new title in the text box.
- 3 Click *OK* to return to the Analyzer Tab. The program implements the changes immediately.

Changing axis titles

You can change the titles for the X-, Y-, and Z-axes; there is a separate command for each, and each command will open the Analyzer Tab's standard Change Label dialog box.

- 1 Right-click the chart and choose the desired title change command (CHANGE X-AXIS TITLE, CHANGE Y-AXIS TITLE, or CHANGE Z-AXIS TITLE) from the shortcut menu. The Change Label dialog box appears.
- 2 Enter a new axis title in the text box.
- 3 Click *OK* to return to the Analyzer Tab. The program implements your changes immediately.

Reversing the series order

You can reverse the order in which the series are displayed on the chart. Right-click the chart and choose REVERSE SERIES from the shortcut menu to toggle the check mark that appears beside the command on or off as needed. If the check mark is toggled on, the series will be reversed. If the check mark is toggled off, the series will be displayed in their default direction.

Reversing the group order

You can reverse the order in which the groups are displayed on the chart. Right-click the chart and choose REVERSE GROUPS from the shortcut menu to toggle the check mark that appears beside the command on or off as needed. If the check mark is toggled on, the groups will be reversed. If the check mark is toggled off, the groups will be displayed in their default direction.

18

Mapping

What you will find in this chapter...

Mapping Overview, Page 386

Choosing a map, Page 386

Where to place a map, Page 390

Analyzer Tab, Page 391

Data you can map on, Page 391

For more map information, Page 391

HANDS-ON (Mapping), Page 391

Mapping Overview

With Seagate Crystal Reports, you can include professional geographic maps in reports. Maps help analyze report data and identify trends more efficiently. For example, you could create a map that shows sales by region. You would then be able to:

- drill-down on the map regions to view underlying data,
- use one of the five map types to analyze the data, and
- use the Analyzer Tab to adjust the appearance and organization of the map (allowing you to better identify trends).

In order to place a generic, group-based map on a report, you must first have a group and a summary or subtotal field present in the report. However, the program does provide several specialized map layouts (Detail, Cross-Tab, and OLAP) that do not require groups and summaries.

***NOTE:** When a field is summarized or subtotaled, the program automatically groups the data. For more information, see [Sorting, Grouping, and Totaling](#), Page 245.*

***NOTE:** Mapping only appears in the 32 bit version.*

Choosing a map

The Map Expert provides a wide range of mapping abilities, including:

- four map layouts, and
- five map types.

You can choose the map layout and type that is best suited to your data.

Map layouts

The Map Expert provides four powerful layouts. Each layout is especially useful for mapping on certain sets of data. Any of the following layouts can be used to create a map:

1. **Group**

The Group layout is a very simplified layout in which a summary on change of a geographic field (such as Region) is shown. In order to create a map using the Group layout, you must have at least one group and at least one summary field for that group.

2. **Detail**

The Detail layout is more complex than the Group layout. Use the Detail layout when using multiple map values, rather than only one, or when you do not have any groups or summaries in the report.

3. **Cross-Tab**

Use the Cross-Tab layout when mapping on a cross-tab object. The cross-tab information can be used as the basis of the map. A Cross-Tab map does not require groups or summary fields.

4. **OLAP**

Use the OLAP layout when mapping on an OLAP grid. The OLAP data can be used as the basis of the map. An OLAP map does not require groups or summary fields.

NOTE: *If there is no map associated with the data you specify, then no map will be shown. For example, if you create a map based on country and one of your detail records has a country for which there is no map an empty block will appear unless the section that the map is placed in has been formatted to suppress if blank.*

Map types

The Map Expert also provides five basic map types, each suitable for a different strategy of data analysis. When deciding which map type best fits your report, you should consider the type of data you want to analyze. For example, if you want the map to display one data item for each geographic division (city, state, country, etc.), then you might use a Ranged, Dot Density, or Graduated map. On the other hand, if you want the map to display more than one value for each new geographic division, then you could use a Pie Chart map or a Bar Chart map. The map types are:

1. **Ranged**

A Ranged map breaks the data into ranges, assigns a specific color to each range, and then codes each geographic area on the map by color to display the range. For example, you could create a map that displays Last Year's Sales by Region. If you have sales ranging from zero to 100,000, you might give the map five ranges, with equal intervals of 20,000 each. You could use shades of red (going from dark red to light red) to color code each region according to those sales figures. Then you could use this map to see where sales are the highest. With equal intervals, you might end up with all your regions ranging between zero and 20,000, except perhaps one region (for example, California) that might have exceptionally high sales (such as 98,000). This map would be a very distorted representation of the data. A more useful map would have ranges like 0-5000, 5001-10000, 10001-15000, 15001-20000, and over 20000. It is important to define your ranges carefully. There are four different range options:

- **Equal count**

This option assigns intervals in such a way that the same number of regions (or as close to the same number of regions as possible) appear in each interval. In other words, this option should assign intervals so that each color on the map is assigned to the same number of regions. The numeric quantity of the summary values in each interval may or may not be equal, depending on the individual regions and their summary values.

- **Equal ranges**

This option assigns intervals in such a way that the summary values in each interval are numerically equal. The number of regions in each interval may or may not be equal, depending on the individual regions and their summary values.

- **Natural break**

This option assigns intervals using an algorithm that attempts to minimize the difference between the summary values and the average of the summary values, for each interval.

- **Standard deviation**

This option assigns intervals in such a way that the middle interval breaks at the mean (or average) of the data values, and the intervals above and below the middle range are one standard deviation above or below the mean. Standard deviation is the square root of the variance. It projects how various values in a set of values deviate from the mean for that set.

2. **Dot Density**

A Dot Density map displays a dot for each occurrence of a specified item. For example, you might create a United States map that shows one dot for each shipbuilder in the nation. In states like Tennessee, there would be no dots. In some coastal states, such as South Carolina, you might be able to count the dots on the map, since their dispersal would be fairly wide. However, for states with major shipbuilding industries, such as California and Virginia, the dots would all merge together into a solid mass along the coastline. The purpose of a Dot Density map, then, is to provide an overall impression of the distribution of the specified item. A Dot Density map is much like a nighttime satellite photo of the U.S., where you can see the lights of all the cities. Such a map is not a very accurate means of communicating information (particularly if you have a large number of items), but is a good way to give an impression of the distribution.

3. **Graduated**

A Graduated map is much like a Ranged map; it shows one symbol per instance of a specified item. This symbol is a circle by default, but you can choose a different symbol if you prefer. Each symbol is proportional in size to the value of the item it represents (within a range of three sizes). A Graduated map communicates the same information as the Ranged map, but you would usually create a Ranged map for a case in which the geographic areas will have distinct geographic boundaries (as in the case of regions), while you would use a Graduated map for displaying data that is linked to points rather than precise areas (as in the case of cities). For example, a map of an individual region could use graduated circles to represent the sales for each office. The size of each circle would be proportional to the sales (or to the sales range) of the office it represents. On this map, an office with a sales figure of \$70,000 might have a large circle, and an office with a sales figure of \$20,000 might have a small circle. So, a Graduated map provides a more efficient representation of point data than a Ranged map does, and it uses sized symbols rather than colors to distinguish variations in the values of the items it represents.

4. **Pie Chart**

A Pie Chart map displays a pie chart over each geographic area. The pie charts represent data items that make up a whole. Each slice of the pie represents an individual data item and shows that item's percentage in the whole. For example, you could create a pie chart map showing heating fuel types by region. You might have four types of heating fuel (four slices in each pie): electricity, gas, wood, and solar. Each region would then have a pie chart showing the breakdown of heating fuel types within that region. Washington state would probably use a high percentage (a large slice of the pie) of electricity because of the hydropower in that region, while Idaho would probably use a high percentage (a large slice of the pie) of natural gas. You can use this map type to compare the distribution of several items within a particular region. You can also specify that the pie charts be sized proportionately, so that, as with the symbols in a Graduated map, the pie charts will appear in various sizes, depending on the underlying data values. This will allow you to compare the totals between regions.

5. **Bar Chart**

A Bar Chart map works like a Pie Chart map, but may be more useful for certain sets of data. Typically, you would use a Bar Chart map for items that do not total 100% (that is, for data items that do not make a whole, or for data items that are unrelated). For example, you could create a Bar Chart map that displays use of heating fuel by region. You might choose to analyze use of three types of fuel: electricity,

gas, and solar. Each bar chart on the map could contain individual bars for each of these types. In this example, the data items (electricity, gas, and solar) do not comprise a whole. There may be other types of fuel used in these regions, such as wood, but this map only focuses on three of them. Also, the purpose of the map is to compare each region's use of each fuel type with that of every other region. In a Pie Chart map, you could show these three fuel types as percentages of the entire fuel use within each region, and though you could compare the percentages for each region, you would probably not be able to compare the actual values for each region, because each region would have the same total value (100%).

Where to place a map

When you choose where to place the map, you determine the amount of data that will be included in the map. For example, if you place the map in the Report Header section, the map includes data for the entire report. If you place it in a Group Header or Group Footer section, it displays group-specific data. This choice will also determine whether the map prints once for the entire report, or many times (once for each instance of a given group).

NOTE: *If your report contains subreports, you can place maps in those subreports as well. See [How to map on a subreport](#), Page 396.*

Drill-down with maps

Not only is mapping a powerful means of presenting data - it is also a powerful analysis tool. You can activate drill-down mode by right-clicking the map in the Preview Tab and choosing Drill-down from the shortcut menu. When you are in drill-down mode, and the mouse pointer is moved over a section of the map in the Preview Tab, and the pointer becomes a Drill-down cursor, double-click to view the underlying details for that section of the map.

NOTE: *If you drill-down on a region that has no data associated with it, you will get a message saying "There are no detail records for that {Region Name}." For example, if you are looking at a world map and try to drill-down on Germany, but there is no Germany group in the report you will get the above message.*

Analyzer Tab

Seagate Crystal Reports provides a third tab (besides the Design and Preview Tabs) specifically for advanced charting and mapping. This is the Analyzer Tab. Use this tab to organize your maps for more efficient analysis. The Analyzer Tab allows you to set the properties of an individual instance of a map independently of the rest of the report. You can center the map, zoom in and out, pan the map, change the map style, and rearrange the map layers. For more information, see *Analyzer Tab*, Page 65.

To activate the Analyzer Tab, right-click the map you want to analyze and choose LAUNCH ANALYZER from the shortcut menu.

Data you can map on

You can map on the following:

- groups (see *How to map on a group*, Page 393).
- detail fields (see *How to map on a detail field*, Page 393).
- cross-tab summaries (see *How to map on a cross-tab*, Page 394).
- OLAP data (see *How to map on an OLAP cube*, Page 396).

For more map information

Seagate Crystal Reports comes with a standard set of maps. For more information and additional maps visit our web site at:

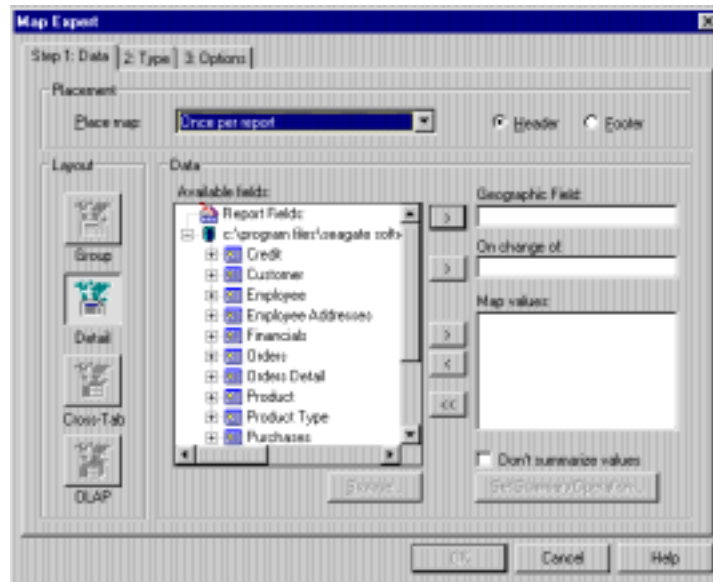
<http://www.seagatesoftware.com/scr-productinfo/moremaps>

HANDS-ON (Mapping)

How to create and insert a map

- 1 Click the INSERT MAP button on the standard toolbar. The Map Expert appears with the Data Tab active.

- 2 Use the *Place Map* drop-down list and the *Header* and *Footer* options to specify map placement.



- 3 Choose a map layout by clicking one of the four map buttons on the Data Tab (GROUP, DETAIL, CROSS-TAB, OR OLAP). For more information about the four map layouts, see *Map layouts*, Page 386.
- 4 Use the drop-down lists, list boxes, and arrow buttons on the Data Tab to specify a summary field (which will supply the numeric values for your map), a geographic field (which will supply the geographic areas for your map), and map values.
- 5 Click the Type Tab.
- 6 Choose a map type by clicking one of the five map buttons on the Type Tab (RANGED, DOT DENSITY, GRADUATED, PIE CHART, OR BAR CHART). Some of these map types will not be available with certain map layouts. For more information about the five map types, see *Map types*, Page 387.
- 7 Use the *Options* section of the Type Tab to specify style and formatting options related to the selected map type.
- 8 Click the Options Tab.
- 9 Use the text boxes and option buttons on the Options Tab to give your map a title and a legend.

- 10 Click *OK*. The program places the map on the report as specified in Step 2, and returns you to the report.

The process for creating a map varies depending on the data you are mapping on. The following sections detail each mapping process.

How to map on a group

To map on a group, you can use the Group layout, in which you show a summary (such as Last Year's Sales) on change of a geographic field (such as Region). In order to create a map using the Group layout, you must have at least one group and at least one summary field in your report.

- 1 Click the **INSERT MAP** button on the standard toolbar. The Map Expert appears with the Data Tab active.
- 2 Click the **GROUP** button to specify that you want to map on a grouped and summarized field.
- 3 Use the *Place Map* drop-down list and the *Header* and *Footer* options to specify map placement.
- 4 Select the group on which you are mapping from the *On change of* drop-down list.
- 5 Select a summary field from the *Show* drop-down list. The value in the summary field will be shown each time the group changes.
- 6 Click the Type Tab.
- 7 Select the map type that will best illustrate your data: Ranged, Dot Density, or Graduated (see *Map types*, Page 387).
- 8 Use the *Options* section to specify style and formatting options related to the selected map type.
- 9 Click the Options Tab. You can use the text boxes on this tab to specify a map title and legend information.
- 10 Click *OK* when you are finished. The program places your map in the Report Header, Group Header, Report Footer, or Group Footer section, depending on the options you selected in Step 3.

How to map on a detail field

Using the Detail layout, you can map on a detail field. This layout also allows you to use multiple fields as map values. Use this layout to use multiple map values, rather than only one, or when you do not have any groups or summaries in a report.

NOTE: You must map on a geographic field, such as Country, Region, or City. The program cannot generate a map based on a non-geographic field.

- 1 Click the **INSERT MAP** button on the standard toolbar. The Map Expert appears with the Data Tab active.
- 2 Click the **DETAIL** button to specify that you want to map on a detail field.
- 3 Use the *Place Map* drop-down list and the *Header* and *Footer* options to specify map placement.
- 4 Select the field on which you want to map from the *Data* scroll box and click the top *arrow* (>) button. The field appears in the *Geographic Field* text box.
- 5 Select the "on change of" field (the map values will be shown on each change of this field) from the *Data* scroll box and click the *arrow* (>) button to the left of the *On change of* text box. The field appears in that text box.
- 6 Use the Ctrl-Click combination to select the fields that you want used as map values from the *Data* scroll box, and click the *arrow* (>) button to the left of the *Map Values* scroll box. The selected fields appear in this scroll box.
- 7 Toggle the *Don't summarize values* check box on if you do not want the program to automatically summarize the map values. This check box is toggled on by default.
- 8 Click the **Type** Tab.
- 9 Select the map type that will best illustrate your data (see *Map types*, Page 387).
- 10 Use the *Options* section to specify style and formatting options related to the selected map type.
- 11 Click the **Options** Tab. The text boxes on this tab can be used to specify a map title and legend information.
- 12 Click **OK** when you are finished. The program places your map in the Report Header, Group Header, Report Footer, or Group Footer section, depending on the options you selected in Step 3.

How to map on a cross-tab

With the Cross-Tab layout, you can map on a cross-tab summary field. For example, with a cross-tab that shows the total number of items of a

product sold in each region of the United States, you may want to include a map that shows the percentage of the total sales of the product provided by each region.

In order to create a cross-tab map you must first have a cross-tab in your report. For more information, see *Cross-Tab Objects*, Page 443.

- 1 With the cross-tab on which you want to map selected, click the INSERT MAP button on the standard toolbar. The Map Expert appears with the Data Tab active.
- 2 Click the CROSS-TAB button to specify that you want to create a cross-tab map.
- 3 Use the *Place Map* drop-down list and the *Header* and *Footer* options to specify map placement.
- 4 Select the summary field on which you want to map from the *Map on* drop-down list. This field will supply the numeric data for the map.
- 5 Select the geographic field you want shown from the *Show Geographic Field* drop-down list. This field will supply the geographic areas for the map.
- 6 You can select an additional field to map on from the *Subdivided by* drop-down list, if desired. The program uses this field to subdivide the pie or bar charts appearing on your map.
- 7 Click the Type Tab.
- 8 Select the map type that will best illustrate your data (see *Map types*, Page 387).
 - If mapping on only one field (if you selected *None* from the *Subdivided by* drop-down list), you can select one of these map types: Ranged, Dot Density, or Graduated.
 - If mapping on two fields (if you selected an additional field from the *Subdivided by* drop-down list), you can select one of these map types: Pie Chart or Bar Chart.
- 9 Use the *Options* section to specify style and formatting options related to the selected map type.
- 10 Click the Options Tab. You can use the text boxes on this tab to specify a map title and legend information.
- 11 Click OK when you are finished. The program places your map in the Report Header, Group Header, Report Footer, or Group Footer section, depending on the options you selected in Step 3.

How to map on an OLAP cube

Using the OLAP layout, you can map on an OLAP grid. In order to create an OLAP map, you must first have an OLAP grid in your report. For more information, see *Reporting on OLAP data, Page 171*.

- 1 With the OLAP grid on which you want to map selected, click the INSERT MAP button on the standard toolbar. The Map Expert appears with the Data Tab active.
- 2 Click the OLAP button to specify that you want to create an OLAP map.
- 3 Specify map placement using the *Place Map* drop-down list and the *Header* and *Footer* options.
- 4 Use the Data Tab to select the summary and geographic fields that you want to use for the map.
- 5 Click the Type Tab.
- 6 Select the map type that will best illustrate your data (see *Map types, Page 387*).
- 7 Use the *Options* section to specify style and formatting options related to the selected map type.
- 8 Click the Options Tab. Use the text boxes on this tab to specify a map title and legend information.
- 9 Click *OK* when you are finished. The program places your map in the Report Header, Group Header, Report Footer, or Group Footer section, depending on the options you selected in Step 3.

How to map on a subreport

Inserting a map into a subreport involves the same process used to insert a map into the primary report. The only difference is that you must insert the map with the subreport Design Tab active.

- 1 Click the INSERT MAP button on the standard toolbar. The Map Expert appears with the Data Tab active.
- 2 Complete the Map Expert, and click *OK*. The program places the map in the section you specified in the Map Expert, and returns you to the report.
- 3 Resize or move your map as desired.

The process for creating a map varies depending on the type of data you are mapping on. For more information about mapping:

- see *How to map on a group*, Page 393.
- see *How to map on a detail field*, Page 393.
- see *How to map on a cross-tab*, Page 394.
- see *How to map on an OLAP cube*, Page 396.

How to edit a map using the Map Expert

Once you have created a map, you may want to add a title, headings, and a legend, and you may want to change fonts, or even the map type. From either the Design or Preview Tab, you can easily open the Map Expert and make your modifications.

- 1 Right-click the map you want to edit and choose MAP EXPERT from the shortcut menu.

The Map Expert appears, supplying all the settings for the selected map.

- 2 Make the desired changes and then click *OK* to update the map.

How to change map size and position

You can use the Object Size and Position dialog box to specify the height, width, and position of your map, in inches.

- 1 From within either the Design or Preview Tab, right-click the map and choose OBJECT SIZE AND POSITION from the shortcut menu. The Object Size and Position dialog box appears.
- 2 In the *X Pos* text box, enter the desired distance in inches from the left edge of the map object to the left margin of the report section. The default distance is 0.04 inches.
- 3 In the *Y Pos* text box, enter the desired distance in inches from the upper edge of the map object to the upper margin of the report section. The default distance is 0.02 inches.
- 4 In the *Height* text box, enter the desired vertical height of the map, in inches.
- 5 In the *Width* text box, enter the desired horizontal height of the map, in inches.

- 6 Click *OK* to return to your report. The program will implement your specifications immediately.

*NOTE: You can also change size and position by moving and resizing the map. However, the **Object Size and Position** dialog box allows you to make exact adjustments.*

How to change the border of a map

- 1 From the Design or Preview Tab, right-click the map and choose **CHANGE BORDER** from the shortcut menu. The Format Editor appears with the Border Tab active.
- 2 Use the Border Tab to change the border as needed. You can change the line style, the color, and you can add or remove a drop shadow.
- 3 Click *OK* when finished. The program immediately implements your changes.

How to use the underlay feature with maps

Since maps can only print in certain areas and sections of your report (see *Area printing characteristics, Page 59*), the underlay feature makes mapping even more useful. Instead of having a map print before the data it represents, you can have the map appear alongside the data, thus making the report easier to read and easier to understand.

- 1 Create your map and place it in the Report Header section. For more information, see *How to create and insert a map, Page 391*.
- 2 In the Design Tab, right-click the gray area to the left of the Report Header section and choose **FORMAT SECTION** from the shortcut menu. The Section Expert appears.
- 3 Toggle the *Underlay Following Sections* check box on for the Report Header section.
- 4 Resize the map as needed, to underlay the following sections.
- 5 Click *OK*.

How to analyze a map

Zooming, panning, and centering

The Analyzer Tab lets you analyze your maps in-depth. The commands on the Analyzer Tab shortcut menu help you customize your map, allowing you to examine complex data and identify trends.

To analyze a map in depth, right-click the map and choose LAUNCH ANALYZER from the shortcut menu that appears. The program opens the Analyzer Tab.

Both the Preview Tab and the Analyzer Tab include commands for zooming, panning, and centering maps. These commands allow you to be very mobile. You can zoom in and out on your maps at will, whenever you need to view more precise or more general information. By panning, you can quickly drag your map anywhere you please. By centering, you can quickly return your map to the center of the Tab after panning. These commands offer you maximum flexibility for examining maps.

- 1 To zoom in on a map, right-click that section of the Analyzer Tab and toggle on the check mark beside the ZOOM IN command on the shortcut menu. A Zoom cursor appears; click the map to zoom in one level of magnification. Click again to zoom in further.

NOTE: To specify more accurately the area you want to zoom in on, drag the mouse to highlight the section of the map you want to see when the Zoom cursor appears.

- 2 To zoom out on a map, right-click that section of the Analyzer Tab and toggle on the check mark beside the ZOOM OUT command on the shortcut menu. A Zoom cursor appears; click the map to zoom out one level of magnification. Click again to zoom out further.
- 3 To pan a map, right-click that section of the Analyzer Tab and toggle on the check mark beside the PAN command on the shortcut menu. A Panning cursor appears. Use this cursor to click and drag the map across the screen.
- 4 To center a map, right-click within that section of the Analyzer Tab and choose CENTER MAP from the shortcut menu. You can also choose NONE from the shortcut menu to disable all movement options. This will prevent accidental panning or zooming.

NOTE: If a map occurs once for each instance of a group, then any panning or zooming settings you specify are instance-specific. In other words, if you zoom in on the map in one group header, this setting is only for that group header. None of the headers have been changed. This way, you can set each map to different settings.

NOTE: *If the Save Data with Report option is enabled (File menu), your panning and zooming settings will be saved with the report. If the option is not enabled, then only the default map settings will be saved.*

Changing the map style

From within the Analyzer Tab, you can quickly change the map type and set the properties for that map. For example, if you are analyzing a Range map, and you want to see how the data would look if it were presented in a Dot Density style, you can quickly rearrange the map, without having to return to the Map Expert and rework the format. The Analyzer Tab also offers more advanced options for changing the appearance of the map you have specified.

- 1 Right-click the section of the Analyzer Tab in which your map appears, and choose CHANGE MAP STYLE from the shortcut menu. The Customize Map dialog box appears.
- 2 Select the desired map type from the *Map type* drop-down list.
- 3 In the *Options* section of the dialog box, set the properties for the map. The properties available will vary depending on the map type chosen.
- 4 Click *OK*.

The program returns you to the Analyzer Tab. Your specifications take immediate effect.

Changing map layers

It takes only a moment to rearrange map layers. You can also set properties, such as visibility, for those layers, and you can add and remove layers as needed.

- 1 Right-click the appropriate section of the Analyzer Tab and choose CHANGE LAYERS from the shortcut menu. The Layer Control dialog box appears.
- 2 Use the UP and DOWN buttons to arrange the map layers in the *Layers* list box.
- 3 For each map layer, set the properties in the *Properties* section of the dialog box you can specify whether the layer is visible, whether it can be selected, and whether it is automatically labeled.
- 4 If desired, click the *Display* button to open the Display Properties dialog box. Use this dialog box to set the default display mode and zoom range (the minimum and maximum possible magnification) for the layer in question, and then click *OK* to return to the Layer Control dialog box.
- 5 If desired, click *Labels* to open the Label Properties dialog box. Use this dialog box to specify the visibility, styles, and position of the labels for the layer in question (if applicable), and then click *OK* to return to the Layer Control dialog box.

Changing the map title

- 6 Click *OK* to return to the Analyzer Tab. The program implements your specifications immediately.

To change the map title:

- 1 Right-click the map and choose *CHANGE TITLE* from the shortcut menu. The Change Label dialog box appears.
- 2 Enter a new title in the text box.
- 3 Click *OK* to return to the Analyzer Tab. The program implements your changes immediately.

What you will find in this chapter...

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Inserting OLE objects into reports, Page 406

Linked vs. Embedded Objects, Page 407

Dynamic OLE menu commands, Page 408

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OLE Objects Overview

When a graphic, spreadsheet, or some other object is inserted into a report, it may be necessary to change that object. Normally, in order to make changes, you would have to:

- exit Seagate Crystal Reports,
- open the original application,
- change the object,
- return to Seagate Crystal Reports,
- delete the object originally inserted, and
- insert the newly revised object.

All of these steps can be avoided by using Object Linking and Embedding (OLE). OLE allows you to insert objects (OLE objects) into a report from other applications (OLE server applications) and then use those applications from within Seagate Crystal Reports to edit the objects if necessary.

To better understand the program's use of OLE, some terminology may be helpful:

- **OLE**

OLE is an acronym for Object Linking and Embedding. It refers to the ability to create compound reports, that is, reports that contain elements from other applications that can be edited using the original application.

- **OLE Object**

An OLE object is, broadly speaking, a presentation of data that was created in another application and that maintains a relationship with the application that was used to create it. A bitmap created in a paint program, an Excel spreadsheet, or a graph from MS Graph may all be OLE objects if they are inserted in the receiving document as OLE objects. If they are not inserted as OLE objects, they retain no relationship with the originating application.

- **OLE Container Application**

An OLE container application is one that can contain and process OLE objects created in other applications (such as Paint or Excel). Seagate Crystal Reports is a container application.

- **Container Document**

A container document is a document that was created using the container application and that contains an OLE object.

- **OLE Server Application**

An OLE server application is an application that is able to create OLE objects which can then be placed into container documents. Microsoft Word and Excel are examples of applications that are both OLE servers and OLE containers. That is, they can both create new OLE objects and they can contain OLE objects created elsewhere.

- **Server Document**

The server document is a file created in the server application that stores the original OLE object.

- **Linked object**

A linked object contains a presentation of the object and a link to its duplicate in the server document. When you modify the original object in the server document, the links assure that the object in your report is also modified automatically. Conversely, if you modify the object in the container document, the original object in the server document is modified. As a general rule, use linked objects when the data in the server document is changing and you want the object in the container document to be updated when changes occur.

- **Embedded object**

An embedded object contains a presentation of the object, all of the data that pertains to the object, and information about the application used to create it. When you modify the original object in the server document, nothing happens to the embedded object unless you specifically update that object. Likewise, when you modify the embedded object, nothing happens to the original. As a general rule, use embedded objects when you need to edit the object in the container application without affecting the original object.

- **In-place editing**

In-place editing is the ability to change an OLE object's properties from within an OLE container application (such as Seagate Crystal Reports). The container application's menu items change to provide the editing tools from the server application so that you can make changes easily.

- **Static OLE Object**

If a user does not have the server application in which an OLE object was created, still has the option of using the static OLE object that the container application has saved and stored. A static OLE object is a picture of an object that can be displayed and printed, but not edited in place. The static OLE object offers improved online and print performance over a standard bitmap.

When an OLE object is placed in a report, the object becomes part of the report. To edit the object, double-click it and then modify it using the editing tools found in the object's original application or from a similar application that allows in-place editing. Using OLE objects in a report enables you to create robust documents that are easy to maintain.

Inserting OLE objects into reports

There are several methods of inserting OLE objects into an application.

- The PASTE SPECIAL command on the Edit Menu can be used to cut the object from an OLE server application and paste it in a report. If the object can be pasted in multiple formats, you need to decide which format to use. For example, when inserting text from a Microsoft Word document, you can paste the text as Microsoft Word document text (which can be edited in Word), or as a metafile which is simply a non-editable picture of the text. Use the PASTE SPECIAL command to place either embedded or linked objects.
- The OLE OBJECT command on the Insert Menu can be used to import an existing object or create a new one. You can place either embedded or linked objects using this method.
- Finally, you can drag and drop an object from an OLE server application. You do this by opening Seagate Crystal Reports in one window and the OLE server application in another and then dragging the object between the two. However, when an object is dragged into a report, the object is embedded, not linked.

NOTE: When inserting selected information (portions of larger files), it is best to use either the COPY or PASTE SPECIAL commands on the Edit Menu, or drag and drop editing. When inserting entire files, use the OBJECT command on the Insert Menu.

Linked vs. Embedded Objects

Since linked and embedded objects each have different properties, it is important for you to consider the capabilities of each when deciding which OLE format to use.

Linked objects

When a linked object is inserted into a report, Windows copies a snapshot of the data from a file that already exists. Only the image of the object is added to your report. The actual data remains with the original file.

When the object is opened from within a report, the original file is opened inside the application that was used to create it. Any changes you make directly affect the original file also.

If you want the data in an object to remain available to other applications, and always reflect the most current changes to the data, link the object to the report.

NOTE: When you have a linked object and you break the link using the Links dialog box, all connections to the original data in the server document are broken. A linked object in a container application is merely a representation of that object and a link between the object and the server document. When you break the link you're left with only the representation, with no relationship to the original data or to the editing capabilities of the server application. In such a situation, Seagate Crystal Reports turns the object into a picture (a metafile), a stand-alone object that can neither be edited using OLE capabilities nor converted into a modifiable OLE object.

Embedded objects

An embedded object can be created from within Seagate Crystal Reports, or by using a file that already exists. The data, as well as the image of the object, is saved with the report.

To create a new object for a report from scratch, or copy the information from an existing file and edit the data without ever affecting the original file, embed the object in the report.

- If the original object is changed, the embedded object does not change.
- If you edit an embedded object, changes made to the object are stored with the report file; the changes do not affect the original.

Dynamic OLE menu commands

The OBJECT command on the Insert Menu is dynamic; it changes to reflect the properties of the selected object.

The object may be described as a Document object, Bitmap Image object, Picture object, Worksheet object, or something similarly descriptive.

- If the object is embedded, the Insert Menu displays those commands that are available to that type of embedded object.
- If the object is linked, the Insert Menu displays commands for that type of linked object.

Commands on the shortcut menus change in a similar fashion.

These dynamic commands are provided to give you more control when working with OLE objects.

OLE and the Picture command

If the **OBJECT** command on the Insert Menu is used to place pictures in a report, the picture can be treated as either an embedded or a linked object.

However, if the **PICTURE** command on the Insert Menu is used to place pictures in a report, Seagate Crystal Reports converts them into static OLE objects in order to enhance online and printing performance.

Static objects do not support in-place editing. To edit an object in place, it will have to be converted into an editable type of object using the **CONVERT** command on the Edit Menu.

If the **OBJECT** or **PASTE SPECIAL** commands on the Insert Menu are used to insert bitmaps, Seagate Crystal Reports automatically converts them to static OLE objects. However, the program does not convert bitmaps that are stored in databases as BLOB field values. When database bitmap fields are placed in a report, the program displays them as normal bitmaps with no OLE characteristics.

General OLE considerations

There are several points to keep in mind when utilizing OLE functionality.

- When you double-click an embedded OLE object, Seagate Crystal Reports changes its menus and toolbars to those of the object's server application. When you are finished editing, click outside the object and Seagate Crystal Reports toolbars reappear.
- When you double-click a linked OLE object, the program opens the object's server application with the object displayed and ready for editing. You can not edit a linked object in place in Seagate Crystal Reports because you are working on the original object. Since the object could be linked to multiple documents, and since, conceivably more than one person could want to edit it at a given time, displaying the original in the server application limits access to one editor at a time.
- Windows 3.x shipped Microsoft Paintbrush (PBRUSH.EXE) as the native bitmap editor. Windows 95 and Windows 98 ship Microsoft Paint (MSPAINT.EXE) as the new bitmap editor. While Windows

95 and Windows 98 know to register and convert PBRUSH.EXE OLE bitmaps as MSPAINT OLE bitmaps, the opposite is not true. You can open a Windows 3.1 OLE bitmap report in Windows 95 and Windows 98; however, you can not open a Windows 95 and Windows 98 OLE bitmap report in Windows 3.x. Thus, if you are going to be working back and forth between these two operating systems, it is best to create the reports in Windows 3.1 rather than in Windows 95 and Windows 98.

HANDS-ON (OLE Objects)

How OLE objects are represented in a report

An OLE object is displayed in a report in any of several different formats depending on how you choose to insert the object.

- If you have chosen to display the object as an icon, the icon will appear in the report. Using this capability with large bitmaps will speed up report processing. Users can choose to edit the bitmap later by double-clicking the icon.
- If the object was created from an existing file, the data from that file (or an icon) will be displayed in the report. This data can be edited by double-clicking the object or its icon.
- If you are creating a new object, the application for the object type that you chose will open, and you can begin designing the object. When you are finished, close or exit the application. The object (or its icon) will be displayed in the report.

Related Topics

Search for *Insert Object dialog box* in online Help.

How to use OLE - General Overview Tutorial

The easiest way to understand the OLE concepts is to create a sample report that uses static, embedded, and linked objects and compare their differences.

Static OLE object

- 1 To begin, create a report using the sample data, xtreme.mdb. Place any field in the Details section of the report.

- 2 Choose the PICTURE command from the Insert Menu and then choose Xtreme.bmp from the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit). When the object frame appears, place the picture on the far left side of the Report Header section.
- 3 Right-click the picture. When the shortcut menu appears, notice that the picture is identified as an OLE object.
- 4 When you double-click the object, nothing happens. A static OLE object can not be edited in place.

Embedded OLE object

- 1 Choose the OLE OBJECT command from the Insert Menu. The Insert Object dialog box appears.
- 2 Click the *Create From File* option. The dialog box changes, allowing you to either type in an object name or browse.
- 3 Click *Browse* and choose Xtreme.bmp from the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).
- 4 Click *Insert* to return to the Insert Object dialog box.
- 5 Click *OK* to return to the report. An object frame appears.
- 6 Place the object in the Report Header section, just to the right of the first picture.
- 7 Right-click this picture and observe that it is also identified as an OLE Object on the shortcut menu. The second command from the bottom of the shortcut menu identifies it as a Bitmap Image Object. It is an embedded OLE object.
- 8 Double-click the object. Note that you have remained in Seagate Crystal Reports but that all the menus and tools have changed to those found in Microsoft Paint. These tools can be used to edit the bitmap in place. Remember that even though you are working with the tools of the OLE server application, you are not working on the original object; you are working with a copy and nothing you do here will affect the original.
- 9 Click the first object you placed - the static OLE object. Note that when you click the object, the tools and menus change back to those from Seagate Crystal Reports. This confirms that the static object can not be edited in place. It also demonstrates how to stop editing an embedded object; when your editing is finished, simply click outside the object to return to Seagate Crystal Reports.

Linked bitmap image object

- 1 Choose the OLE OBJECT command from the Insert Menu. The Insert Object dialog box appears.

- 2 Click the *Create From File* option. The dialog box changes, allowing you to either type in an object name or browse.
- 3 Click *Browse* and choose Xtreme.bmp from the \CRW16 directory (16-bit), or \Program Files\Seagate Software\Crystal Reports directory (32-bit).
- 4 Click *Insert* to return to the Insert Object dialog box.
- 5 This time, toggle the *Link* check box on.
- 6 Click *OK* to return to the report. An object frame appears.
- 7 Place this object just to the right of the embedded object.
- 8 Right-click this object and observe that this object is identified as an OLE object. The second command from the bottom of the shortcut menu identifies this as a Linked Bitmap Image Object.
- 9 Double-click the object. Microsoft Paint opens, displaying the original version of the object. Any changes you make to the original will be reflected in the object that appears in your report.
- 10 Close Microsoft Paint and return to your report.

Converting a static OLE object to a linked bitmap image object



Dragging and dropping OLE objects

- 1 Right-click the first object you placed -- the static OLE object.
- 2 When the shortcut menu appears, choose CONVERT PICTURE OBJECT. The Convert dialog box appears.
- 3 Select Paintbrush Picture from the *Object Type* list, and click *OK*. You have just converted a static OLE object to a modifiable OLE object.
- 4 Right-click the object you have just converted. The second command from the bottom of the shortcut menu is now BITMAP IMAGE OBJECT, the same command that appeared for the first object you linked.
- 5 Now double-click the object. Microsoft Paint opens, just as it did for the linked bitmap image object.
- 6 Click the SAVE button on the standard toolbar and save the report as OLE.RPT.

One more procedure needs to be demonstrated: dragging an object from a server application and dropping it in Seagate Crystal Reports. For this tutorial, you will work with a spreadsheet object instead of a graphic object.

NOTE: This procedure assumes that you have Microsoft Excel on your computer or another spreadsheet program that is an OLE server application.

- 1 Open both Seagate Crystal Reports and Microsoft Excel and size the program windows so that they both are visible at the same time. You will need to be able to see both the object's origin and its destination.
- 2 In Seagate Crystal Reports, open OLE.RPT if it's not already open.
- 3 Create a simple spreadsheet in Microsoft Excel by typing the numbers one through ten (1-10) in cells A1 through A10.
- 4 Highlight cells A1 through A10.
- 5 Move the cursor to the left edge of the highlighted cells until you get an arrow pointer.
- 6 Press the mouse button and hold it down. This activates the cells to be moved. Since you're only going to copy the cells, press the Control key and hold it down too.
- 7 Now drag the cells into the Details section of the report in Seagate Crystal Reports and, when you have the cells positioned, release the mouse button and Control key. That's all there is to it. You have just dragged an OLE object into your report.
- 8 Save the file you created in Excel and close the application.
- 9 Right-click the spreadsheet object in the report. When the shortcut menu appears, observe that it is identified as an OLE object and that the second command from the last identifies it as a Worksheet Object.
- 10 Double-click the spreadsheet object. The menus and tools change to those from the OLE server application. You can now edit the object in place. The object is an embedded object. Any changes you make to the object will not affect the original.
- 11 Click outside the object when you are finished. The menus and tools change back to those from Seagate Crystal Reports.

Now that you have a working understanding of OLE, you can use these capabilities within Seagate Crystal Reports to make your work more efficient.

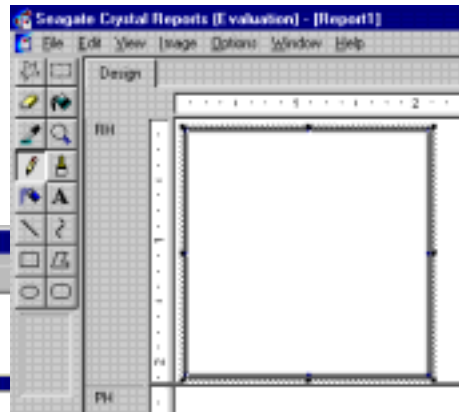
How to insert a graphic/picture as an OLE object

You can add already existing graphics/pictures to your reports as OLE objects or you can create new graphics/pictures from scratch.

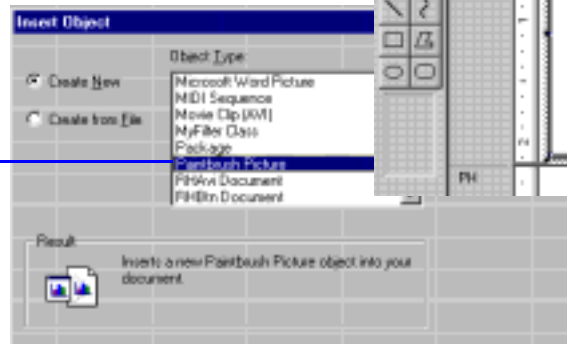
- 1 Choose the OLE OBJECT command from the Insert Menu. The Insert Object dialog box appears. You have two options when it comes to OLE objects. You can:
 - insert an existing object, or
 - create a new object in Seagate Crystal Reports, using in-place editing.

When you choose the Create New option...

...The associated program takes control of Seagate Crystal Reports, allowing you to create the object in place.

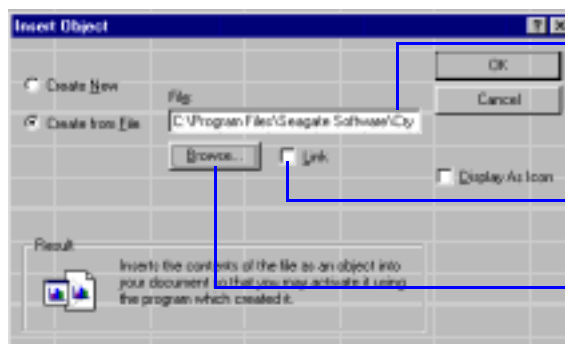


- 2 Select the Object Type you want to create.



- 3 When finished, click anywhere on the report to exit the graphic program.

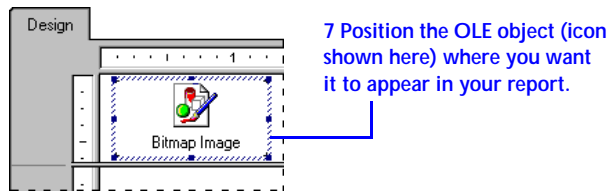
A frame approximating the size of the object (or icon) appears.



- 4 Type in the full path of the object you want to insert.

- 5 Toggle this option on to have the object automatically updated.

- 6 If you do not know the path, click the Browse button to locate the object.



20

Subreports

What you will find in this chapter...

What are subreports?, Page 416

Unlinked vs. linked subreports, Page 416

How subreport linking works, Page 417

Database links vs. subreports in one-to-many situations, Page 418

HANDS-ON (Subreports), Page 419

What are subreports?

A subreport is a report within a report. The process for creating a subreport is similar to the process of creating a regular report. A subreport can have most of the characteristics of a report, including its own record selection criteria. The only differences between a subreport and a primary report are that a subreport:

- is inserted as an object in a primary report; it can not stand on its own (although a subreport can be saved as a primary report),
- can be placed in any report section and the entire subreport will print in that section, and
- can not itself contain a subreport.

There are four instances in which a subreport would typically be used:

1. To combine unrelated reports into a single report. See *How to combine unrelated reports by using subreports*, Page 425.
2. To coordinate data that can not otherwise be linked. See *How to use subreports with unlinkable data*, Page 427.
3. To present different views of the same data within a single report. See *How to show different views of the same data in one report*, Page 431.
4. To perform one-to-many lookups from a field that is not indexed on the lookup field. See *ONE-TO-MANY RELATIONSHIPS*, Page 515.

Unlinked vs. linked subreports

Unlinked

Unlinked subreports are freestanding; their data is not in any way coordinated with the data of the primary report.

In unlinked subreports, there is no attempt to match up the records in one report with the records in the other. An unlinked subreport does not have to use the same data as the primary report; it can use the same data source or a different data source entirely. In addition, the subreport is not limited to reporting on a single table. An unlinked subreport can be based on a single table or on multiple tables. Regardless of the underlying data sources, the reports are treated as unrelated.

Linked

Linked subreports are just the opposite; their data is coordinated. The program matches up the records in the subreport with the records in the primary report. If you create a primary report with customer information and a subreport with order information and link them, the program

creates a subreport for each customer and includes in that subreport all the orders for that customer.

For more information on linking, search for *Visual Linking Topics Index* in Seagate Crystal Reports online Help.

How subreport linking works

When you link a subreport to a primary report, the program creates the link by using a parameter field. See *Parameter Fields*, Page 351.

Note: *When an existing report with saved data is added as a linked subreport, the data is refreshed from the database. Unlinked subreports can preserve the saved data.*

When a subreport link field is selected, the program creates:

- a parameter field in the subreport which is then used to retrieve values passed to it by the primary report, and
- a record selection formula for the subreport using the parameter field.
 - the selection formula limits the subreport to those records in which the link field is equal to the parameter field value.

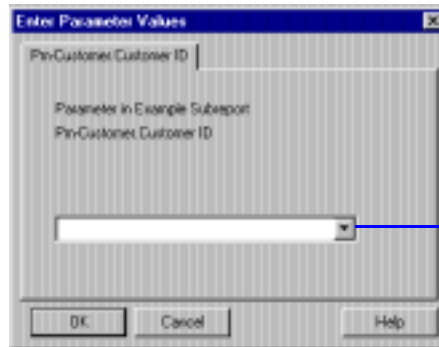
When the report is run, the program finds the first primary field record it needs and passes the value in the link field to the parameter field in the subreport. The program then creates the subreport with record selection based on the parameter field value. Here is an example:

- You create a report that shows customer data and a subreport that shows order data and then you link the two reports using the Customer ID field.
- When you run the report, the program finds the first customer record it needs and passes the Customer ID value from that record to the subreport parameter field.
- The program runs the Orders subreport. Since the subreport selection formula selects only those records in which the Customer ID value is equal to the parameter field value, and since that parameter field value is equal to the Customer ID in the first record in the primary report, the subreport contains only those records that have the same customer ID. Namely, those records that are orders for the first customer.

- When the subreport is finished, the program locates the second record it needs in the primary report, prints the customer data, and then passes this customer's ID number to the parameter field.
- The program then runs a subreport including only those order records for the second customer.
- The process continues until the report is finished.
- All of this parameter field manipulation takes place behind the scenes. You simply pick the fields that will link the primary report with the subreport and the program does the rest. The values are passed without the parameter field prompting you for a value.



NOTE: If you have a linked subreport and you click the **PRINT PREVIEW** button on the standard toolbar (from the **Subreport Design Tab**), then the program runs the subreport on its own, without waiting to receive a parameter field value from the primary report and without evaluating the tab text formula. In this case, the program displays the **Enter Parameter Values for Subreport** dialog box and prompts you for a value.



The value entered here is the value the program uses to run the subreport.

Database links vs. subreports in one-to-many situations

When two tables in a report have a one-to-many relationship, the program retrieves the data in different ways depending on:

- the data source,
- the index situation,
- the record selection criteria, and
- whether you are creating a single report based on linked tables or a primary report that contains a subreport.

When you are considering whether to use a subreport or linked tables, you need to understand the ramifications of each. These issues are discussed fully in *Performance considerations in one-to-many links*, Page 515.

As a general rule, if you have:

- indexed tables,
- linked indexed fields, and
- range limiting record selection criteria based on the indexed fields,

the program needs to read the same number of records whether you are linking tables in a single report or using subreports. Since each subreport is run as a separate report, linked tables may have a performance advantage. See *Indexed tables*, Page 511.

HANDS-ON (Subreports)

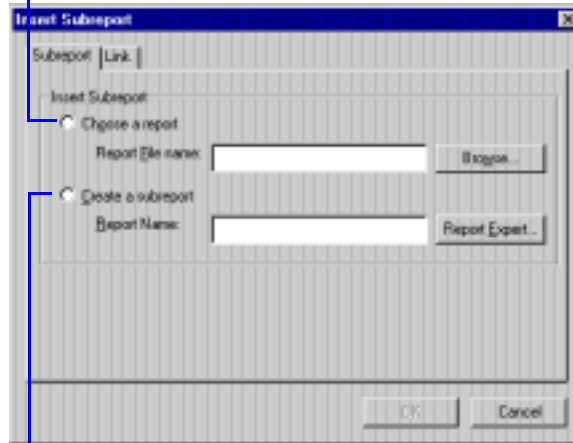
How to insert a subreport, Page 419, and *How to link a subreport to the data in the primary report*, Page 421, explain in detail how to perform the two basic subreporting tasks. You need to perform one or both of these tasks each time you set up a subreport. The other tutorials in this chapter will address more specific issues (i.e., how to create certain types of reports using subreports). In these later tutorials, instructions involving basic procedures will be conveyed in very general terms (i.e., "create a subreport," "link these two fields," etc.). To study these basic procedures in greater detail, refer back to the first two topics.

How to insert a subreport



- 1 Click the SUBREPORT button on the supplementary toolbar. The Insert Subreport dialog box appears.

2 To choose an existing subreport, click this option button and type the subreport name into the text box. If you do not know the name, click the Browse button and locate it in the dialog box that appears, or...



...to create a new subreport, click this option button and type a name into the text box. If you need assistance in creating the subreport, click the Report Expert button.

3 Click OK. The program displays an object frame.



4 Move this frame to the desired position in the report and click once to place it.

- If you imported the subreport, the program creates a Subreport Design Tab, which is labeled with the subreport name.
 - If you do not want to edit the report, then you are finished.
 - To edit the report, click the Subreport Design Tab and then make your modifications.
- If you are creating a new subreport, the program creates a Subreport Design Tab labeled with the subreport name.
 - To edit the subreport further, after exiting the Expert, click the Subreport Design Tab and finish modifying the subreport as you would with any other report.
 - If you do not want to edit the report, then you are finished.

For information about creating a custom caption for the Subreport Preview Tab, see *How to add captions to subreports*, Page 430.

Click the Preview Tab to
see the parent report.

Click the Example Subreport
Preview Tab to see the subreport.



How to preview a subreport

There may be times when you want to preview a subreport on its own instead of previewing it as a part of the main report. For example, you may want to preview the subreport in order to view and analyze the data for a particular set of parameter values. While most Windows report designers do not allow you to preview subreports separately, Seagate Crystal Reports makes it easy.



- 1 Click the Design Tab corresponding to the subreport of interest.
- 2 Click the PRINT PREVIEW button on the standard toolbar.

The program displays a preview of the selected subreport.

How to link a subreport to the data in the primary report

Frequently, the data in a subreport supplements the data in the primary report. You might, for example, have customer data in a primary report and then use subreports to show the orders for each customer.

Primary Report Data		Linked Subreport Data
Bike-O-Rama Corporation 7464 St. Georges Way Sterling Heights, MI 48358	12/2/94	\$41.90
	12/8/94	\$3,520.30
	1/6/95	\$62.33
	2/16/95	\$6,682.97
	6/14/95	\$0.00
	9/1/95	\$4,078.95
	2/2/96	\$931.05
The Peddallers Inc. 410 Eighth Avenue DeKalb, IL 60148	12/11/94	\$764.85
	12/24/94	\$42.00
	1/30/95	\$3,884.25
	3/1/95	\$1,515.35
	4/9/96	\$5,549.40

In such cases, you will need to coordinate the data in the primary report with the data in the subreport so that the orders in each subreport match up with the correct customer.

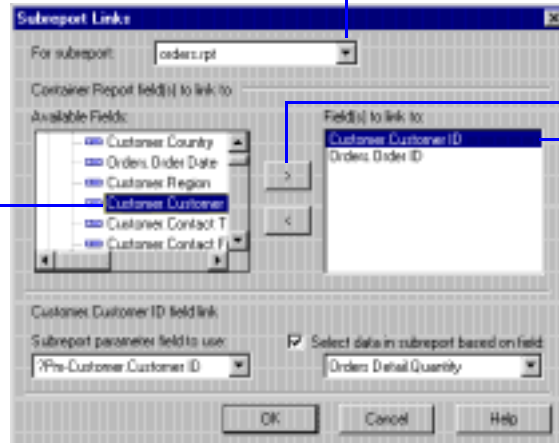
To do this, you need to specify a field that is common to both the subreport and the primary report. With the Subreport Links dialog box, you create a link between the two common fields. Seagate Crystal Reports uses the link to match up records from the primary report to those in the subreport. The link makes certain that the "orders" data in the subreport sits on the same row as the corresponding "customer" data in the primary report. You can navigate to the Subreport Links dialog box in two ways:

1. Whether you are importing a report as a subreport or creating a subreport from scratch, click the *Subreport Link* button in the Insert Subreport dialog box. Then, you can build or import the subreport and link it to the primary report with one process.
2. If you have already placed a subreport in the primary report, but did not create a link at setup, you can navigate to the Subreport Links dialog box by choosing the SUBREPORT LINKS command on the Edit Menu.

From within the Subreport Links dialog box, follow these steps:

1 Choose the subreport that you want to link from this drop-down list (if it is not already selected).

2 Select the field you want used as a link field in the primary report from this list box.



3 Click the > (arrow) button.

The field is added to this list box, and is now selected as the link field.

- 4 Repeat steps 2 and 3 for each additional link, as desired.
- 5 Use the *Field link* section (which will only appear if you have selected a link field) to set up the link for each link field:
 - select the field you want linked to the primary report from the *Subreport parameter field to use* drop-down list, and
 - toggle the *Select data based on field* check box on and select a field from the adjacent drop-down list if you want to organize the subreport data based on a specific field (this is the quick equivalent of using the Select Expert). If nothing is specified here, the subreport will adopt the organization of the primary report.
- 6 Click OK.

When you run the report, the program will coordinate the data in the primary report with the data in the subreport.

NOTE: The field type of the Containing Report field determines which subreport fields are visible. Because Seagate Crystal Reports reads dates as either strings, Dates, or Date-Time fields, you must make sure your subreport parameter field type matches the field type set up in Report Options in the main report for the field you want linked.

How to link a subreport to the main report without modifying the selection formula

At times, you may wish to use a linked parameter field in a subreport without using it as part of the selection formula for the subreport. For instance, you may want the main report to pass in a summary value that can be used in calculations by the subreport, or you may want the main report to pass in the title of the subreport.

You can accomplish these tasks using Seagate Crystal Reports, but first it is important to understand how the program handles subreport linking.

Seagate Crystal Reports uses a parameter field mechanism for linking subreports to main reports.

When linking a main report field that is not a parameter field to a subreport field, the program:

- automatically creates a parameter field to complete the link, and
- modifies the subreport record selection formula to select those records in which the subreport field is equal to the parameter field value.

The need for a parameter field is implied; it is called an “Implicit Link” situation.

When you link a field in the main report to a parameter field that you have created in the subreport, the Visual Linking Expert:

- checks the link you have specified,
- does not create any additional parameter fields, and
- does not modify the subreport record selection formula.

Specifying a link is called an “Explicit Link” situation.

For example, if you want to link a subreport to the main report but do not want to modify the selection formula, you must use an Explicit link. To do this:

- 1 Create a parameter field in the subreport.
- 2 Link a field in the main report to that parameter field using the Visual Linking Expert.

How to combine unrelated reports by using subreports

At times, you may wish to combine unrelated reports into a single report. For example, you may want to create a single report that presents:

- sales grouped by sales representative, and
- sales grouped by item.

While both reports deal with sales data, there is no real linear relationship between the reports.

NOTE: This sample report has been designed to illustrate concepts only, and not the actual look of your finished report.

Sales Summaries		
Employee Sales	Employee Name	Employee Sales
	Nancy Davolio	\$58,872.03
	Andrew Fuller	\$24,972.18
	Janet Leverling	\$71,245.08
	Margaret Peacock	\$89,799.32
Product Sales	Product Name	Product Sales
	Lycra Gloves	\$242,362.87
	Craze Mtn Lock	\$44,305.17
	Craze Adult Helmet	\$249,127.99
	Micro Nicros	\$63,682.39
	Rapel	\$441,033.88
	Slick Rock	\$423,605.05

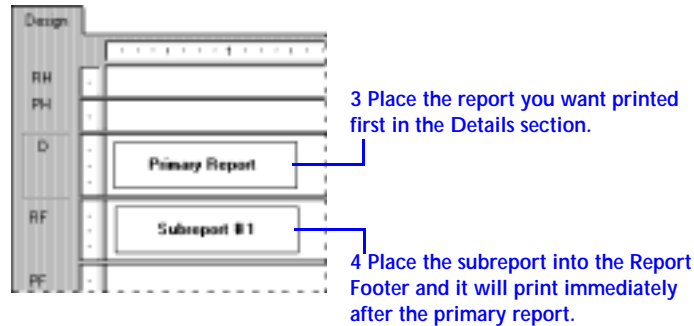
Subreports can be used to combine unrelated reports into a single report like this. While the reports could be based on the same data set, they do not have to be. They could each be based on entirely different data sets.

Each of these reports is freestanding; the data in any of the reports is not linked in any way to data in another report. This is the easiest of the subreport options to work with.

FOR TWO UNRELATED REPORTS

To create a report that consists of two unrelated reports:

- 1 Create the report you want printed first as the primary report.
- 2 Import an existing report for use as a subreport or create a new subreport.

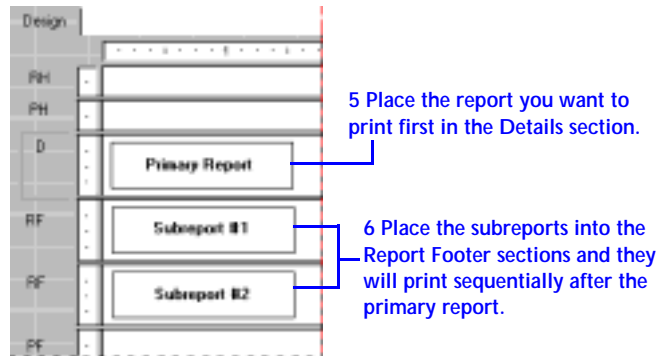


FOR THREE OR MORE UNRELATED REPORTS

To create a report that consists of three or more unrelated reports:

- 1 Create the report you want printed first as the primary report.
- 2 Import or create each of the other reports you want to use as subreports.
- 3 Use the Section Expert to insert enough Report Footer sections to match the number of subreports that you are using. For example, if you want to use three subreports, insert two new Report Footer sections so that you have a total of three Report Footer sections.
- 4 Place in Report Footer A the subreport you want printed immediately after the primary report, in Report Footer B the subreport you want printed next, and so forth. The primary report will print first and then the subreports in the order that you placed them in the report.

NOTE: Subreports can be placed side-by-side in the same Report Footer section. They will print next to each other at the end of the report.



Related Topics

Area printing characteristics, Page 59

How to add, delete, move, and merge sections, Page 79

How to use subreports with unlinkable data

Tables can be linked in a report as long as the following criteria are met:

- the link fields are both database fields,
- the link fields contain similar data,
- the link fields are the same length, and
- the link field in the *link to* (lookup) table is indexed (PC databases only).

Linking tables is rarely a problem. However, there are some circumstances in which you can not coordinate data from different tables because the data does not meet the linking criteria.

For example:

- linking to or from a formula field, or
- linking two unindexed tables,

can not be done in a single report. Subreports must be used.

Linking to/from a formula field

There are situations in which you may need to link to or from a formula (calculated) field. For example, an employee ID could be an 11 character value that consists of a two-character department code followed by the employee's nine-character Social Security Number (for example,

HR555347487). The formula language makes it easy to extract the Social Security Number from this field:

```
{employee.EMPLOYEE ID} [-9 to -1]
```

OR

```
{employee.EMPLOYEE ID} [3 to 12]
```

For the value HR555347487, either formula would return the value 555347487.

While the return value is a valid Social Security Number, the fact that it comes from a formula prevents you from using the field to link to a Social Security Number field in another table. You can report on and coordinate the values in the two tables, however, by using a subreport. Search for *Subscript* in Seagate Crystal Reports online Help.

LINKING TO A FORMULA FIELD

- 1 Create the primary report using a table that includes the Social Security Number field (for this example, {file.SSN}).
- 2 Create (or import) a subreport using the formula that extracts the Social Security Number from the Employee ID field (for this example, {@EXTRACT}). See *How to insert a subreport, Page 419*.
- 3 Place the subreport where you want it to appear in the primary report.
- 4 Link the subreport to the primary report by linking the Social Security Number field in the primary report ({file.SSN}) to the formula that extracts the number in the subreport ({@EXTRACT}). See *How to link a subreport to the data in the primary report, Page 421*.

LINKING FROM A FORMULA FIELD

- 1 Create the primary report using the formula that extracts the Social Security Number from the Employee ID field (for this example, {@EXTRACT}).
- 2 Create (or import) a subreport using a table that includes the Social Security Number field (for this example, {file.SSN}). See *How to insert a subreport, Page 419*.
- 3 Place the subreport where you want it to appear in the primary report.
- 4 Link the subreport to the primary report by linking the formula that extracts the Social Security Number in the primary report ({@EXTRACT}) to the Social Security Number field in the subreport ({file.SSN}). See *How to link a subreport to the data in the primary report, Page 421*.

Linking unindexed tables

When using PC databases (not SQL or ODBC), the link field in the lookup database needs to be indexed in order to create a valid link. You can not link the tables in a single report when two tables contain related data yet neither is indexed on the field which you want to use as a link field, or when the primary table is indexed but the lookup table is not. You must use subreports if you want to coordinate the data in both tables.

NOTE: It is important to note that linking unindexed tables or linking from an indexed primary table to an unindexed lookup table may cause inefficient reporting. If your data set is large, this kind of report will take considerable time to run. Use this technique only if you do not have other options.

- 1 Create the primary report.
- 2 Create (or import) the subreport and insert it into the primary report. See *How to insert a subreport, Page 419*.
- 3 Use the unindexed fields (or the indexed field in the primary table and the unindexed field in the lookup table) to link the subreport to the primary report. See *How to link a subreport to the data in the primary report, Page 421*.

How to create an on-demand subreport

Seagate Crystal Reports now allows you to create on-demand subreports. In the Preview Tab, an on-demand subreport is represented by an object frame, which is much easier to manage than the bulk of an entire subreport. Furthermore, the actual data is not read from the database until the user drills down on the frame. This way only data for on-demand subreports that are actually viewed will be retrieved from the database.

NOTE: Data for an on-demand subreport is not saved unless the subreport is actually open in a preview window.

On-demand subreports can be especially useful if you want to create a report that contains multiple subreports. In this case, you can choose to have these subreports appear only as object frames. This makes the subreports much more manageable.

Best of all, the process of creating an on-demand subreport is easy and fast. Simply place an ordinary subreport in your primary report, and then complete the following three steps:

- 1 Click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears.

- 2 With the Subreport Tab active, toggle the *On-demand subreport* check box on.
- 3 Click OK.

The program does all the work for you.

For information about adding a caption to your on-demand subreport, see *How to add captions to subreports, Page 430*.

How to add captions to subreports

To further organize a report, captions can be created for the Subreport Preview Tab and for the placeholder frame of an on-demand subreport. This allows you to quickly organize reports in a concise and visually manageable form. Note that placeholder frame captions only apply to on-demand subreports, while tab text captions apply to both on-demand subreports and regular subreports. Since the data from a regular subreport is in place and visible on the Preview Tab, rather than on-demand and represented by a placeholder object frame, there is no need for a frame caption when you format a regular subreport.

NOTE: *A tab text caption replaces the subreport file name caption on the Subreport Preview Tab.*

Captions are written by using formulas. Both placeholder frame captions and Subreport Preview Tab captions can include field names from the main report. To add a caption:

- 1 Select the subreport and click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears.
- 2 Click the Subreport Tab.
- 3 You can enter either an on-demand subreport caption or a tab text caption by clicking the appropriate *Formula* button and opening the Format Formula Editor.
- 4 Enter your formula in the *Formula text* box. For example:

```
"More Information About " + {Customer.Customer  
Name }
```

Using the xtreme.mdb sample database, this formula would give you a caption like "More Information About Pathfinders" or "More Information About Rockshocks for Jocks".

- 5 Click CHECK to check the formula for errors. If the program finds an error, it will prompt you with a message box detailing the nature of the error.

- 6 After fixing any errors, click the SAVE AND CLOSE button. The program returns you to the Format Editor.
- 7 Click OK to return to the report.

NOTE: A tab text formula is only evaluated when you drill-down on a subreport. If you preview a subreport separately from the primary report, the formula will not be evaluated.

NOTE: Again, frame captions apply only to on-demand subreports, while tab captions apply to both on-demand subreports and regular subreports. For more information about on-demand subreports, see How to create an on-demand subreport, Page 429.

How to show different views of the same data in one report

Subreports can be used to provide a different view of the data in the primary report. For example, assume you want to show summary values at the top of a report and details at the bottom, like this:

NOTE: This sample report has been designed to illustrate concepts only and not the actual look of your finished report.

Sales by Year		
1995 Summary		Total Orders
Last Quarter 1994		\$161,261.31
1st Quarter 1995		\$566,532.69
2nd Quarter 1995		\$571,829.90
3rd Quarter1995		\$639,669.34
Details		
Region	Order Date	Order Amount
ID	12/30/94	\$6,539.40
CA	12/31/94	\$4,709.50
MN	12/31/94	\$7,764.90
Subtotal for Quarter		\$19,013.80
IA	1/1/95	\$1,025.40

This can be done in a variety of ways. The two easiest methods are:

1. By creating the summary report as the primary report and the details report as the subreport. In this method, the details subreport would be placed in the Report Footer section.
2. By creating the details report as the primary report and the summary report as the subreport. In this method, the summary report would be placed in the Report Header section.

Use the appropriate link fields to link the report and coordinate the data.

How to save a subreport as a primary report

You may find it advantageous to save a subreport as a primary report for the sake of distributing the information to a variety of audiences. For example, the primary report containing the subreport may be relevant for a stockholders meeting at the end of the fiscal year; however, the data contained in the subreport may be relevant for everyday use by your managers. In such cases, it is easy to save a subreport as a primary report.

- 1 In the Design Tab, right-click the subreport and choose Save Subreport As from the shortcut menu. The Save As dialog box appears.
- 2 Choose the appropriate directory from the list box.
- 3 Type a new name for the subreport.
- 4 Click Save.

The program saves the subreport as a primary report so that you can open it separately when necessary.

What You Will Find...

How to use the Document Import Tool, Page 435

How to set report font size, Page 441

How to define custom colors, Page 441

How to specify a custom formula, Page 442

The Document Import Tool



Seagate Crystal Reports offers a powerful reporting functionality in the Document Import Tool. With this specialized reporting tool, you can easily convert a plain ASCII text report to Seagate Crystal Reports.

This new tool lets you:

- convert old text reports,
- remap the fields to the original database, and then
- generate the text report whenever you want, from within Seagate Crystal Reports.

The Document Import Tool extends your reporting capabilities by allowing you to use Seagate Crystal Reports functionality in *all* your reports.

NOTE: *The Document Import Tool does not convert cross-tabs.*

Why use this Tool?

To give you an example of the uses of this tool, suppose that you created a plain text report in Microsoft Word, and now you want to modify the report using Seagate Crystal Reports functionality. If you save the Word document as an ASCII text file, you can open that file in the Document Import Tool and generate a Seagate Crystal Reports based on that file. You can then use all the familiar formatting abilities of Seagate Crystal Reports to modify the report, adapting it to better suit your needs.

Using the Document Import Tool

To convert an ASCII text report to a Seagate Crystal Reports, you must specify the correlations between the sections and objects in the ASCII report and the sections and objects in Seagate Crystal Reports. You can accomplish this by highlighting various sections and objects in the ASCII report with a colored, resizable frame. These frames represent report headers and footers, page headers and footers, details sections, etc. Highlight only:

- the first instance of each header,
- the last instance of each footer, and
- the first instance of the Details section.

You can highlight sections by using the Sections Menu or by using the button toolbar displayed to the right of the ASCII text report. A set of text boxes are displayed below the toolbar, allowing you to set the properties for each highlighted section.

NOTE: *When highlighting fields, make certain your highlighting frames are at least as large as the maximum size of the field. That way, values*

appearing in the field will not be truncated when the report is converted. For example, if the first record in the field contains the name "Bob," but a record occurring later contains the name "Cynthia," then you must highlight at least seven characters or spaces for that field.

NOTE: The Document Import Tool comes with two sample text reports and two conversion interfaces files. For information on .cif files, see *Generating the Report*, Page 439. The text reports are *Import1.txt* and *Import2.txt*, in the *C:\Program Files\Seagate Software\Crystal Reports\reports\Import directory(32-bit)*, or in the directory in which the program resides. You can refer to these reports for examples of successful conversion.

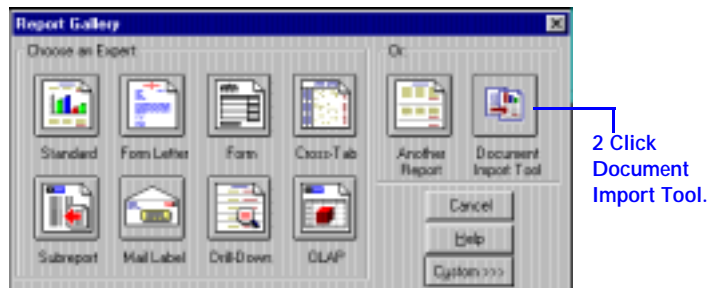
NOTE: You can delete a highlighting frame by selecting the frame and pressing the Delete key, or by right-clicking the frame and choosing Delete from the shortcut menu.

HANDS-ON (Document Import Tool)

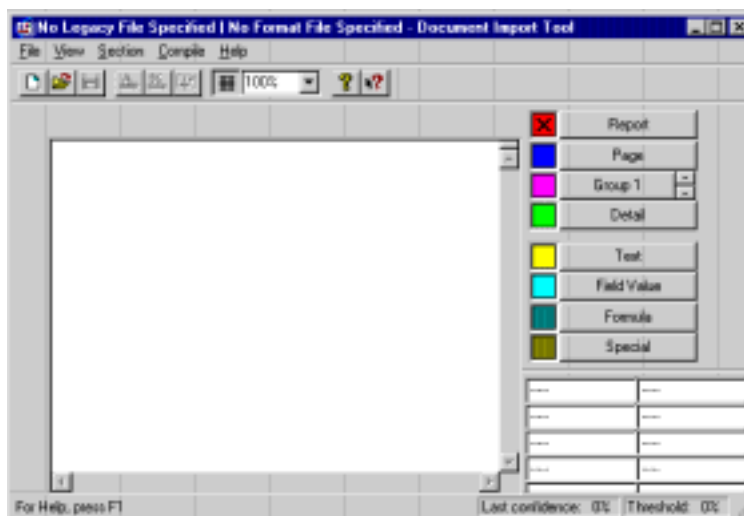
How to use the Document Import Tool



- 1 Click the NEW button on the standard toolbar. The Report Gallery appears.



The Document Import Tool appears.



- 3 To convert an ASCII report, choose the NEW command from the File Menu.

The New dialog box appears.



- 4 Enter the name of the ASCII report you are converting in the *Legacy File* text box, or click *Browse* to search for an ASCII report in the Open dialog box.
- 5 Click *OK* when finished. The selected ASCII report appears in the Document Import Tool.

NOTE: If you have already formatted an ASCII report, you can click the OPEN button on the standard toolbar and enter the name of the ASCII report legacy file and the .cif file in the Open dialog box. You must supply both files. Click OK, and the selected ASCII report appears as previously formatted in the Document Import Tool.

CONVERTING AN ASCII TEXT REPORT

For information about the various sections of a Seagate Crystal Reports, see *Design Tab Areas*, Page 57.

Report

- 1 Click the REPORT button to highlight the report header and footer, if applicable. Click the row of data you want designated as the report header. A resizable frame appears; adjust the frame as needed. Then repeat the process to designate a report footer. You can determine that something is a report header or footer if it only appears once, at either the start or the end of the report.

Page

- 2 Click the PAGE button to highlight the first instance of the page header and footer, if applicable. Designate the page header and footer just as you would designate a report header and footer. You can determine that something is a page header or footer if it appears at either the top or the bottom of every page in the report.

Group 1

- 3 Click the GROUP 1 button to highlight the first instance of the group header and the *last* instance of the group footer. For the next group level, increment the group number by clicking the up arrow button (to the right of the Group button). The *Group 1* button becomes the GROUP 2 button. Define the new group, and then repeat the process for all remaining groups. Be careful not to highlight more than one instance of the same group level.

NOTE: For each group, set the *Group by property* to one of the fields in the report. This field will work like the *Group by field* in Seagate Crystal Reports.

NOTE: Both the header and the footer of a group need not be present in a report. If a report only has a group header and not the associated group footer, then it is not necessary to define the group footer in the Document Import Tool. The generated report, in this case, will have the group footer suppressed and the end result will look like the original text report.

Detail

- 4 Click the DETAIL button to highlight the first instance of the Detail section.

NOTE: All headers (Report Header, Page Header, Group Headers) should appear before the Detail section. All footers should appear after the Detail section.

Text

- 5 Click the TEXT button to highlight the text instances (which will become text objects) occurring in the previously highlighted sections. Then set the properties for the text objects in the field information text boxes.

NOTE: You must set all the properties for all the text objects in order for the report to generate properly.

Field Value

- 6 Click the FIELD VALUE button to highlight the database field instances occurring in the previously highlighted sections. Make certain each field highlighting frame is large enough to contain the

maximum number of characters that can appear in that field. Then set the properties for the field values in the field information text boxes (you may need to resize the window in order to see all the text boxes):

- Set the field data type.
- Set the field name to the name from the text file's original database.
- Set the default value, if other than NULL (for example, some reports display null date field values as XXX-00-0000).
- If you want the field suppressed when duplicated (a displayed field value is identical to the previous displayed field value), then set the *Suppress if Same* parameter in the field information to Yes.

NOTE: You must set all the properties for all the fields in order for the report to generate properly.

NOTE: The Document Import Tool sorts the data in ascending order, by default.

Formula

- 7 Click the FORMULA button to highlight the formula instances occurring in the previously highlighted sections.
 - If the field is a summary field, set the field name to the name of the database field on which the summary is based.
 - Set the summary type (use the Type drop-down list). If the field is a custom formula, set the type to Custom. For information about specifying custom formulas, see *How to specify a custom formula*, Page 442.

NOTE: You must set all the properties for each formula in order for the report to generate properly.

Special

- 8 Click the SPECIAL button to highlight the special field instances occurring in the previously highlighted sections. Set the field type in the field information text boxes.

NOTE: You must set all the properties for each special field in order for the report to generate properly.

Setting the Confidence Threshold

When the Document Import Tool converts a report, it uses a confidence percentage (C). If fewer than C percent of the fields are located correctly, the conversion will fail. You can change the confidence threshold from the Compile Menu.

- 1 Choose SET CONFIDENCE from the Compile Menu, or click the SET CONFIDENCE button on the standard toolbar. The Confidence dialog box appears.

- 2 Set the confidence threshold in the *Confidence Threshold* text box. The default threshold is 80%.
- 3 Click *OK*.

The confidence percentage (if changed) is displayed on the status bar. When you generate the report, the system will apply the specified confidence threshold.

Generating the Report

When a converted text report is generated for the first time, the program generates a conversion interface file (.cif extension), which saves your highlighting and formatting specifications, and an Access.mdb database that contains the data from the text report's original database.

When you highlight a section or an object in the Document Import Tool and set properties for database fields, these settings are saved in the .cif file. You can use the .cif file to convert ASCII text reports that have a similar format, without having to do any additional highlighting. Also, if you need to generate a certain text report daily, you can convert that report automatically every day, without highlighting anything, because your format specifications are already saved in the .cif file.

The database, meanwhile, stores the original data from the text report. The database does not store formulas, text objects, etc., only database fields. The Document Import Tool then uses this database to create the report.

Furthermore, if the field names you specified for the report are the same as the names specified in the text report's original database, you can remap the fields in the generated report to the original database. If you remap the fields in this way, you will no longer require the ASCII text report. You will be able to generate your reports directly from within Seagate Crystal Reports, without having to use the Document Import Tool.

Finally, when the report is generated, the program uses repetition in the structure of the report to match any lines that are not highlighted. This is possible because any given section can be followed by certain other sections. For example, a Details section can only be followed by another Details section, a Group Footer 1, or a Page Footer.

This situation has the following ramifications:

- The same .cif file may be used to convert any other instance of the same report.
- Because the report will always contain the same basic structure, you only have to highlight the first instance of headers, and the last instance of footers.

- The Document Import Tool will not be able to convert text reports that do not match the basic nested structure of Seagate Crystal Reports. For example, the Document Import Tool can not import a cross-tab-like text report because a cross-tab report does not follow the structural pattern of the sections in Seagate Crystal Reports.
- If a section is matched incorrectly in the Document Import Tool, the report will not be generated correctly. For example, suppose you highlight a Details section. Then you look at the next section and assume that it is another Details section (when, in reality, it is a Group Footer). In this case, the Group Footer will not be specified correctly, and the group may not appear on the generated report.

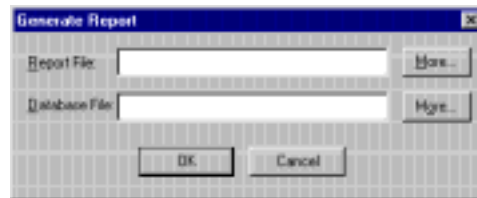
When generating the report the Document Import Tool creates a log file which can be used to view the results of the failed report generation. Check this log file to determine the cause of the first error in the log file. Often, if you fix this problem the other problems will disappear. If you're still having problems converting a report, check to see whether the sections are highlighted correctly. Make certain you verify that all the text objects have been highlighted as text objects, and not as string fields.

To generate the report:



- 1 Choose GENERATE REPORT from the Compile Menu, or click the GENERATE REPORT LOCALLY button on the standard toolbar.

The Generate Report dialog box appears.



- 2 Enter a report name for the converted report in the *Report File* text box. To specify a file path and additional options, click *More* to open the File Option dialog box.
- 3 Enter a database name in the *Database File* text box (for the database that will be generated when the report is generated). To specify a file path and additional options, click *More* to open the File Option dialog box.
- 4 Click *OK*. The program generates the report as specified.

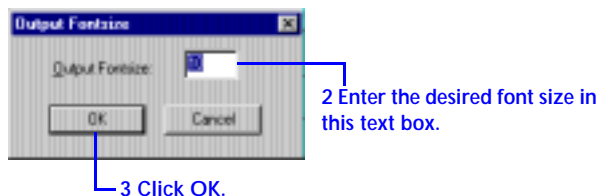
How to set report font size

Before compiling, you can specify the report font size as follows:



- 1 Choose OUTPUT FONTSIZE from the Compile Menu, or click the SET REPORT FONTSIZE button on the standard toolbar.

The Output Fontsize dialog box appears.



When the report is generated, the field values will appear in the specified fontsize.

How to define custom colors

For more comfortable ASCII report conversion, the Document Import Tool allows you to:

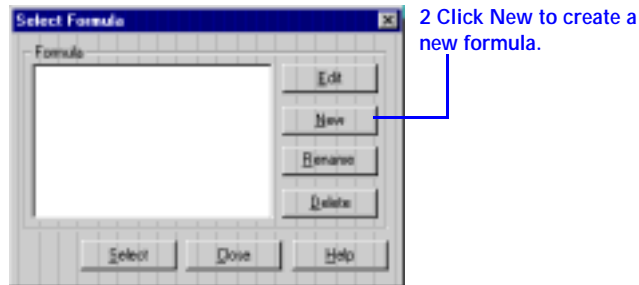
- select highlighting colors other than the default colors, and
 - define custom highlighting colors.
- 1 Choose the command corresponding to the section of interest from the View | Colors Menu, or right-click a color button and choose COLOR from the shortcut menu.
The Color dialog box appears.
 - 2 To select a new color for the specified highlighting frame, click one of the Basic colors.
 - 3 To define a custom color for the specified highlighting frame, click *Define Custom Colors*. The Color dialog box expands to include a color chart. Use this chart to define your custom colors. Then select one of the custom colors you have defined.
 - 4 Click *OK* to return to the Document Import Tool. The new color is applied to the color button and to the appropriate highlighting frames.

NOTE: You can also specify a color or define a color for the module guidelines, by choosing either VERTICAL GUIDELINE or HORIZONTAL

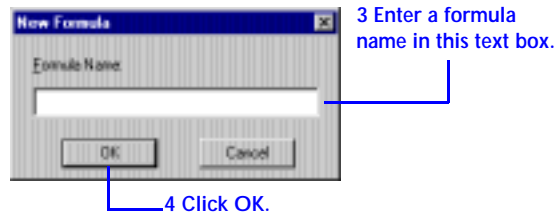
GUIDELINE from the View/Colors Menu, depending on which guideline you want customized. Then use the Color dialog box to select or define the desired color.

How to specify a custom formula

- 1 Set the summary type for the formula field to Custom. The Select Formula dialog box appears.



The New Formula dialog box appears.



The Formula Editor dialog box appears.

- 5 Enter the custom formula in the *Formula* text box.
- 6 Click the SAVE FORMULA AND CLOSE button. The custom formula now appears in the Select Formula dialog box. Click *Select* to use that formula in the formula field. The formula name now appears in the *Type* text box in the field information.

NOTE: *The Formula Editor does not check a formula before accepting it. Error messages for incorrect formulas will not be generated until the report is generated.*

22

Cross-Tab Objects

What you will find in this chapter...

Cross-tab overview, Page 444

Cross-tab components, Page 448

HANDS-ON (Cross-Tab Objects), Page 450

Cross-tab overview

A cross-tab is an object that summarizes and presents data in a compact row and column format. This format makes it easy to compare data and identify trends.

Report examples have been provided with this version of Seagate Crystal Reports to demonstrate the power of cross-tabs. Cross-tabs become an option when you want to consider a specific set of data in relation to a specific category. In other words, use cross-tabs when the word *by* is included in your report description. For example:

- sales *by* state,
- products sold *by* color and size, or
- orders *by* customer.

While there are certainly many ways to create these kinds of reports, cross-tabs present data in a more compact, easier to understand form than other reporting methods.

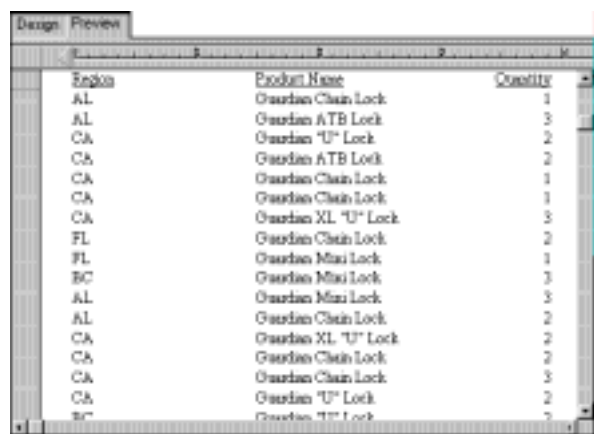
NOTE: You can insert as many cross-tab objects in a report as you need. You can even place them in subreports. Thus, you can use cross-tabs to show summarized data in a report that presents the details in another form.

In the following examples, the goal is to analyze the unit sales of five different bicycle locks in four different regions (a unit sales of locks *by* region report). For greater clarity, only the most essential information in these reports has been included:

- the region from which the order came,
- the name of the lock, and
- the quantity ordered.

The first way of looking at the data is in the most basic of all reports, a columnar report with no grouping or sorting.

Report of order data - no sorting/grouping



Region	Product Name	Quantity
AL	Gaarden Chain Lock	1
AL	Gaarden ATB Lock	2
CA	Gaarden "U" Lock	2
CA	Gaarden ATB Lock	2
CA	Gaarden Chain Lock	1
CA	Gaarden Chain Lock	1
CA	Gaarden XL "U" Lock	3
FL	Gaarden Chain Lock	2
FL	Gaarden Mini Lock	1
BC	Gaarden Mini Lock	3
AL	Gaarden Mini Lock	3
AL	Gaarden Chain Lock	2
CA	Gaarden XL "U" Lock	2
CA	Gaarden Chain Lock	2
CA	Gaarden Chain Lock	2
CA	Gaarden "U" Lock	2
BC	Gaarden "U" Lock	2

This report presents nothing but details. Each row represents an individual order. There are many orders from each of the regions for different locks. But because there is no summary information, it is nearly impossible to get any useful information out of a report like this.

The next logical step is to group the data in some way. You can group it by region, or by product line. The following section shows a look at both of these options.

Report of order data - grouped by region

This report uses the data seen in the first report, but here the data is grouped by region. All the orders in each region are grouped together, but each regional group contains orders for different types of locks. Because the groups contain different kinds of data, summarizing the Quantity field will determine the total number of locks sold per Region, but not the total of each type.

Region	Product Name	Quantity
AL	Guardian Chain Lock	1
AL	Guardian ATB Lock	3
AL	Guardian Mini Lock	3
AL	Guardian Chain Lock	1
AL	Guardian "U" Lock	2
AL	Guardian ATB Lock	2
AL	Guardian Chain Lock	1
BC	Guardian Mini Lock	3
BC	Guardian "U" Lock	2
BC	Guardian "U" Lock	2
BC	Guardian Mini Lock	3
BC	Guardian Chain Lock	1

Each region group contains orders for different kinds of locks.

Report of order data - grouped by product

This report groups the data by product. Each group displays all the orders for a specific product. At first it appears that this might be useful, but then it becomes clear that each product group includes orders from several different regions. The information is helpful, and it brings you closer to your goal, but you are still a long way from having the information you need.

Region	Product Name	Quantity
CA	Guardian "U" Lock	2
CA	Guardian "U" Lock	2
BC	Guardian "U" Lock	2
BC	Guardian "U" Lock	2
AL	Guardian "U" Lock	2
AL	Guardian ATB Lock	3
CA	Guardian ATB Lock	2
AL	Guardian ATB Lock	2
AL	Guardian Chain Lock	1
CA	Guardian Chain Lock	1
CA	Guardian Chain Lock	1

Each product group contains orders for many regions.

Report of order data - grouped by region and product

This report is the logical next step. If the *By Region* report contains multiple products in each region group, and the *By Product* report contains multiple regions in each product group, then it seems to make sense to combine the two. Doing that, you group first by Region and then by Product.

Region	Product Name	Quantity
AL	Guardian ATB Lock	5
AL	Guardian ATB Lock	2
AL	Guardian Chain Lock	1
AL	Guardian Chain Lock	2
AL	Guardian Chain Lock	1
AL	Guardian Mini Lock	3
BC	Guardian "U" Lock	2
BC	Guardian "U" Lock	2

Each group contains orders for one product for one region.

But the data is all spread out and remains difficult to analyze. This information is useful, and with a little work you can use a report like this to get the comparison information you need. However, a cross-tab offers a better solution.

Order data in a cross-tab object

With cross-tabs, all the information you need is provided in a compact format. The report shows the products sold in each region and what the unit sales were. It is easy to see, for example, that Guardian Mini Locks are not popular at all in California but they are the biggest seller in BC or that Florida is being outsold by Alabama in every lock category.

	AL	BC	CA	FL	Total
Guardian "U" Lock	2	4	4	0	10
Guardian ATB Lock	5	0	2	0	7
Guardian Chain Lock	4	1	7	2	14
Guardian Mini Lock	3	6	0	1	10
Guardian XL "U" Lock	0	0	5	0	5
Total	14	11	18	3	46

Regions

Product names

Total - one product in one region

Total - all products in one region

Total - one product in all regions

Total - all products in all regions

In this cross-tab:

- Product names make up the row headings.
- Regions make up the column headings.
- The value at each row/column intersection is the sum of all the orders for a particular product for a particular region; for example, the total number of Guardian Mini Locks purchased in British Columbia.
- The total at the end of each row is the total of all of the purchases for one product in all regions; for example, the total number of Guardian ATB Locks purchased in Alabama, British Columbia, California, and Florida combined.
- The total at the bottom of each column is the total number of all kinds of locks ordered in one region; for example, the number of locks of all kinds purchased in California.
- The total in the bottom right corner is the grand total showing the total unit sales of all five locks in all four regions.

The report is compact, and you can compare your customers' purchasing habits in a hurry. Clearly this is a worthwhile report in situations such as this.

Cross-tab components

A cross-tab is an object that summarizes and presents data in a compact row/column format. This format makes it easy to compare data and identify trends. A cross-tab is made up of three elements:

1. rows,
2. columns, and
3. summary fields.

	USA	MEXICO	CANADA	UK	Total
Gloves	4	0	4	0	8
Belts	0	1	1	1	3
Shoes	0	0	0	1	1
Total	4	1	5	2	12

- The rows in a cross-tab run horizontally (from side to side). In the example above, “Gloves” is a row.
- The columns in a cross-tab run vertically (up and down). In the example above, “USA” is a column.
- The summary fields are found at the intersection of rows and columns. The value found at each intersection represents a summary (sum, count, etc.) of those records that meet the row and the column criteria. In the example above, the value at the intersection of “Gloves” and “USA” is four, the number of gloves sold in the USA.

A cross-tab also includes several totals:

	USA	MEXICO	CANADA	UK	Total
Gloves	4	0	4	0	8
Belts	0	1	1	1	3
Shoes	0	0	0	1	1
Total	4	1	5	2	12

Annotations:

- ← TOTAL OF PRODUCTS IN ROW (GLOVES) (points to the '8' in the 'Gloves' row total)
- ← GRAND TOTAL ALL PRODUCTS ALL ROWS (GLOVES IN USA) (points to the '12' in the 'Total' row total)
- ↑ TOTAL OF PRODUCTS IN COLUMN (USA) (points to the '4' in the 'USA' column total)

- At the end of each row is a total for that row. In the example above, this total represents a single product sold in all countries. At the end of the “Gloves” row is the value 8, the total number of gloves sold in all countries.
- At the bottom of each column is a total for that column. In the example above, this total represents all products sold in a single country. The value at the bottom of the “USA” column is four, the total number of products (gloves, belts and shoes) sold in the USA.

- At the intersection of the Totals column (totals for the products) and the Totals row (totals for the countries) is a grand total. In the example above, the value at the intersection of the Total Column and Total Row is 12, the total number of all products sold in all countries.

HANDS-ON (Cross-Tab Objects)

How to create a cross-tab object

In this tutorial you will create a simple Product by Region count cross-tab using xtreme.mdb (located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or the directory in which the program resides).

The Xtreme database contains several tables. For this example use the following tables:

- Customer,
- Orders,
- Orders Detail, and
- Product.

NOTE: Using the Ctrl-click combination allows you to pick a non-continuous range of fields. You can use the Shift-click combination to pick several fields from the list that are continuous.

NOTE: Make certain that the Customer table is linked to the Product table via the Orders and Orders Detail tables for this example. Search for Visual Linking Topics Index in Seagate Crystal Reports online Help for assistance.

The Customer and Product tables contain records for a variety of products and sales regions. To keep the report a manageable size, you will create a cross-tab that shows only a subset of those products and regions. You will restrict the report to Xtreme Mtn, Xtreme Rhino, and Xtreme Titan locks sold in California, Florida, Illinois, and Oregon. To do this, you will limit the number of regions and products by using record selection tools.

NOTE: For this example place the following fields in the Details section:

- Customer Name and Region (From the Customer table)
- Product Name (From the Product table)



The Select Expert makes it easy to specify the records you want included in a report. Simply highlight the field you want to base your selection on and then select the desired records. See *Record and Group Selection*, Page 227.

Selecting regions

- 1 Highlight the Region field of the Customer Table, and use the Select Expert to select the following records:
 - CA
 - FL
 - IL
 - OR

Selecting products

- 2 Highlight the Region field of the Customer Table and, use the Select Expert to select the following records:
 - Xtreme Mtn Lock,
 - Xtreme Rhino Lock, and
 - Xtreme Titan Lock.

Now you are ready to create a cross-tab.



- 3 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Use this dialog box to add the rows, columns, and summary fields that will make up the cross-tab.

Adding rows

- 4 From the *Fields* list box, select the {product.PRODUCT NAME} field listed under the Report Fields heading and click *Add Row*. The highlighted field are added to the *Rows* list box.

Adding columns

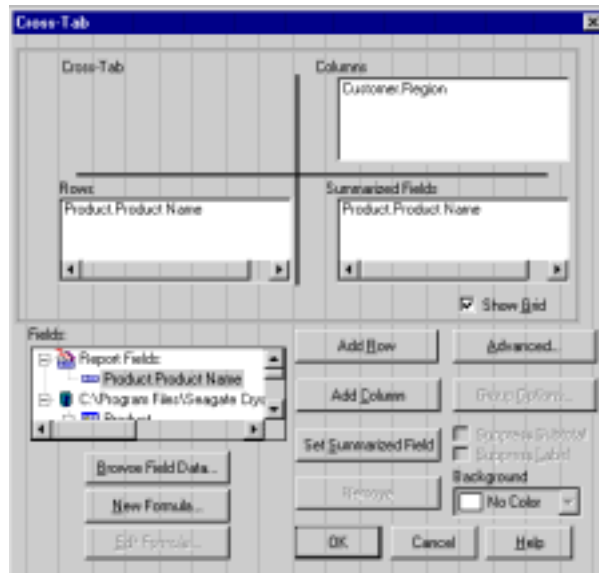
- 5 From the *Fields* list box, select the {customer.REGION} field found listed under the Report Fields heading and click *Add Column*. The highlighted field is added to the *Columns* list box.

Adding summarized fields

- 6 From the *Fields* list box, select the {product.PRODUCT NAME} field listed under the Report Fields heading, and click *Set Summarized Field*. The field is added to the *Summarized Fields* list.

NOTE: You can also drag fields from the Database Fields section of the *Fields list box* to the *Rows*, *Columns*, and *Summarized Fields list boxes* using the drag-and-drop feature.

The dialog box should look similar to the following:



- 7 Click OK. A placement frame appears. Place the cross-tab in the Report Header section of the report.

NOTE: Placing the cross-tab in different sections of a report produces different results. For example, cross-tabs placed in the Report Header will contain data for the entire report and will print only once at the beginning of the report, while cross-tabs placed in a Group Header will contain data for that group only, and will print every time the group changes. See *Design Tab Areas*, Page 57, and *Area printing characteristics*, Page 59.



- 8 Click the PRINT PREVIEW button on the standard toolbar to preview the cross-tab. It should look similar to the following:

	CA	FL	IL	OR	Total
Xtreme Mtn	0	0	4	0	4
Xtreme Rhino	0	1	1	1	3
Xtreme Titan	1	0	0	1	2
Total	1	1	5	2	9

NOTE: Rows and columns of a cross-tab can be independently formatted with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. See How to format a cross-tab, Page 460.

How to create a cross-tab with multiple rows/columns

You may want to create reports that contain multiple levels of information. For example, if you have a report that contains the sales data for a single product sold to all customers in the USA, you can break it down further into a region by region analysis. Seagate Crystal Reports enables you to create cross-tabs with multiple rows and/or columns to accommodate multiple levels of information such as these.

In this tutorial you will create a cross-tab with multiple rows (number of Products sold by Country and Region) using xtreme.mdb (located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or the directory in which the program resides).

The Xtreme database contains several tables. For this example you will use the following tables:

- Customer,
- Orders,
- Orders Detail, and
- Products.

NOTE: Make certain that the Customer table is linked to the Product table via the Orders and Orders Detail tables for this example. For more information on linking tables, search for Visual Linking Topics Index in Seagate Crystal Reports online Help.

The Customer, Orders, Orders Detail, and Products tables contain records for a variety of products, countries, and sales regions. To keep the report a manageable size, create a cross-tab that shows a subset of the products, regions, and countries included in the sample data. Restrict the report to the: Extreme Adult, Triumph Pro, and Triumph Vertigo helmets sold in the USA in California and Oregon only. To do this, limit the number of products, regions, and countries using record selection tools.

NOTE: For this example place the following fields in the Detail section:

- Customer Name, Region, and Country (From the Customer table)
- Quantity (From the Orders Detail table)
- Product Name (From the Product table)



The Select Expert makes it easy to specify the records you want included in your report. Simply highlight the field you want to base your selection on and then select the desired records. For more information on record selection, see *Record and Group Selection, Page 227*.

Selecting countries

- 1 Highlight the Country field of the Customer Table and use the Select Expert to select the record for USA.

Selecting regions

- 2 Highlight the Region field of the Customer Table and use the Select Expert to select the following records:
 - CA, and
 - OR.

Selecting products

- 3 Highlight the Product Name field of the Product Table and use the Select Expert to select the following records:
 - Xtreme Adult Helmet,
 - Triumph Pro Helmet, and
 - Triumph Vertigo Helmet.

Now you are ready to create a cross-tab.



- 4 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Use this dialog box to add the rows, columns, and summary fields that will make up the cross-tab.

Adding multiple rows

- 5 In the *Fields* list box, highlight the {customer.COUNTRY} and click the ADD ROW button. The highlighted field is added to the *Rows* list box.
- 6 Repeat Step 5, to add the {customer.REGION} to the *Rows* list box as well.

NOTE: The order in which rows, columns, and summary fields are added affects their placement in the cross-tab. The first row or column added will remain outermost in the cross-tab. Consecutive rows will be added inside (to the right of the first column and below the first row). Consecutive summary fields will be added below the first summary field. For more information on multiple summary fields, see *How to create a cross-tab with multiple summary fields, Page 456*.

Adding the column

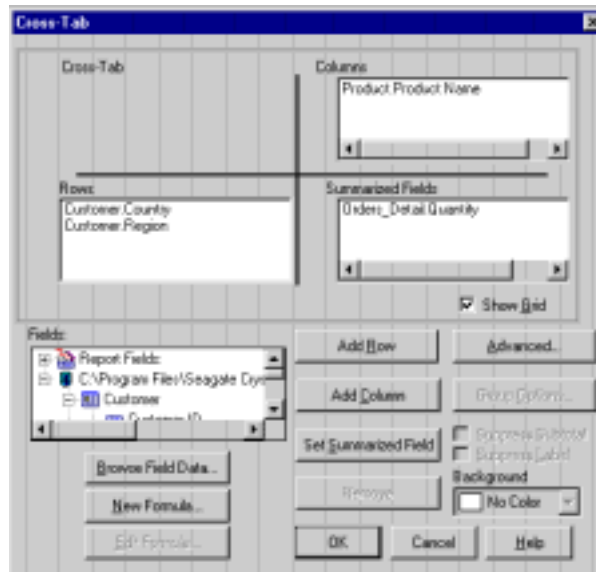
- 7 In the *Fields* list box again, highlight {product.PRODUCT NAME} and click the ADD COLUMN button. The highlighted field is added to the *Columns* list box.

Adding the summarized field

NOTE: To create a cross-tab with multiple columns, simply add the desired columns to the Columns list box by repeating Step 7.

- 8 In the *Fields* list box again, highlight {orders detail.QUANTITY} and click the SET SUMMARIZED FIELD button. The highlighted field is added to the *Summarized Fields* list box.

The dialog box should look similar to the following:



- 9 Click OK. A placement frame appears. Place the cross-tab in the Report Header section of the report.

NOTE: Placing the cross-tab in different sections of a report produces different results. For example, cross-tabs placed in the Report Header will contain data for the entire report and will print only once, at the beginning of the report, while cross-tabs placed in a Group Header will contain data for that group only, and will print every time the group changes. For more information see Design Tab Areas, Page 57, and Area printing characteristics, Page 59.



- 10 Click the PRINT PREVIEW button on the standard toolbar to preview the cross-tab. It should look similar to the following:

Design		Preview			
		1 2 3 4 5 6			
RH					
		Triumph Pro Helmet	Triumph Vertigo Helmet	Xtreme Adult Helmet	Total
USA	CA	22.00	46.00	30.00	98.00
	OR	16.00	29.00	12.00	57.00
	Total	38.00	75.00	42.00	155.00
Total		38.00	75.00	42.00	155.00

NOTE: Rows and columns of a cross-tab can be independently formatted with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. See *How to format a cross-tab*, Page 460.

How to create a cross-tab with multiple summary fields

You will often find it useful to include multiple summaries in a report. For example, you may have a report that shows the total number of orders for each of your California and Oregon customers. You might then want to see the average dollar amount of each customer's order as a means of comparing their purchasing habits. To accommodate situations such as these, Seagate Crystal Reports allows you to create cross-tabs with multiple summary fields.

In this tutorial you will create a cross-tab with multiple summary fields (total and average orders for each Customer, by Region) using xtreme.mdb (located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or the directory in which the program resides).

The Xtreme database contains several tables. For this example you will use the following tables:

- Customer, and
- Orders.

NOTE: The Customer table must be linked to the Orders table for this tutorial. For more information on linking tables, search for *Visual Linking Topics Index in Seagate Crystal Reports online Help*.

The Customer and Orders tables contain records for a variety of customers, regions, and orders. To keep the report a manageable size, you will create a cross-tab that shows a subset of the customers and regions included in the sample data. You will restrict the report to Sporting Wheels Inc. and Whistler Rentals in California and Oregon only. To do this, you will use record selection tools to limit the number of customers and regions.

NOTE: For this example place the following fields in the Detail section:

- Customer Name and Region (From the Customer table)
- Order Amount (From the Orders table)



The Select Expert makes it easy to specify the records you want included in a report. Simply highlight the field you want to base the selection on and then select the desired records. For more information on record selection, see *Record and Group Selection, Page 227*.

Selecting regions

- 1 Select the Region field of the Customer Table and use the Select Expert to select the record for CA.

Selecting customers

- 2 Highlight the Customer Name field of the Customer Table and, using the Select Expert, select the following records:
 - Sporting Wheels Inc., and
 - Whistler Rentals.

Now you are ready to create the cross-tab.



- 3 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Use this dialog box to add the rows, columns, and summary fields that will make up the cross-tab.

Adding rows

- 4 From the *Fields* list box, highlight {customer.REGION} and click the ADD ROW button. The highlighted field is added to the *Rows* list box.

Adding columns

- 5 From the *Fields* list box again, highlight the {customer.CUSTOMER NAME} field and click the ADD COLUMN button. The highlighted field is added to the *Columns* list box.

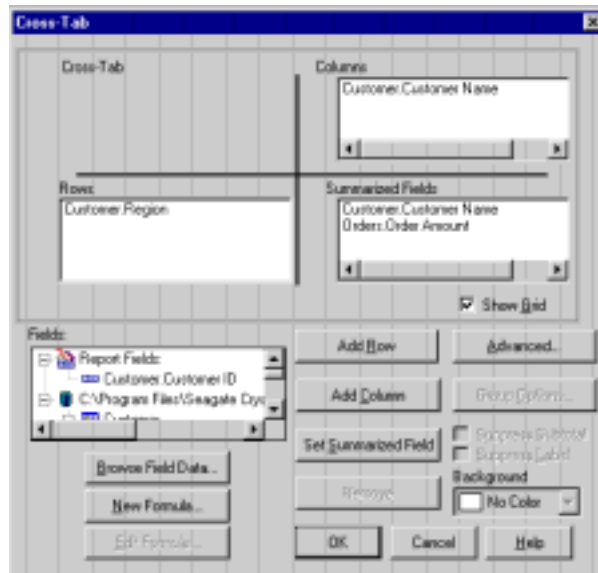
Adding multiple summary fields

- 6 From the *Fields* list box again, highlight {customer.CUSTOMER NAME} and click the SET SUMMARIZED FIELD button. The highlighted field is added to the *Summarized Fields* list box.
- 7 Repeat Step 6 and add the {orders.ORDER AMOUNT} to the *Summarized Fields* list box as well.

NOTE: The order in which rows, columns, and summary fields are added affects their placement in the cross-tab. The first row or column added

will remain outermost in the cross-tab. Consecutive rows will be added inside (to the right of the first row and below the first column). Consecutive summary fields will be added below the first summary field.

The dialog box should look similar to the following:



- 8 Click OK. A placement frame appears. Place the cross-tab in the Report Header section of the report.

NOTE: *Placing the cross-tab in different sections of a report produces different results. For example, cross-tabs placed in the Report Header will contain data for the entire report and will print only once at the beginning of the report while cross-tabs placed in a Group Header will contain data for that group only and will print every time the group changes. For more information, see Design Tab Areas, Page 57, and Area printing characteristics, Page 59.*



- 9 Click the PRINT PREVIEW button on the standard toolbar to preview the cross-tab. It should look similar to the following:

		Norse Adult Helmet	Triumph Pro Helmet	Triumph Vestige Helmet	Totals
USA	CA	37	22	35	94
	OR	4	8	23	35
	Total	41	30	58	129
Total		41	30	58	129

The first summary operation on the cross-tab is the count of orders for each of the three customers. The second summary operation is the sum of all the orders made by each company. For this example, you want to calculate the average order amount for each customer. To do this you will need to change the summary operation for the {sum of orders.ORDER AMOUNT} field.

NOTE: *If the first summary operation is not a count, follow the directions below to change the summary operation to count.*

Changing the summary operation (aggregate function)

- 10 In the Design tab, right-click the summary field that you want to change {sum of orders.ORDER AMOUNT}, and choose CHANGE SUMMARY OPERATION from the shortcut menu. The Change Summary Operation dialog box appears.
- 11 Select the desired function from the *Summary Operation* drop-down list and then click *OK*. For this example, select *average*. The summary operation will be changed as specified.

For more information on summary functions, search for Summary Functions Index in Seagate Crystal Reports online Help.



- 12 Click the PRINT PREVIEW button on the standard toolbar again to preview the cross-tab. It should now look similar to the following:

	Sporting Wheels Inc.	Xtreme Cycles	Total
CA	26 \$1,781.58	0 \$0.00	26 \$1,781.58
Total	0 \$0.00	26 \$1,659.84	26 \$1,659.84
Total	26 \$1,781.58	26 \$1,659.84	51 \$1721.90

The first summary operation in the cross-tab is the count of orders for each of the three customers and now the second summary operation is the average order amount for each customer.

By creating cross-tabs with multiple summary fields such as these, you can pinpoint customer information and easily identify purchasing trends.

NOTE: Rows and columns of cross-tabs can be independently formatted with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. See *How to format a cross-tab*, Page 460.

How to format a cross-tab

Seagate Crystal Reports has powerful formatting capabilities that can be applied to cross-tabs. You can:

- change the width and height of cross-tab cells,
- format the background color of an entire row/column at once,
- format the background of Grand Totals,
- format fields individually,
- format several fields at once,
- suppress empty rows, columns, or totals, and
- print cross-tabs that span multiple pages, with the option of repeating the row headings.

By applying such formatting as background color, borders, and fonts, you can emphasize important data and create professional-looking and easy-to-understand cross-tabs. You can also use the Highlighting feature to add conditional formats to numbers and currencies. For more information, see *How to Use the Highlighting Expert*, Page 224.

Changing width and height of cross-tab cells

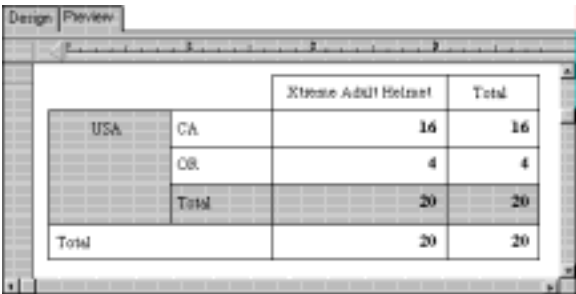
- 1 In the Design Tab, click a Row or Column heading, or a cell of summarized data, to activate the sizing handles.
- 2 Click and drag one of the sizing handles to expand the width or height of the cross-tab cell.
- 3 Click the *Preview Tab* to view the changes.

NOTE: Changing one row or column heading affects all of the rows or columns. Changing one cell of summarized data effects all of the cells of summarized data.

Formatting background color of entire rows/columns

- 1 Right-click the blank top-left area of the cross-tab and choose **FORMAT CROSS-TAB** from the shortcut menu. The Cross-Tab dialog box appears.
- 2 Highlight the row (from the *Rows* list box) or column (from the *Columns* list box) for which you want a background color, and select a color from the *Background Color* drop-down list.
- 3 Click **OK** to return to the cross-tab. The row/column will be formatted as specified.

A cross-tab with a single row highlighted looks similar to the following:



		Xtreme Adult Helmet	Total
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

*NOTE: To apply background colors for grand total rows and columns, select the desired colors from the *Background* drop-down lists on the *Advanced Cross-Tab Options* dialog box. Search for *Advanced Cross-Tab Options* dialog box in Seagate Crystal Reports online Help.*

NOTE: You can also apply separate background colors to Row and Column totals.

Formatting background of Grand Totals

- 1 Right-click the blank top-left area of the cross-tab and choose **FORMAT CROSS-TAB** from the shortcut menu. The Cross-Tab dialog box appears.

- 2 Highlight the Grand Total row (from the *Rows* list box) or Grand Total column (from the *Columns* list box) for which you want a background color, and select a color from the *Background Color* drop-down list.
- 3 Click *OK* to return to the cross-tab. The Grand Total row/column will be formatted as specified.

Formatting fields individually

- 1 Right-click the field you want formatted and choose *FORMAT FIELD* from the shortcut menu. The Format Editor appears.
- 2 In the Format Editor, make font, background, borders, numbering, currency symbols, and printing characteristics choices.
- 3 Click *OK* to return to the cross-tab. The field will be formatted as specified.

A cross-tab with a single field formatted looks similar to the following:

		Xtreme Adult Helmet	
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

Formatting several fields at one time

- 1 Use the Shift-click method to select the desired fields.
- 2 Right-click any of one and choose *FORMAT OBJECTS* from the shortcut menu. The Format Editor appears.
- 3 In the Format Editor, make font, background, borders, numbering, currency symbols, and printing characteristics choices.
- 4 Click *OK* to return to the cross-tab. The fields will be formatted as specified.

A cross-tab with several fields formatted looks similar to the following:

		Xtreme Adult Helmet	Total
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

How to suppress empty rows, columns, subtotals, and grand totals

Seagate Crystal Reports makes it easy to remove rows and columns from a cross-tab report when those rows and columns contain:

- no records,
- subtotals, or
- grand totals.

Row and column labels

The Cross-Tab dialog box can be used to remove the label on a cross-tab report for specified fields.

NOTE: You can only suppress the label of fields for which you are also suppressing the subtotal.

- 1 In the *Rows* or *Columns* list box of the Cross-Tab dialog box, highlight the field whose label you want to suppress.
- 2 Toggle the *Suppress Subtotal* check box on.
- 3 Toggle the *Suppress Label* check box on. Now, when you print the report, no label will appear for the selected field.

Empty rows and columns

The Advanced Cross-Tab Options dialog box can be used to remove empty rows and/or columns from a cross-tab.

- 1 In the Cross-Tab dialog box, click the **ADVANCED** button. The Advanced Cross-Tab Options dialog box appears.
- 2 Toggle the *Suppress Empty Rows* and/or the *Suppress Empty Columns* check box(es) on, as needed. Now, when you print the report, no empty rows and/or columns will appear.

Subtotals

The Cross-Tab dialog box can be used to suppress a subtotal for a particular field.

- 1 In the *Rows* or *Columns* list box of the Cross-Tab dialog box, highlight the field whose subtotal you want to suppress.
- 2 Toggle the *Suppress Subtotal* on. Now when you print the report, no subtotal field will appear.

Grand totals

The Advanced Cross-Tab Option dialog box can be used to remove the entire grand total row or column from a cross-tab.

- 1 In the *Cross-Tab* dialog box, click the **ADVANCED** button. The Advanced Cross-Tab Options dialog box appears.
- 2 Toggle the *Suppress (Rows Grand Totals)* and/or *Suppress (Column Grand Totals)* check box on, as needed. Now, when you print the report, no row and/or column grand totals will appear.

How to print cross-tabs that span multiple pages

When you create a cross-tab that is wider or longer than the specified page size, the program will automatically span the printing across enough pages to accommodate the size of the cross-tab. In the Preview Tab, a line will appear at each page break. For ease in reading, column headings will be repeated on subsequent pages. Row headings may also be repeated.

- 1 In the Cross-Tab dialog box, click the **ADVANCED** button. The Advanced Cross-Tab Options dialog box appears.
- 2 Toggle the *Repeat Row Labels on Page Break* option on in the Advanced Cross-Tab Options dialog box.

23

The Crystal SQL Designer

What you will find in this chapter...

The Crystal SQL Designer, Page 466

Why use a query?, Page 466

Using the SQL Designer, Page 467

HANDS-ON (Queries), Page 468

The Crystal SQL Designer

The Crystal SQL Designer is a type of query; a request for specific information from a database. If you are requesting that information from an SQL database (or from a database accessed via ODBC), your query must be written using the Structured Query Language (SQL). The SQL language is not difficult to learn, but mastering the fine points of creating and retrieving data with SQL can take quite a while. Since the SQL Designer eliminates the need to understand SQL, it can get you building effective queries right away.

The SQL Designer has been designed to meet the needs of individuals with little or no query background as well as the needs of experienced SQL professionals.

- If you are new to querying, you will enjoy the way the SQL Designer helps you create queries. By answering a few questions on a set of sequential tabs, you'll give the program all the information needed to generate a query that fits your needs. The program will do all the work for you.
- If you are an SQL professional, you will appreciate the facility that enables you to fine-tune the queries that the SQL Designer generates. If you are more comfortable writing your own SQL queries, you will find it easy to enter the queries directly or even paste them in from another source.

The Crystal SQL Designer can be a powerful tool for many of your information gathering needs.

NOTE: The SQL Designer can only access data stored in an ODBC data source. Any SQL or any other type of database mentioned in this chapter must be accessed through an ODBC data source.

Why use a query?

Query files provide a means of off-loading much of the data generating tasks normally performed by Seagate Crystal Reports on to an SQL or other database server. The set of data returned represents a subset of the actual data in the database - only the data you specifically need.

If you are an experienced SQL programmer, the Crystal SQL Designer allows you to reuse your existing queries, quickly and easily. All of your existing queries become convenient query files that you can use to design reports with Seagate Crystal Reports.

In addition, a Query file provides full ANSI SQL compatibility. Although Seagate Crystal Reports supports powerful SQL pass-through reporting, it does not support the full SQL language or allow you to edit every part

Using the SQL Designer

of an SQL statement. When using the SQL Designer to create data sets on which to base your reports, you get all of the power of SQL, including complex joins, sorts, and aggregate functions.

NOTE: *Many of the topics in this chapter refer to specific SQL clauses. If you are experienced with SQL, use this information to better understand how the Query Expert generates an SQL statement. If you are new to SQL, you can ignore this information and continue to use the Query Expert.*

The SQL Designer has two primary uses:

1. Designing and developing data sets for building reports in Seagate Crystal Reports, and
2. Retrieving and analyzing current information on an “as needed” basis to facilitate informed decision making.

SEAGATE CRYSTAL REPORTS AND QUERY DATA SETS

Seagate Crystal Reports allows you to design a report based on a query data set rather than tables and fields. Since the query contains a predefined set of data, the tables and fields necessary for the report are already included.

The set of data produced by the SQL query works just like a database table when you design your report. The name of the query, along with fields it accesses, appear in the Insert Field dialog box. Aggregate functions and SQL expressions act like fields, providing data values corresponding to each record in the SQL query.

DATA ANALYSIS AND DECISION MAKING

You may not always need to produce finished reports based on your data; sometimes you just need numbers in a hurry (to prepare for a meeting, to help make projections, etc.). The SQL Designer makes it easy to get the information you need.

Sometimes you may need to retrieve the same data on a recurring basis (weekly, every month end, etc.). By setting up and saving a single query, you can retrieve updated data quickly, whenever you need it, with minimal effort.

NOTE: *The SQL Designer can not retrieve any number value longer than 20 characters or calculate a formula with a value longer than 20 characters. Values longer than 20 characters will be truncated.*

HANDS-ON (Queries)

How to use an SQL query that was designed elsewhere

- 1 Copy the SQL statement to the Windows Clipboard. Many SQL editors allow the SQL statement to be copied to the Clipboard using the Ctrl-C key combination.



- 2 Click the NEW button on the toolbar in the Crystal SQL Designer. The New Query dialog box appears.



3 Click the Enter SQL statement directly button.

The Log On Server dialog box appears.



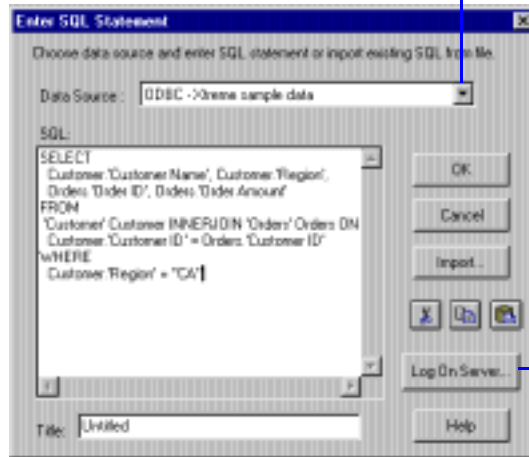
4 Select the desired SQL server for your SQL statement and click OK.

The SQL Server Login dialog box appears.

- 5 Enter your user ID and password to log on to the SQL server, and click *OK*.

After a message appears indicating the success of your log on (assuming you logged on correctly) the Enter SQL Statement dialog box appears.

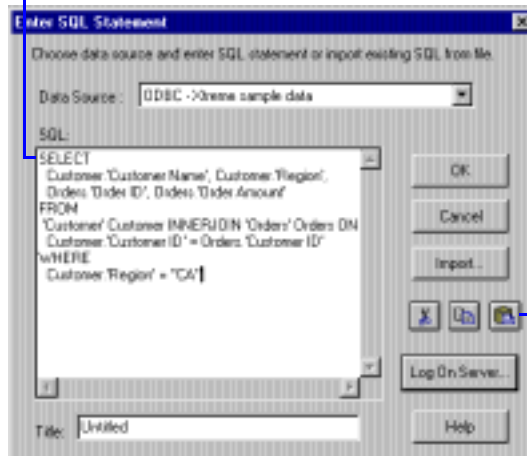
- 6 Select an ODBC data source from this drop-down list.



If you are not already logged on to an SQL Server, click this button and use the Log On Server dialog box to log on.

- 7 To log on to another server or ODBC data source, click the *Log On Server* button. All data sources that you are logged on to will appear in the *Data Source* drop-down list.
- 8 In the *Title* text box, type a descriptive title for the query.

9 Edit the SQL statement in this box.



10 Click this button to paste the SQL statement into the SQL edit box.

The SQL edit box allows you to make any changes you wish to the SQL statement. You can even enter an entirely new SQL statement if you wish.

11 Make any changes you need and click the *OK* button when you are finished.

The old SQL statement becomes a new SQL query that can be used with Seagate Crystal Reports just like any other SQL query file.

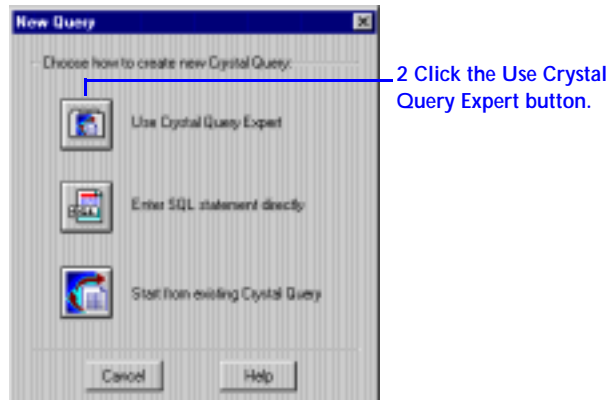
Alternatively, you can import an SQL statement saved in an ASCII text file. To do so, disregard Step 1 above, follow Steps 2 through 6 to open the Enter SQL Statement dialog box and log on to the ODBC data source, then click *Import* to import the SQL statement from the text file.

How to create a new query



1 Click the **NEW** button in the Crystal SQL Designer.

The New Query dialog box appears.



The Create Query Expert consists of several tabs. The tabs are numbered to lead you step-by-step through the query creation process.



NOTE: The Links Tab only appears when two or more database tables are selected on the Tables Tab.

NOTE: Once you select at least one field for the query on the Fields Tab, you can view the data retrieved by your query at any time, by clicking the Preview Query button at the bottom of the dialog box. After you are done viewing the query data, use the Edit button to return to the Query Expert.

How to add tables to a query

FROM clause

The FROM clause specifies the sources (tables) of the database fields indicated in the SELECT statement.

- 1 Click the Tables Tab in the Create Query Expert.



- 2 Click the *SQL/ODBC* or *Dictionary* button.
 - If you click *SQL/ODBC*:
 - Select an SQL or ODBC data source in the Log On Server dialog box.
 - Choose one or more database tables in the Choose SQL Table dialog box. Click *Add* to add each table to your SQL query. Click *Done* when finished.
 - If you click *Dictionary*:
 - Select *Dictionary (.DC5)* in the File Open dialog box, and click *OK*.
 - All ODBC database tables accessible from the dictionary will be added to your SQL query.

NOTE: *Dictionary files must be based on an ODBC data source. See Dictionaries, Page 487, for further information.*

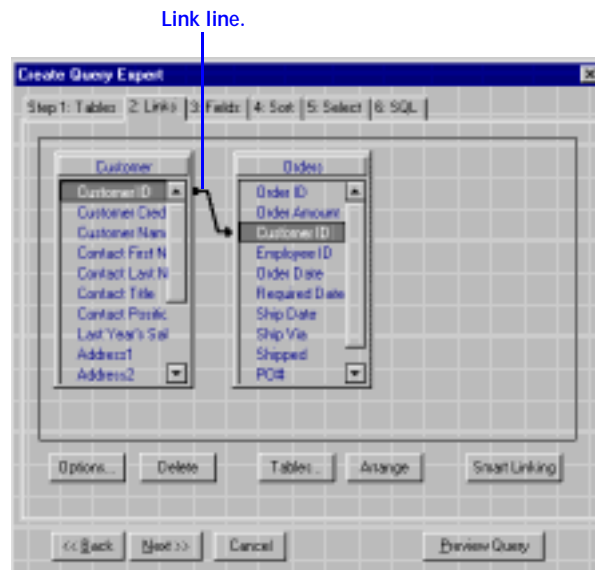
How to link tables and specify a join type

WHERE clause

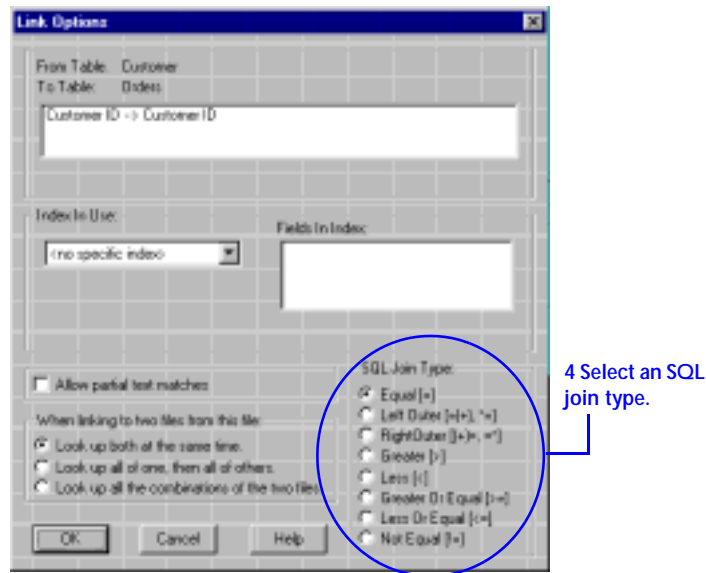
The WHERE clause specifies how two database tables are linked.

NOTE: *Some links can be generated in the FROM clause.*

- 1 Click the Links Tab and click the *Smart Linking* button. The Create Query Expert will make any links it can detect between tables. These links are represented by an arrow between the two fields. This arrow is called a link line.



- 2 Click one of the link lines. It becomes highlighted, along with the fields on either end of the line.
- 3 Click the *Options* button to open the Link Options dialog box. This dialog box describes the link between the tables in greater detail. Search for *Link Options dialog box* in Crystal SQL Designer online Help.



Related Topics

SQL join types (ODBC data sources), Page 527

WHERE, Page 541

How to add fields to a query

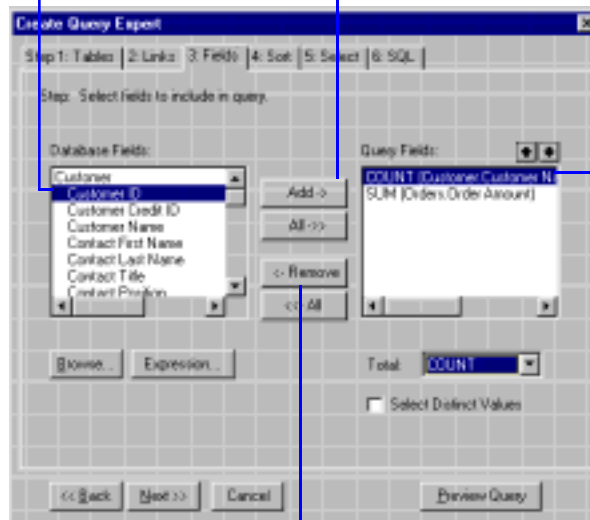
SELECT clause

The SELECT clause selects specific data items to retrieve from the database tables specified by the FROM clause.

- 1 Click the Fields Tab in the Create Query Expert.

2 Select the fields you want to appear in your query from this list.

3 Click the Add button...



...the field(s) are added to this list.

4 Click Remove to remove any fields from the Query Fields list box.

Related Topics

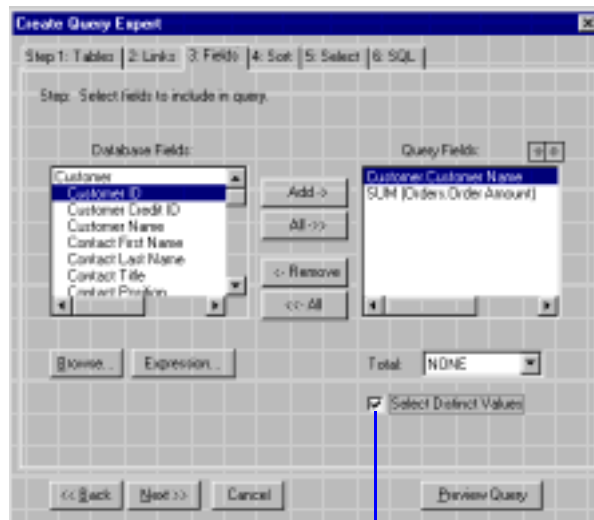
SELECT, Page 540

How to identify unique values in a query

DISTINCT clause

DISTINCT forces the query to retrieve only unique (distinct) sets of data.

1 Click the Fields Tab of the Create Query Expert.



2 Toggle the Select Distinct Values check box on to activate it.

Related Topics

DISTINCT, Page 540

How to summarize data with aggregate functions

GROUP BY clause

The GROUP BY clause retrieves a set of summary data.

Aggregate functions

Use aggregate functions to obtain summary information on all records or on specific groups of records. Aggregate functions are most useful when you do not need the detailed information and you only want to examine totals.

For example, you might need the total number of orders made and the average amount of each order. For this type of query, you apply the COUNT function to the Order ID field, and the AVG (average) function to the Amount field. The query calculates the summary information and provides the results you need.

1 Click the Fields Tab of the Create Query Expert.

2 Highlight the field on this list you want to summarize.



3 From the *Total* drop-down list, choose an aggregate function to apply to the selected field.

- COUNT() counts the number of values within a group.
- SUM() adds the values within a group, to provide a total.
- AVG() finds the average of all values within a group.
- MIN() finds the minimum value within a group.
- MAX() finds the maximum value within a group.

The query summarizes the field to which the aggregate function is applied. Any other fields that appear in the *Query Fields* list box are used to sort the data.

Related Topics

GROUP BY, Page 542

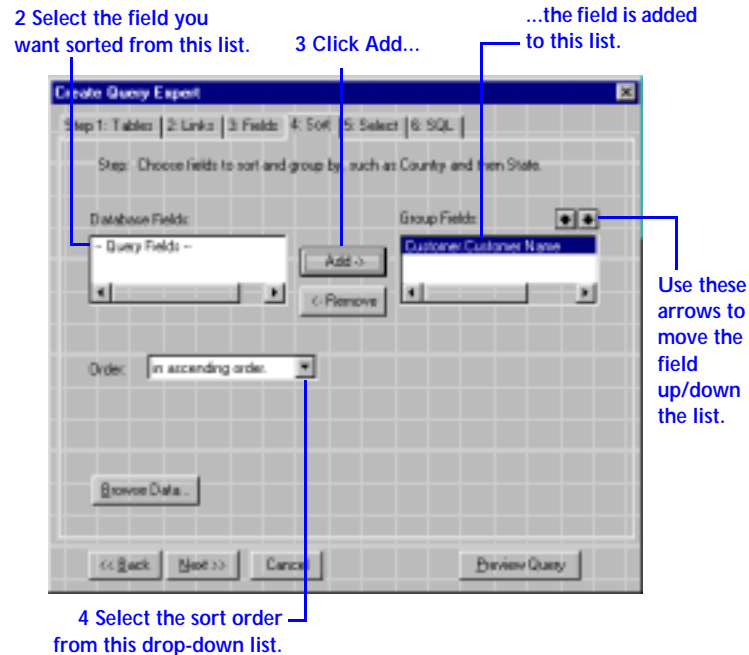
How to sort records according to field values

ORDER BY clause

The ORDER BY clause specifies that the database records retrieved be sorted according to the values in a specific field.

You can group either by sorting data, so that records with like data appear grouped in the sorted list, or by summarizing data with aggregate functions, so that summary data appears in your query for each group of records. For information on using aggregate functions in your query, see *How to summarize data with aggregate functions*, Page 476. This section shows you how to group data by sorting.

1 Click the Sort Tab in the Create Query Expert.



Related Topics

ORDER BY, Page 541

How to specify records to be included in a query

WHERE clause

The WHERE clause can specify record selection criteria.

1 Click the Select Tab of the Create Query Expert.

2 Select the field that contains the data you want to base selection criteria on from this list.

3 Click Add...

...the field is added to this list.



4 Use these controls to specify the selection criteria to be applied to the field highlighted in the Select Fields dialog box.

This tab works much like the Select Expert in Seagate Crystal Reports. Search for *Select Expert* in Crystal SQL Designer online Help.

5 Repeat Steps 2 and 3 for every field in the *Select Fields* list box.

Related Topics

WHERE, Page 541

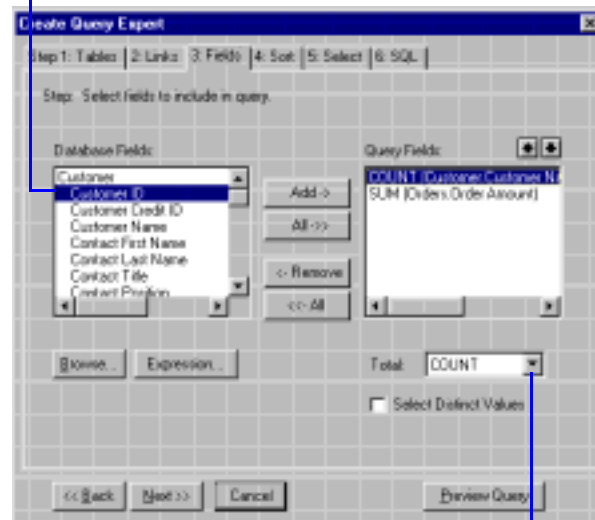
How to select groups to be included in a query

GROUP BY and HAVING clauses

The HAVING clause creates selection criteria for the summary information produced by the GROUP BY clause.

1 Click the Fields Tab of the Create Query Expert.

2 Select the field you want to summarize from this list.

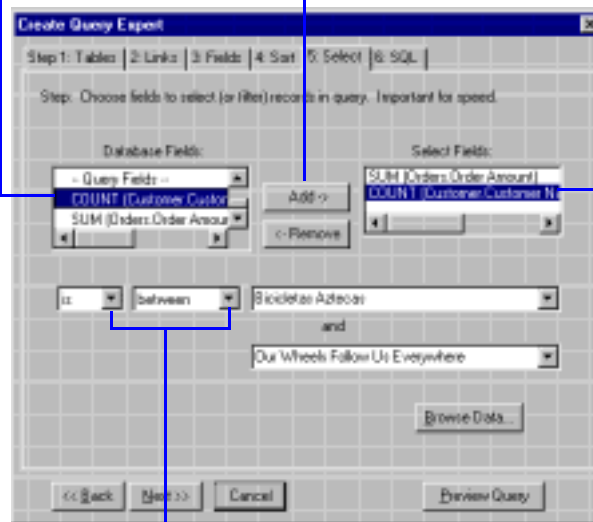


3 Select the aggregate function from this drop-down list you want applied to the highlighted field.

4 Click the Select Tab.

5 Select the aggregate function from this list box.

6 Click Add...



...the field is added to this list.

7 Use these drop-down lists to specify which group summary values based on the aggregate function should appear in the result.

Related Topics

GROUP BY, Page 542

How to create an SQL expression

NOTE: You must have some familiarity with the SQL language and SQL expressions before trying to add an expression to your query file.

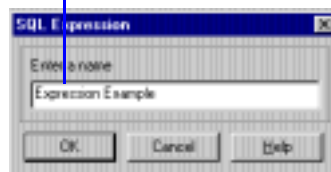
1 Click the Fields Tab in the Create Query Expert.



2 Click Expression.

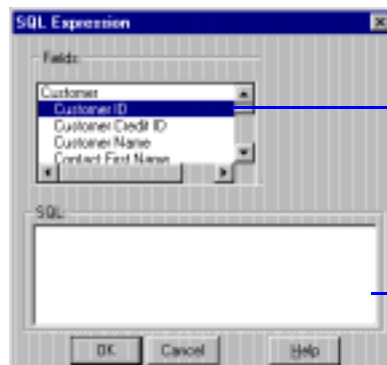
The SQL Expression dialog box appears.

3 Type a name for the new expression and click OK.



4 Double-click a field in this list to add it to the expression.

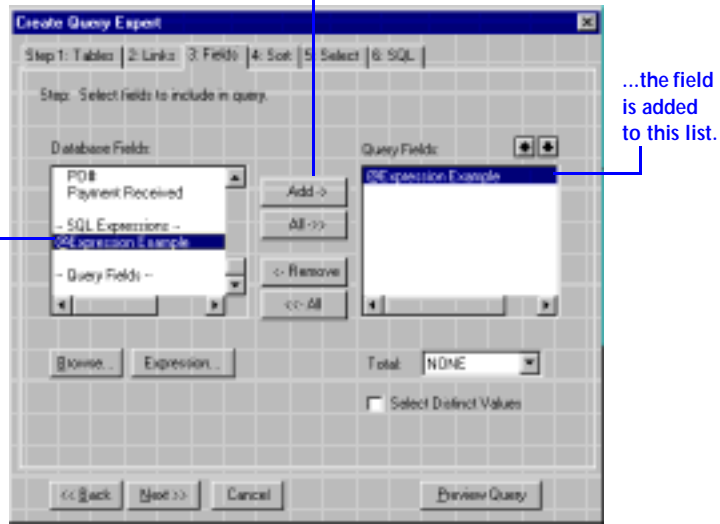
5 Edit the expression in this edit box.



- When you have finished designing the SQL expression, click *OK* to return to the Fields Tab.

7 Highlight the new SQL expression.
It will be indicated by a @ sign.

8 Click Add...



How to create a query from another Crystal Query



- Click the **NEW** button in the Crystal SQL Designer.
The New Query dialog box appears.



2 Click Start from existing Crystal Query.

- 3 Use the File Open dialog box to highlight the query (*.QRY) file that you want used to base a new query on, and click *OK*. The program runs the existing SQL query and displays the data set.



- 4 Click the *EDIT* button.

The Create Query Expert appears with the specifications for the selected query already in place.



- 5 Use the Create Query Expert to make any changes necessary to the query. Click *Preview Query* when finished to view the new query results.
- 6 Choose *SAVE AS* from the File Menu to save the new query under a different name. The new query is saved in a separate file; your source query remains unchanged.

How to select a query for a report



- 1 In Seagate Crystal Reports, click the *NEW* button on the standard toolbar.
The Report Gallery appears.
- 2 Click a Report Expert from the Report Gallery. The Create Report Expert appears.
- 3 On the Tables Tab, click *Query*. The File Open dialog box appears.

- 4 Use the controls in this dialog box to locate and highlight the query (.QRY) file you want to use to create a new report.
- 5 Click *OK*. The query file for your report is opened. Use the tools in the Create Report Expert to design a new report. Your query fields will appear in each section of the Expert just as any other database fields would. In the list boxes, the name of the query file will appear above the fields, where you would normally see the name of a database table.

NOTE: More than one query file can not be used in a report.

24

Dictionaries

What you will find in this chapter...

Dictionaries Overview, Page 488

Why use a dictionary?, Page 489

HANDS-ON (Dictionaries), Page 489

Dictionaries Overview

A dictionary is a structured and simplified view of data that you can create for some or all of the individuals in your organization that are using Seagate Crystal Reports.

Unlike some systems that force users to access data through a data distribution metalayer, dictionaries are optional components. Data can still be accessed directly by the user. Dictionaries simply provide all of the convenience without the restrictions.

Dictionaries allow you to:

- design a single, dynamic view of all the data that is necessary to create organizational reports and queries,
- organize the data and rename tables and fields to make it easier for users to understand the content and purpose of the data, and
- create complex data-manipulation formulas that users can access without the need to understand formula concepts.

NOTE: The Formula Editor used in Crystal Dictionaries is not as complete as the one used in Seagate Crystal Reports. Please see Crystal Dictionary online Help for a description of the Formula Editor for use in Crystal Dictionaries.

Dictionaries reduce support cost and time, increase user productivity, and reduce data misuse, loss, and damage. They are a powerful component of Seagate Crystal Reports.

When a Dictionary is used to create a report, the only data used in the report is the data accessed through the Dictionary; you can not use a Dictionary and some other data source in the same report. Because Dictionaries are often used to impose data security, it would breach that security to allow unrestricted data access in a Dictionary report.

NOTE: You can include a subreport based on a different data source in a primary report based on a Dictionary.

Finally, Dictionaries provide an easy means of changing the underlying data set without changing the view of the data seen by users. You can change field and table names in the underlying data, for example. Then you remap the Dictionary to the new field and table names without changing the aliases assigned to the data. The users create their reports using the same data interface they've been using, never knowing what has changed under the surface.

Once created, the Dictionary acts as a filter, providing a view of complex data that is clear and easy for any user to understand.

Why use a dictionary?

Dictionaries are often designed and distributed by Information System (IS) Managers or Network Administrators who control and manage a company's databases. These databases are often complex collections of data spread throughout several tables with hundreds or even thousands of fields. A user, trying to locate and use a small set of data for a report, can easily get lost among database, table, and field names.

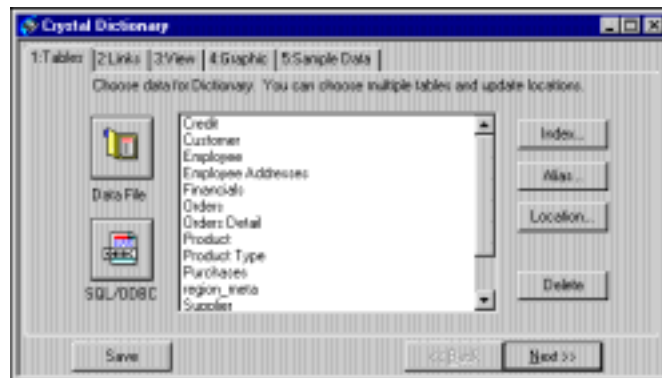
By creating a customized dictionary that contains a small amount of data specific to the work performed by a small group of users, you provide those users with clear and easy access to all of the data they need. For example, the Accounting department's dictionary can be different from the Sales department's dictionary, or the Personnel department's dictionary. Some data may overlap between dictionaries, but it can be named and organized in a fashion that best suits the users accessing it.

HANDS-ON (Dictionaries)

How to create a new dictionary



- 1 Click the NEW button on the toolbar. The Crystal Dictionary Expert appears.



This Expert contains several tabs. Each tab is numbered to lead you through the development process step-by-step.

NOTE: The Links Tab appears only when you have added more than one table to your dictionary.

- 2 To access the options on each tab, simply click the tab. Information and controls needed for the selected step will be displayed in the dialog box. You may also use the *Next>>* and <<*Back* buttons to go to the next (right) and previous (left) tab, respectively.

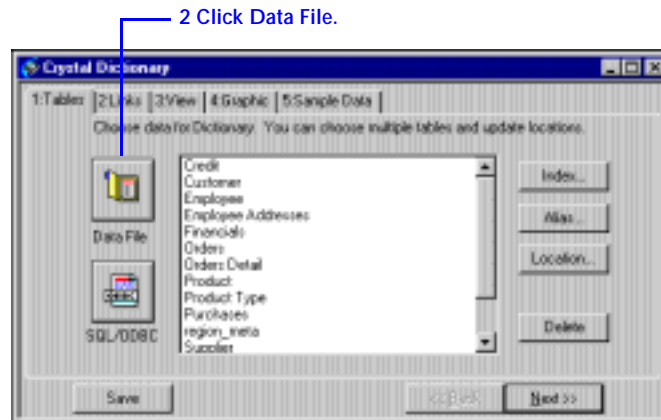
NOTE: *Certain steps must be performed before others in the creation process. For example, you must select tables before you can select fields from those tables. For that reason, some tabs may not be available until you perform the required steps prior to selecting those tabs.*

- 3 Click *Save* at the bottom of the Expert to save at any time.

NOTE: *Since a dictionary must contain some database data, the *Save* button will be disabled until you add at least one field to the *Headings & fields* in *View list box* on the *View* Tab.*

How to add a data file

- 1 While in the Crystal Dictionary Expert, click the *Tables* Tab to activate it.



The Choose Database File dialog box appears.

- 3 Use the options in this dialog box to highlight a database file.
- 4 Click *Add* to add the file. If the selected database file contains only one table, that table will appear in the list box on the *Tables* Tab.

NOTE: *When there is more than one table to add from the selected database file, the *Select Tables* dialog box appears. Highlight the tables you wish to include from the list and click *OK*. Only the tables you*

selected will appear in the list box on the Tables Tab. See How to select tables and fields for users, Page 494.

NOTE: You can not create a dictionary from two different data sources.

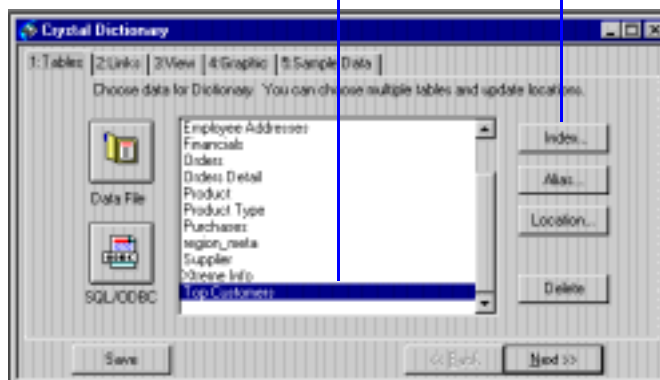
- 5 Repeat Steps 3 and 4 for each database file you want to add to the dictionary.
- 6 Click *Done* when you are finished adding database files.

NOTE: When a database file is added, the tables and fields from that file will not necessarily appear to the user who opens the dictionary from Seagate Crystal Reports. The tables that appear on the Tables Tab are only the tables available to the creator of the dictionary. To add specific fields, see How to select tables and fields for users, Page 494.

You may also need to pick an index file to be used by one of the database tables. This is done in the Tables Tab:

- 7 Highlight the database table you want to pick a specific index for.

- 8 Click *Index*.



The Choose New Location dialog box appears.

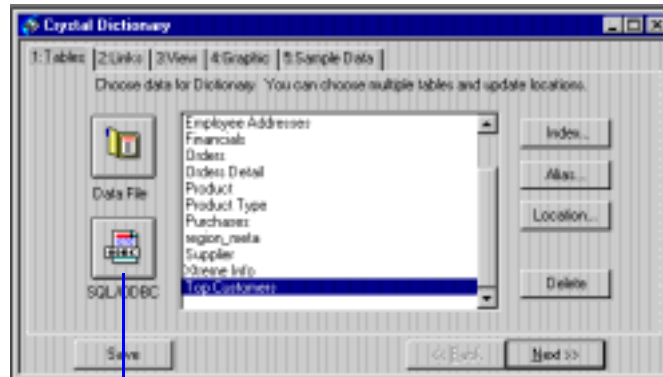
- 9 Use the controls in this dialog box to highlight a new index file, and click *OK* when finished.

NOTE: By default, Crystal Dictionaries will use any index file it finds with the same name as the database file. You only need to select an index file if you want to use an index with a different name than the database file. For more information on indexes, see Indexed tables, Page 511.

NOTE: Data files and ODBC data sources can be mixed in the same dictionary file. However, to link data files and ODBC data sources together, you can only use string fields to perform the links.

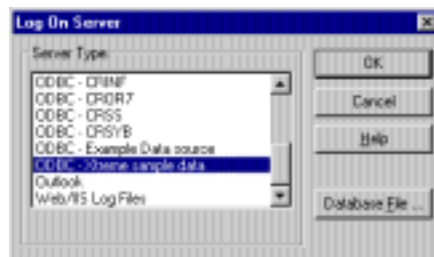
How to open an SQL or ODBC data source

- 1 While in the Crystal Dictionary Expert, click the Tables Tab to activate it.



2 Click SQL/ODBC.

The Log On Server dialog box appears.



3 Select an SQL or ODBC data source and click OK when finished.

- 4 If the data source requires any log on information, such as user name and password, the SQL Server Login dialog box will appear. Use this dialog box to log on to the ODBC data source just as you normally do from your Database Management System application.
- 5 Click OK. The Choose SQL Table dialog box appears.
- 6 Highlight a database in the SQL Databases list box. The SQL Tables list box displays all of the tables for the database you selected. Choose the table you would like to have included and click Add to add it to your dictionary.
- 7 Repeat Step 6 for each table you want to add to the dictionary.

- 8 Click *Done* when finished.

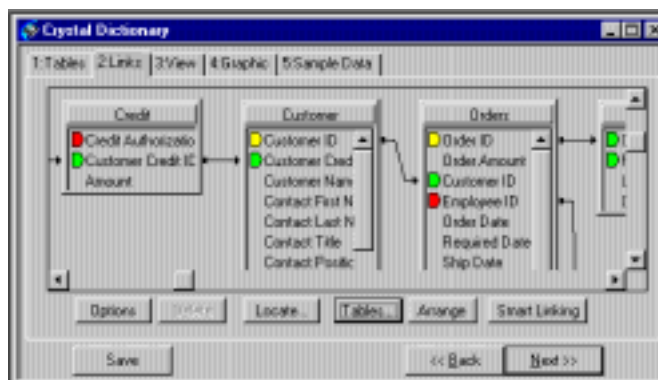
NOTE: When an SQL or ODBC data source is added from the Tables Tab, the tables and fields from that data source will not necessarily appear to the user who opens the dictionary. The tables that appear on the Tables Tab are only the tables available to the creator of the dictionary, for adding to the dictionary. See *How to select tables and fields for users*, Page 494.

NOTE: Data files and ODBC data sources can be mixed together in the same dictionary file. However, to link data files and ODBC data sources together, you can only use string fields to perform the links.

How to link multiple tables

- 1 If you have added more than one database table to your dictionary, click the Links Tab in the Crystal Dictionary Expert.

To create a link manually, drag a field name from one table to the other.



- If a link is possible between two tables, you can create a new link by dragging a field name from one table to the other. The application will draw a new link arrow between the tables. See *Indexed tables*, Page 511.
- If you select a link and click the *Options* button, the Link Options dialog box appears. You can use the controls in this dialog box to make any necessary changes to the highlighted link. Search for *Link Options dialog box* in Seagate Crystal Reports online Help.
- If you click the *Smart Linking* button, the application will create logical links between tables in your Dictionary.

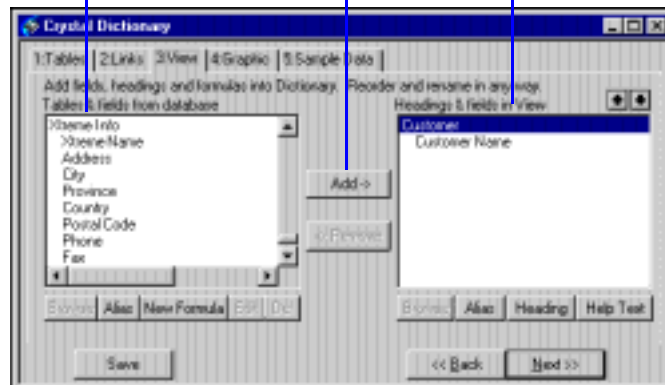
How to select tables and fields for users

After using the Tables Tab to add tables to the dictionary, those tables, and the fields in them, are not automatically available to users. The View Tab must be used to expose these fields. The View Tab lets you design the actual view of the data that the users will see.

- 1 While in the Crystal Dictionary Expert, click the View Tab to activate it.

NOTE: The following screenshot illustrates both a before and after state of the dialog box. Typically, any fields you move to the Headings and fields in View list box will no longer appear in the Tables and fields from database list box.

- 2 Highlight the field you want to make available to users from this list.
- 3 Click Add... ...the field is added to this list.



- To make a table and all its fields available to users, select the table name from the *Tables & fields from database* list box, and click *Add*. The table name becomes a field heading in the *Headings & fields in View* list box. All fields from the table appear as fields under the new field heading.
- To make a single field available to users, select the field in the *Tables & fields from database* list box and click *Add*. The field is added to the end of the list in the *Headings & fields in View* list box.

When adding and organizing tables and fields in the View Tab, keep in mind the following points:

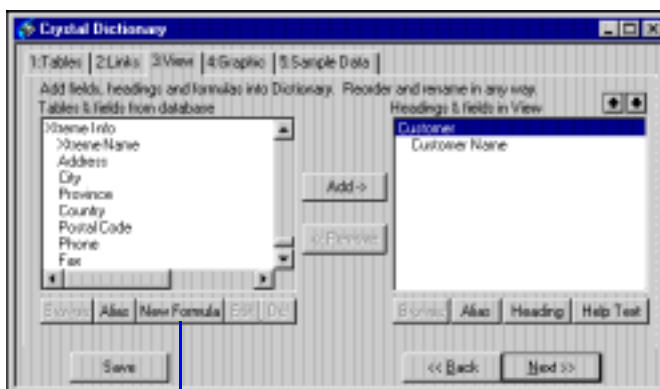
- Tables are not displayed to the dictionary user as database tables. Table names become field headings. These headings appear just

like tables when the user designs a report based on your dictionary. However, field headings do not necessarily represent database tables that actually exist.

- Field headings can be added anywhere in the *Headings & fields in View* list box to provide clearer organization of data for your users. See *How to add a new field heading*, Page 499.
- Fields can be added to the *View* list box as many times as necessary. A field does not have to appear under a field heading that matches the table the field exists in. Organize fields in any order and under any field headings that will work best for your users.
- Fields must be grouped under field headings. If you add a single field to the *Headings & fields in View* list box and no field heading appears in the list box (the list box is empty), the application will provide a default field heading for you and will add the field you selected underneath that heading.
- Field names and field headings that appear in the *Headings & fields in View* list box can be renamed to anything you want. See *How to rename fields, field headings, and formulas*, Page 497.

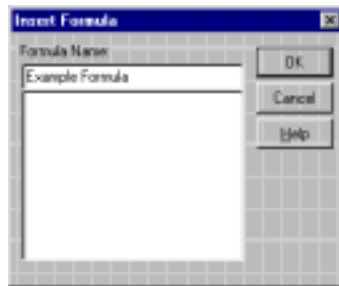
How to add/create formulas

- 1 While in the Crystal Dictionary Expert, click the View Tab to activate it.



2 Click New Formula to create a formula.

The Insert Formula dialog box appears.



3 Type a name for the formula and click OK when finished.

The Formula Editor appears.

- 4 Use the Formula Editor to create a formula for the Dictionary, just as you would create a formula for a report. See *Introduction to Formulas*, Page 291, or search for *Formula Editor* in Seagate Crystal Reports online Help.
- 5 Click *Accept* when finished. The new formula is added to the *Tables & fields from database* list box.

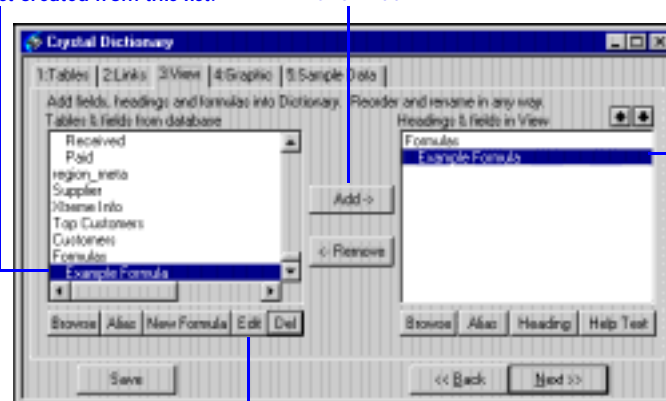
Next, you will need to add the formula to the view.

NOTE: The following illustrates both a before and after state of the dialog box. Typically, any fields you move to the *Tables & fields in view* list box will no longer appear in the *Headings & fields in view* list box.

6 Highlight the formula you just created from this list.

7 Click Add...

...the field is added to this list.



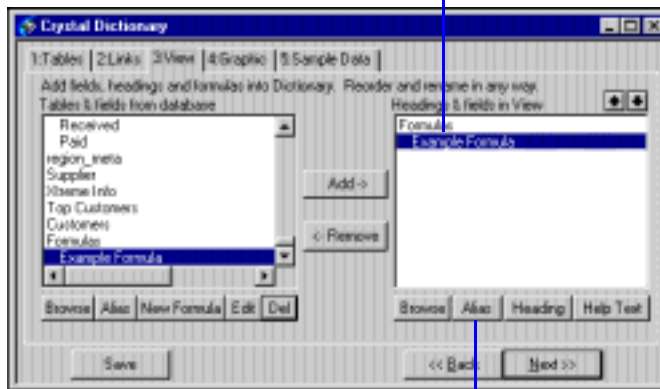
8 To modify a formula, highlight it and click the Edit button.

NOTE: Normally, formulas are represented with an @ symbol. The formula name appears in the Headings & fields in View list box without the @ symbol to hide the fact that this is a formula.

How to rename fields, field headings, and formulas

1 While in the Crystal Dictionary Expert, click the View Tab to activate it.

2 Highlight the heading or field you want to rename from this list.



3 Click Alias.

The Set Alias dialog box appears.

- If you chose a heading, the Set Table Alias dialog box appears.
- If you chose a field, the Set Field Alias dialog box appears.

See *Aliases*, Page 509.



4 Type the new name into this text box and click OK when finished.

NOTE: This process does not actually rename tables or fields. Only the alias name that appears to the user opening the dictionary is changed. The original database file is not affected.

How to move fields/field headings within the list

- 1 While in the Crystal Dictionary Expert, click the View Tab to activate it.
- 2 Highlight the heading or field you want to move from the *Headings & fields in View* list and drag it up or down to the desired position.

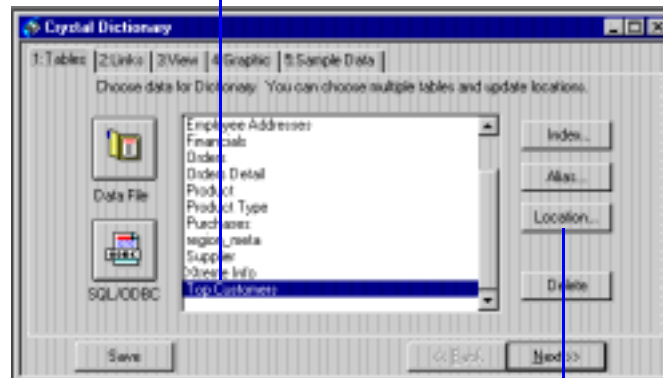
The order that the fields and field headings appear in this list box is the order that they will appear to users.

NOTE: When organizing fields and field headings, remember that field headings take the place of database tables. Because of this organization, the first item in the list box must be a field heading.

How to update the location of a database table

- 1 While in the Crystal Dictionary Expert, click the Tables Tab to activate it.

2 Highlight the table or field that has changed name or location from this list.



3 Click Location.

NOTE: Remember, the table names that appear here are aliases rather than the actual database table names. See *Aliases*, Page 509.

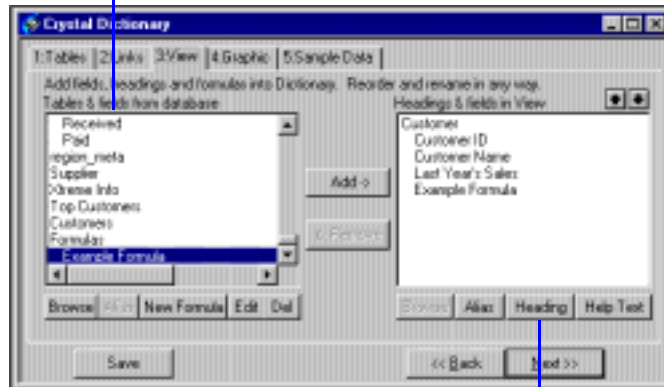
- If the table is from a data file, the Choose New Location dialog box appears.

- If the table is from an SQL server or other ODBC data source, the Choose SQL Table dialog box appears.
- 4 Highlight the new name or location of the database table from the dialog box that appears, and click **OK**.

How to add a new field heading

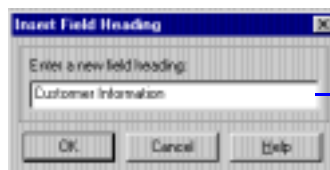
- 1 While in the Crystal Dictionary Expert, click the View Tab to activate it.

2 Highlight the field that will be the first to appear under the new field heading from this list.



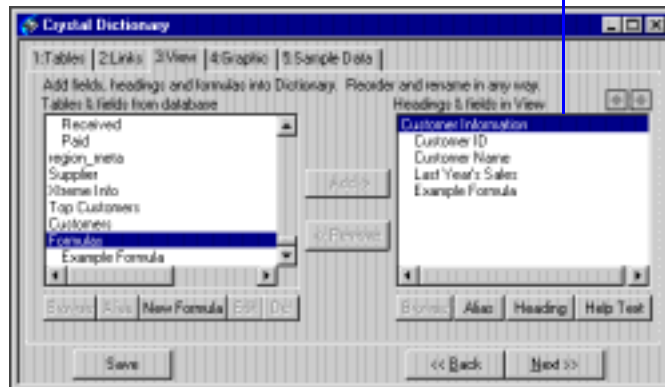
3 Click **Heading**.

The Insert Field Heading dialog box appears.



4 Type the new name into this text box and click **OK** when finished.

The new field heading appears in this list, as specified.

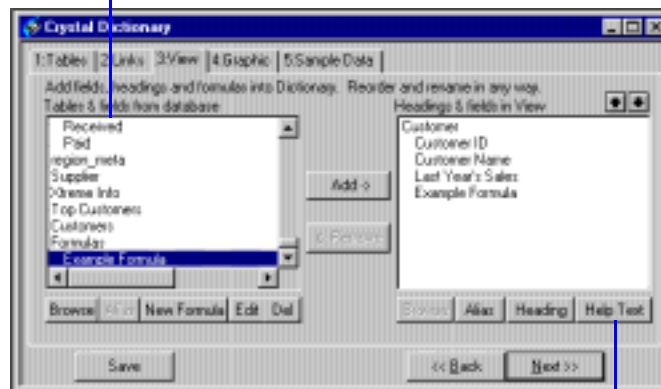


How to add Help text

To maximize the efficiency of your dictionary, Seagate Crystal Reports allows you to add Help text. Whenever anyone needs clarification on what the elements of your dictionary are, they can point to the item in question and Help text will appear in a pop-up window to assist them.

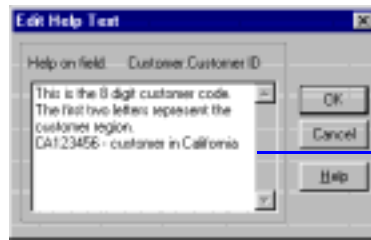
- 1 While in the Crystal Dictionary Expert, click the View Tab to activate it.

- 2 Highlight the field that you want to add Help text to from this list.



- 3 Click Help Text.

The Edit Help Text dialog box appears.

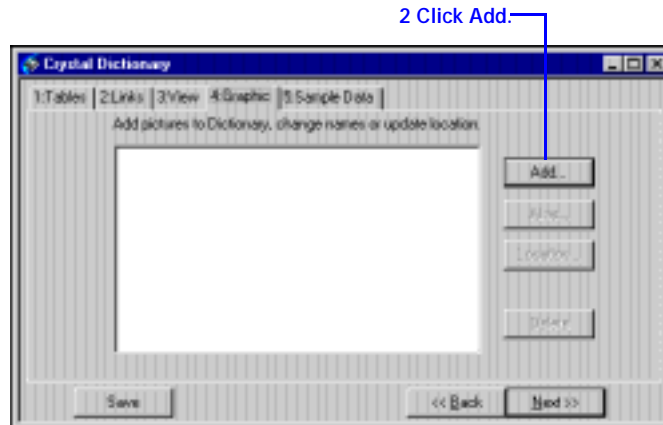


4 Enter the Help text and click OK when finished.

When the user selects a field or field heading and holds the cursor over the selected item, the Help text appears in a pop-up window.

How to add a graphic

- 1 While in the Crystal Dictionary Expert, click the Graphic Tab to activate it.



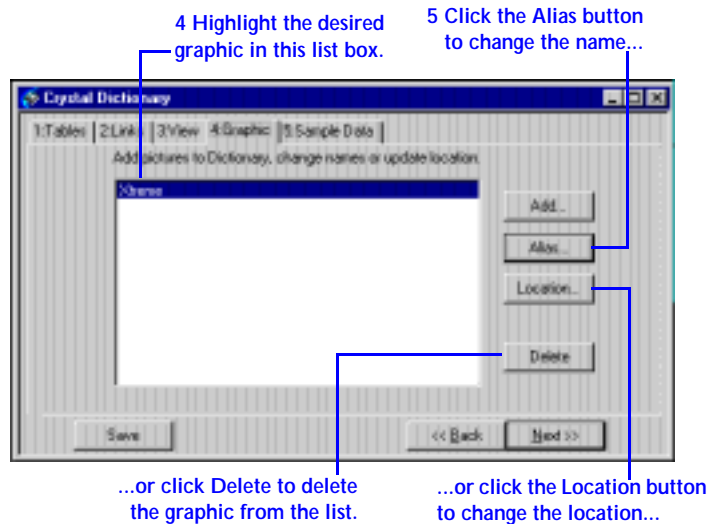
2 Click Add.

The File Open dialog box appears.

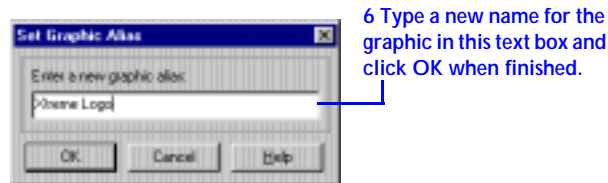
- 3 Use the controls in the File Open dialog box to highlight a graphic image file, and click *OK* to add it to the dictionary.

Dictionaries support the Windows bitmap (.BMP), PC Paintbrush (.PCX), Tiff (.TIF), and TARGA (.TGA) graphic formats. The image file appears in the list box of the Graphic Tab.

You may now want to change the alias name, update the location, or delete a graphic. Simply highlight the desired graphic and click the appropriate button for your needs.



- If you clicked the *Alias* button, the Set Graphic Alias dialog box appears.

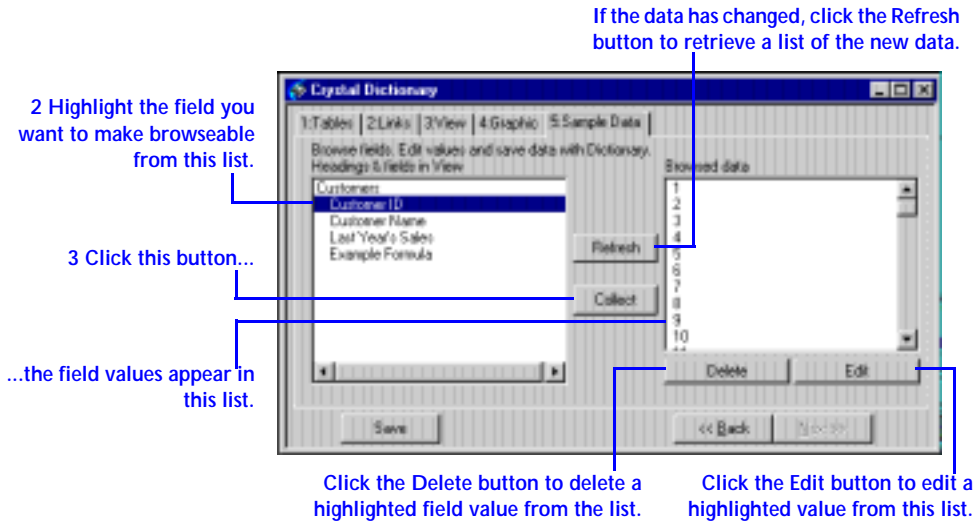


- If you clicked the *Location* button to set the new location of the image, the Choose New Location dialog box appears. Use this dialog box to find the new name and/or location of the graphic file.

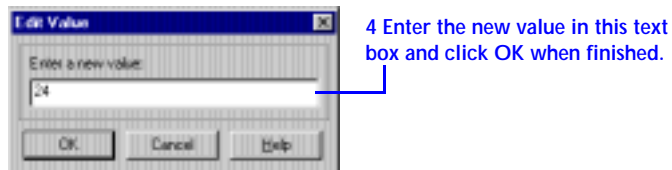
How to create sample data for users to browse

The Sample Data Tab in the Dictionaries Expert lets you create a set of custom sample data that appears to users when they browse field data. The data they see may or may not reflect actual data in the database, depending on the sample data you design.

- 1 While in the Crystal Dictionary Expert, click the Sample Data Tab to activate it.



If you clicked the *Edit* button, the Edit Value dialog box appears.



The new value appears in the *Browsed data* list box.

NOTE: Deleting and editing values in the *Browsed data* list box of the *Sample Data* Tab does not change the database file. It only changes the list of values that appears to a user whenever the *Browse and Paste* dialog box is opened. This allows you to customize the look of the data when users browse data, without actually changing the data that is reported on.

How to edit an existing dictionary



- 1 Click the OPEN button on the toolbar. The File Open dialog box appears.
- 2 Use the *Drives*, *Directories*, and *File Name* controls to highlight the existing dictionary file and click OK. The Crystal Dictionary Expert appears.

- 3 Use the Expert to make changes to the dictionary file.

How to convert a 4.x or 5.x dictionary file



- 1 Click the OPEN button on the toolbar. The File Open dialog box appears.
- 2 Use the *Drives*, *Directories*, and *File Name* controls to highlight the old dictionary (*.DCT) file and click *OK*. The Select View dialog box appears, listing the names of all views from the old dictionary file.
- 3 Highlight the view you want to convert to a new dictionary file, and click *OK*. The Crystal Dictionary Expert appears with the data from the view you selected.

NOTE: *This version of Crystal Dictionaries provides an easier and more powerful method for controlling data access than older versions. However, each view from an older dictionary file is handled as a separate dictionary in this version. An older dictionary file, on the other hand, held several views. To convert an entire dictionary 4.x or 5.x file, you must open each view in the file separately and save it as a new dictionary file.*

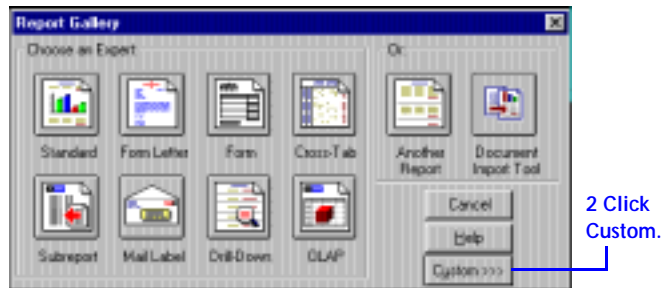
- 4 Use the Expert to make changes to the new file.
- 5 When the file is saved, it will be saved in the new dictionary format (*.DC5).

How to select a dictionary for a report

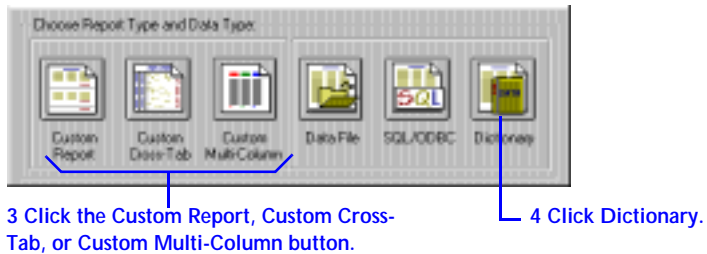
When creating a new report in the Seagate Crystal Reports, you can specify a dictionary as your data source. By using a dictionary for your report, administrators can monitor company information being disclosed and users are not burdened by extra data they will not be using in their reports.



- 1 Click the NEW button on the standard toolbar in the Seagate Crystal Reports. The Report Gallery appears.



An additional section is added to the dialog box, revealing custom report options.



- 5 Use the *Drives*, *Directories*, and *File Name* controls from the dialog box that appears to highlight the dictionary (*.DC5) file that you want to use, and click *OK*.



- 6 To add items from the dictionary to your report, click the **INSERT FIELDS** button on the standard toolbar, and use the Insert Fields dialog box to highlight fields and images for your report.
 - Field headings from the dictionary appear as tables in the Insert Fields dialog box.
 - Fields from the dictionary appear as fields for each table.

NOTE: You can not use more than one dictionary file in a report at a time. Also, you can not link fields from dictionary files to fields in other database tables.

What you will find in this chapter...

Databases Overview, Page 508

Relational Database basics, Page 508

Aliases, Page 509

Locating files, Page 510

Indexed tables, Page 511

Linking tables, Page 513

Using SQL and SQL databases, Page 535

HANDS-ON (Working With Databases), Page 548

Server-side processing, Page 542

Remapping database fields, Page 545

Databases Overview

Though there are hundreds of Database Management Systems (DBMS) available, Seagate Crystal Reports eliminates many of the differences once it connects to the actual database files. The process of working with database files, tables, fields, and records is much the same, regardless of the actual type of data being accessed.

This chapter discusses several concepts and tasks common to working with database files. Using database aliases, locating moved or renamed database files, working with indexed tables, and linking tables are subjects common to anyone who designs reports in Seagate Crystal Reports. The topic, *Using SQL and SQL databases*, Page 535, is especially important for anyone who accesses data in SQL databases and other database formats that are accessed through ODBC.

Relational Database basics

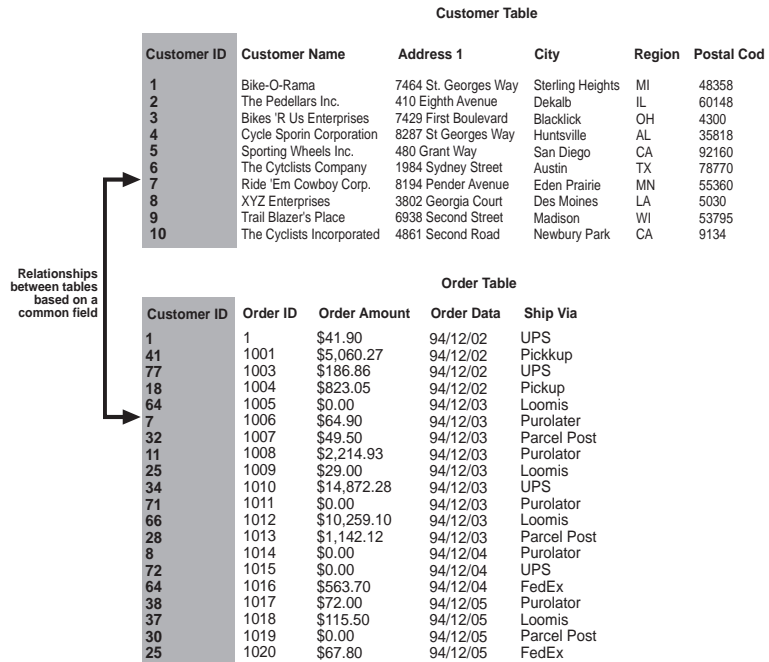
The most popular architecture for database files used in the corporate world is based on the relational model. Applications that allow you to create databases with the relational model are, therefore, often referred to as Relational Database Management Systems (RDBMS).

In a relational database, data is organized in a system of rows and columns. The rows are called records, and the columns are called fields. Each record contains a collection of related data, all information relating to a specific customer, for example. Each field refers to a common type of data that exists in all records, the names of the customers, for example. Records and fields are stored in a database table. The following diagram illustrates the basic relational database model:

Customer Table					
Customer ID	Customer Name	Address 1	City	Region	Postal Code
1	Bike-O-Rama	7464 St. Georges Way	Sterling Heights	MI	48358
2	The Pedellars Inc.	410 Eighth Avenue	Dekalb	IL	60148
3	Bikes 'R Us Enterprises	7429 First Boulevard	Blacklick	OH	4300
4	Cycle Sporin Corporation	8287 St Georges Way	Huntsville	AL	35818
5	Sporting Wheels Inc.	480 Grant Way	San Diego	CA	92160
6	The Cytclists Company	1984 Sydney Street	Austin	TX	78770
7	Ride 'Em Cowboy Corp.	8194 Pender Avenue	Eden Prairie	MN	55360
8	XYZ Enterprises	3802 Georgia Court	Des Moines	LA	5030
9	Trail Blazer's Place	6938 Second Street	Madison	WI	53795
10	The Cytclists Incorporated	4861 Second Road	Newbury Park	CA	9134

Diagram labels: An arrow points to the first column (Customer ID) labeled "Column". An arrow points to the third row (Bikes 'R Us Enterprises) labeled "Row".

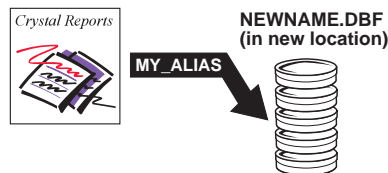
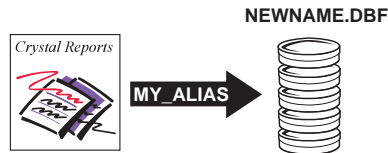
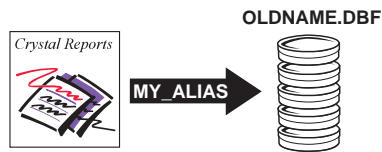
Often, data in two different tables can be related by a common field. For example, a Customers table will have a Customer ID for each customer, and an Orders table will have the Customer ID of each customer who placed an order, demonstrating a relationship between tables. The two tables can be linked by a common field (see *Linking tables*, Page 513). The following diagram displays how two tables can have a relationship:



Aliases

For a variety of reasons, database names and locations get changed. If you create a report, then change the name or location of a table or file, Seagate Crystal Reports must be able to find the new name or location. This is especially important when you create formulas in your report that access a table that has been renamed or moved. To fix the reference for a single field would not be difficult, but to find every formula that uses that field could be a difficult and time consuming task.

To solve this problem, Seagate Crystal Reports uses aliases to refer to database tables and files. Aliases are pointers, internal devices that tell the program where it should look for a database field. Now, if you change the name or location of the database, you simply reset the pointer. See *Locating files, Page 510*. The name of the alias does not change, so your formulas are not affected. Seagate Crystal Reports looks to the alias for the location and name, goes to the new location for the database field, and executes the formula without a problem.

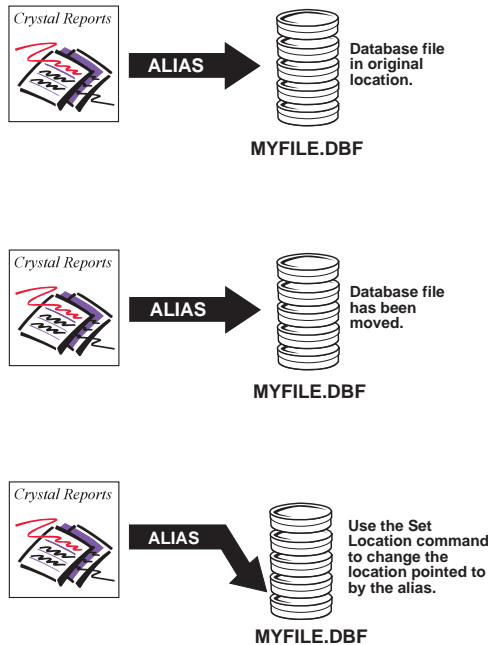


Seagate Crystal Reports automatically assigns default alias names to database tables when you first select the table or file. By default, an alias matches the original name of the table. In databases where the database table is a separate file (for instance, dBASE), the name of the database file is used without the file name extension. For example, if you are using the dBASE database file COMPANY.DBF, the program will assign a default alias name of COMPANY to the file. You can accept the default alias or assign a new one to the database table.

You can change an alias at any time using the SET ALIAS command on the Database Menu. However, if you have already created formulas in your report using the original alias name, you will need to edit the formulas to use the new alias.

Locating files

When a database file is moved or renamed, Seagate Crystal Reports will not be able to find the data the next time the report is printed. On other occasions, a report may be created on one machine where all of the database data is stored in a certain directory, then the report is copied or moved to another machine that stores the same data in a different directory. In any of these events, you need to verify the location of the database files accessed by the report and reset the alias pointers to the new database location or name.



The **VERIFY DATABASE** command on the Database Menu checks the alias pointers stored in a report file to verify that the database files expected are located in the indicated directories. If the databases are not found in the specified location, the program notifies you of the discrepancies. Search for *Verify Database command* in Seagate Crystal Reports online Help.

Use the **SET LOCATION** command on the Database Menu to change the alias pointers stored by Seagate Crystal Reports. The **SET LOCATION** command provides a simple way to indicate the new name or location of database files. In addition, the **SET LOCATION** command can be used to change the ODBC data source used by a report. See *How to change the ODBC data source accessed by a report*, Page 563, and search for *Set Location command* in Seagate Crystal Reports online Help.

Indexed tables

Creating indexes for database tables can increase the speed of data access and reduce the time it takes for the program to evaluate data. Some DBMS applications automatically index your database tables, while others require that you create an index yourself. For the best report generation performance, make sure each of your database tables has a corresponding index.

NOTE: Some DBMS applications do not support indexed tables. Refer to the documentation for your DBMS to find out if it supports indexes and how to create them. If your DBMS documentation does not mention indexed tables, it may not support them, and you should link tables based on common fields. The Visual Linking Expert can also help you determine if your tables include indexes. Search for Visual Linking Expert in Seagate Crystal Reports online Help.

Indexes organize the records in a relational database table so that data can be located easier. For example, assume you have a table with the following data:

Order#	Customer	Amount
10444	Allez Distribution	25141.50
10470	BG Mountain Inc.	19164.30
10485	Sierra Mountain	8233.50
10488	Mountain Toad	24580.50
10495	SFB Inc.	7911.80
10501	La Bomba de Bicicleta	1956.20
10511	BG Mountain Inc.	1683.60
10544	Sierra Bicycle Group	19766.20
10568	Mountain Tops Inc.	29759.55
10579	Sierra Bicycle Group	12763.95

The information in this table is organized according to the Order# field. This is fine anytime you want to look up information in the table based on order numbers. However, what if you want to look up information specific to a certain customer?

Say you want to look up all orders made by Sierra Bicycle Group. The database engine must begin by looking at the first order number in the list and checking to see if the customer name matches the request. If not, it goes to the second order number, and checks that customer name. When an order number is reached that contains the correct customer name, the database engine retrieves the information, then continues to the next order number. Using this technique, both the Order# field and the Customer field must be read for every single record in the table. This takes a long time and a large amount of computer processing effort for examining extensive database tables with thousands, or even millions of records.

Instead, you can create an index for the table based on the Customer field. Such an index might look like this:

<i>Customer</i>	<i>Pointer to Order#</i>
Allez Distribution	10444
BG Mountain Inc.	10470
BG Mountain Inc.	10511
La Bomba de Bicicleta	10501
Mountain Toad	10488
Mountain Tops Inc.	10568
SFB Inc.	10495
Sierra Bicycle Group	10544
Sierra Bicycle Group	10579
Sierra Mountain	10485

In this index, information is organized by customers, not order numbers. Also, notice that the second column actually contains pointers to specific order numbers in the original table. By using this index, the database engine can search just the information in the Customer column until it finds the customer you are interested in, Sierra Bicycle Group.

For each correct customer entry the database engine finds in the index, it looks up the matching order in the table according to the pointer in the second column of the index. Only the orders for the correct customer are read. Finally, since information in the index is organized according to the customer names, the database engine does not need to continue searching through the index or the table as soon as it finds an index entry that does not match the requested customer.

The advantage of this highly organized search through a database table according to an index is speed. Using indexes speeds up data retrieval and report generation, important factors when reporting on large database files.

Linking tables

You link tables so records from one table will match related records from another. For example, if you activate an Orders table and a Customers table, you link the tables so that each order (from the Orders table) can be matched up with the customer (from the Customer table) that made the order.

When you link, you are using a field that is common to both tables. Seagate Crystal Reports uses the link to match up records from one table with those from the other. In this example, the link assures that the data in each row of the report refers to the same order.

Link from and link to

When you link two tables, you link *from* one table *to* another table. When linking tables, you must understand this concept. The *from* table is used as a primary table, while the *to* table acts as a lookup table where records are looked up by the primary table. In a simple link, Seagate Crystal Reports examines the first record in the primary table and finds all matching records in the lookup table. Once all matches have been found in the lookup table for the first record in the primary table, all matches in the lookup table for the next record in the primary table are found.

NOTE: Seagate Crystal Reports can link two records based on a partial match of string data. This is called a partial link. To enable partial linking in Seagate Crystal Reports, toggle the Allow partial text matches check box on using the Link Options dialog box. As an example of a partial link, a record with a field value of "Chris" can link to a record with a field value of "Christopher". However, partial linking only works when the value in the lookup table is longer than the value in the primary table. In other words, the value "Chris" can link to the value "Christopher", but the value "Christopher" can not link to the value "Chris". Search for Link Options dialog box in Seagate Crystal Reports online Help.

Link relationships

When you link records from one table to another table, the records will typically fall under one of two relationship types:

1. one-to-one, or
2. one-to-many.

ONE-TO-ONE RELATIONSHIPS

In a one-to-one relationship between records in two linked tables, for every record in the primary table there is only one matching record in the lookup table (based on the linked fields). For example, in the xtreme.mdb database, the Employee table can be linked to the Employee Addresses table based on the Employee ID field in each table. The Employee table contains information about employees at the company, the positions they hold, their salaries, hiring information, etc. The Employee Addresses table contains each employee's home address. There is only one record for each employee in each of these tables. Therefore, if the Employee table is linked to the Employee Addresses table, only one record will be found in the Employee Addresses table for each record in the Employee table. This is a one-to-one relationship.

ONE-TO-MANY RELATIONSHIPS

In a one-to-many relationship between records in two linked tables, for every record in the primary table, there may be more than one matching record in the lookup table, based on the linked fields. In the `xtreme.mdb` database, the Customer table can be linked to the Orders table based on the Customer ID field in each table. The Customer table contains information about each customer that has placed an order with the company. The Orders table contains information about orders that customers have placed. Since customers can place more than one order, there may be more than one record in the Orders table for each customer record in the Customers table. This is a one-to-many relationship.

Performance considerations in one-to-many links

The information provided in this section is intended to help you maximize processing time and minimize network traffic when you are running your reports. You will learn about the best ways to use selection formulas and indexes in one-to-many situations to make your reporting more efficient. If you do not use the information in this section, your reports may end up processing dozens or even hundreds more records than necessary.

When a one-to-many situation exists between two database tables and the program matches up records from the tables, there are a number of factors that determine how many records the program reads and evaluates. Understanding this information will help you avoid those situations that require excessive processing time or that generate unnecessary network traffic.

The tables that follow show the effects of the different factors on the number of records the program ultimately has to read. The charts are based on these assumptions:

- Table A contains 26 records (one for each letter in the alphabet).
- Table B contains 2600 records (100 matching records for every record in Table A).
- The scenario is to produce a report that finds two specific records in Table A and the 200 records (100+100) in Table B that match those two records in Table A.
 - In a best case scenario, the program would only have to read about 200 records to accomplish the task.
 - In a worst case scenario the program would have to read about 67,600 records to accomplish the same task.

NOTE: The performance considerations for data files are different from the considerations for SQL databases. A data file is any non-SQL database that is accessed directly from Seagate Crystal Reports. For the purpose of this discussion, an SQL database is any SQL database accessed directly from Seagate Crystal Reports or through ODBC as well as any other database types that are accessed through ODBC. For a better understanding of the difference between direct access databases and ODBC data sources, see Data Sources, Page 579.

EXTENDED DESCRIPTIONS OF CHART COLUMNS

The performance charts use the following columns:

- **Linking or Subreport**
Are you creating a report from linked databases or are you inserting a subreport and binding it to the data in your primary report?
- **Selection Formula**
Does your primary report include a record selection formula that sets range limits on the key (indexed) field in Table A?
- **Index A**
Is Table A on the field you are going to use indexed to match up the records?
- **Index B**
Is Table B on the field you are going to use indexed to match up the records?
- **Reads A**
How many records does the program have to read out of Table A to find the two records it is looking for?
- **For each A reads in B**
How many records does the program have to read in Table B to find the 200 records it is looking for?
- **Total Records Read**
What is the total number of records the program has to process to complete the task?

<i>PC Data</i>						
<i>Linking/ Subreport</i>	<i>Selection Formula</i>	<i>Index A</i>	<i>Index B</i>	<i>Reads A</i>	<i>For each A reads in B</i>	<i>Total Records Read</i>
Linking	No	Yes or No	Yes	26	100 (26*100)	2600

<i>PC Data</i>						
Linking	Yes	No	Yes	26	100 (26*100)	2600
Linking	Yes	Yes	Yes	2	100 (2*100)	200
Subreport	No	No	No	26	2600 (26*2600)	67,600
Subreport	No	Yes	No	2	2600 (26*2600)	67,600
Subreport	No	Yes	Yes	26	100 (26*100)	2600
Subreport	Yes	No	No	2	2600 (2*2600)	5200
Subreport	Yes	No	Yes	26	100 (26*100)	2600
Subreport	Yes	Yes	Yes	2	100 (2*100)	200

<i>SQL Data</i>				
<i>Linking/ Subreport</i>	<i>Selection Formula</i>	<i>Reads A</i>	<i>For each A reads in B</i>	<i>Total Records Read</i>
Linking	No	26	100 (26*100)	2600
Linking	Yes	2	100 (2*100)	200
Subreport	No	26	100 (26*100)	2600
Subreport	Yes	2	100 (2*100)	200

Data file considerations

When working with data files, one-to-many links can occur when you link tables in a single report or when you add a subreport to your report.

LINKING DATA FILES

When retrieving data from linked data files in one-to-many situations, the program uses the following process:

- If there is a selection formula, the program parses the selection formula and passes what it can down to the database DLL. This is generally range limit information. Consider the following record selection formula:

```
{customer.REGION} in "CA" to "IL" AND  
Remainder ({customer.CUSTOMER ID}, 2)=0
```

In this formula, the part before the “and” operator contains range selection criteria for the Region field. The region must fall alphabetically between “CA” and “IL”. The program passes this kind of condition down to either the database DLL (for PC data) or the server (for SQL data). See *Record and Group Selection*, Page 227.

The second half of the selection formula, however, requires processing that must be done in the Report Engine. It uses a built-in function to manipulate and evaluate a field value and it can not be done in the database DLL or the server. The program does not pass this condition to the database DLL.

- If there is an index on Table A, and the range limit selection condition is based on the indexed field ({customer.REGION} in this example), the program goes directly to the record it is seeking in Table A (the first CA record) and reads it.
 - For that record, the program locates the first matching record in Table B, using the Table B index.
 - The program passes this merged record (A+B) back to Seagate Crystal Reports, which tests the record against the entire selection formula.
 - The program then reads the second matching record and passes the merged record on, and then reads the third matching record, and so on, until it has read all of the matching records.
 - The program then it returns to Table A and reads the next record. There is no need to test the record to see if it meets the CA condition; the field is indexed and the records are in alphabetic order. But the program tests the record to see if it goes beyond the “IL” condition (for example, could the next record be from Mississippi or Tennessee?). If the record is still within the specified range, the program begins the matching process again for that record.
 - The program continues the process until it has located all targeted Table A records and the matching Table B records.

To find two records in Table A and the 100 records in Table B that match the Table A records, the program reads 200 records.

NOTE: The lookup table in a link (Table B) must always be indexed; otherwise, you will not be able to link the tables.

- If there is no index on Table A, or if there is an index but the range limit selection condition is not based on the indexed field, the program reads the first record it finds.
 - For that record, the program uses the Table B index to locate the first matching record in Table B.
 - The program passes this merged record (A+B) back to the Report Engine, which tests it against the entire selection formula.
 - The program then locates the second matching record in Table B and passes that merged record back, then the third record, and so on, until it has located, merged, and passed back all the records in Table B that match the first record in Table A.
 - The program then moves on to the next record in Table A and begins the matching and merging process all over again.

To find two records in Table A and the 100 records in Table B that match the Table A records, the program reads 2600 records.

SUBREPORTS AND DATA FILES

If your primary report is based on Table A, the subreport is based on Table B, and the records are linked, your primary considerations are as follows:

- The number of subreports that are run by the program is determined by the index and the selection formula situation in the primary report.
 - If Table A is indexed, and if the primary report has a selection formula that passes down range limit conditions for the indexed field, the program runs two subreports.
 - If Table A is not indexed, or if Table A is indexed but the selection formula does not pass down range limit conditions for the indexed field, the program runs 26 subreports.
- The number of records read for each subreport is determined by the index situation on Table B.
 - If you have an index on Table B, the program will read only the matching records (100) when it runs a subreport.
 - If you do not have an index on Table B, the program will always read every record in Table B (2600) when it runs a subreport.

SQL database considerations

Since indexes are not critical with SQL data, the primary concern with both linked tables and subreports is whether or not there is a selection formula in the primary report that puts range limits on Table A. See *LINKING DATA FILES, Page 517*.

LINKED SQL TABLES

If there are range limit conditions in the selection formula, the program passes those conditions down to the server.

- If there is a selection formula that puts range limits on Table A, the server locates the records in Table A that satisfy the selection criteria (2), matches them up with the appropriate records in Table B (100), and returns 200 merged records to the Report Engine.
- If there is no selection formula, or if there is a selection formula that does not put range limits on Table A, the server matches up each record in Table A (26) with the appropriate records in Table B (100), and returns 2600 merged records to the Report Engine.

In either case, the Report Engine will then apply the entire selection formula to the merged records.

SUBREPORTS AND SQL DATABASES

If you are creating a primary report based on Table A and a subreport based on Table B:

- The number of subreports that are run is determined by the selection formula situation in the primary report.
 - If there is a selection formula and it passes down range limits on Table A, the program runs a subreport only for those records that satisfy range limit conditions (2).
 - If there is no selection formula, or if the selection formula does not pass down range limits on Table A, the program runs a subreport for every record in Table A (26).
- The number of records read by each subreport remains the same regardless of whether there was range limit selection on Table A. Each subreport will read only those records in Table B that match each record read in Table A (100).

Performance considerations for all reports

CONSIDERATION #1

With both data files and SQL databases, the program parses the entire selection formula and passes down whatever parts of the criteria it is able

to translate (pass), wherever they may physically appear in the formula. Thus, if the formula finds criteria it can pass, then criteria that it can not, then criteria that it can, it passes down the first part, skips the second, and then passes down the third.

- In the case of data files, the program passes down the criteria that it can to the database translation layer.
- In the case of SQL databases, the program passes down to the server the criteria that it can in the form of a WHERE clause.

While there are exceptions, as a general rule the program can pass down any part of the record selection formula that compares a field with a constant. Typically, this means that it can pass down any kind of record selection criteria that can be set up in the Select Expert (*equal to, one of, less than, greater than, less than or equal, greater than or equal, between, starting with, or like* constant).

There are two special selection formula situations that you need to consider. In these situations, the record selection formula includes multiple conditions, some of which can be passed down while others can not.

1. AND situations

```
{customer.REGION} = "CA" and  
{customer.CUSTOMER ID}[3 to 5] = "777"
```

In this situation, the program sees that it can pass down the condition before the And operator but not the condition after. Since the only records that will meet the second condition will have to meet the first as well, the program passes down the first condition, retrieves the data set that satisfies the condition, and then applies the second condition only to the retrieved data. The rule for AND situations is that the program passes down whatever conditions it can.

NOTE: *If all of the conditions in an AND situation can be satisfied on the server or in the database DLL, the program passes them all down.*

2. OR situations

```
{customer.REGION} = "CA" or  
{customer.CUSTOMER ID}[3 to 5] = "777"
```

In this situation, the program also sees that it can pass down the condition before the Or operator but not the condition after. Since there are records that can satisfy the second condition without satisfying the first, passing the first condition down does not make any sense because it will retrieve an incomplete data set. In other words, even if it retrieves all the data that satisfies the first condition,

it will still have to retrieve all the data in the table(s) before it can apply the second condition in Seagate Crystal Reports. Thus, instead of duplicating parts of the data retrieval, the program passes nothing down. It retrieves all the data and then runs both tests in Seagate Crystal Reports. The rule for OR situations is that the program either passes down all the tests, or none of the tests.

NOTE: If all the tests in an OR situation can be performed on the server or in the database DLL, the program passes them all down.

CONSIDERATION #2

To make certain the program can use the index on Table A to enhance performance, make certain that:

- there is a selection formula,
- there are range limits in the selection formula on the key (indexed) field in Table A, and
- the *Use Indexes* option is toggled on in the Options dialog box. Search for *Options dialog box* in Seagate Crystal Reports online Help.

CONSIDERATION #3

If the fields you are using from Table A are not indexed, but there is an indexed field that you can use in your record selection request, use that field. For example, assume that you have three products (Product 1, Product 2, and Product 3) and you want to identify all sales of Product 2 in the U.S. There is no index on the Product field but there is an index on the Order Date field. Since you know that Product 2 did not begin shipping until July of 1995, you can improve speed by limiting your report to orders placed in and after July 1995 using the selection formula. In such a case, the program uses the Order Date index to retrieve only those orders from July 1995 and afterward (a small subset of the entire database) and then searches for the occurrences of Product 2 in that subset, not in the entire database.

The Visual Linking Expert

The Visual Linking Expert lets you easily link two or more tables. When you choose the ADD DATABASE TO REPORT command from the Database Menu and select an additional database table, the Visual Linking Expert appears and displays that database table. Search for *Visual Linking Expert* and *Add Database To Report command* in Seagate Crystal Reports online Help.

The easiest way to link database tables is to click the *Smart Linking* button in the Visual Linking Expert. Smart Linking automatically chooses links

for your tables based on common fields in tables or indexed fields (if your database supports indexed fields).

Linking indexed tables

When you are linking direct-access database tables, you must link from the primary table to an indexed field in the lookup table. The link field in the primary table can be indexed, but does not have to be. The link field in the lookup table, however, must be indexed.

In addition, the fields used to link two tables must have the same data type. For example, you can link a string field in one table to a string field in another table, or a numeric field in one table to a numeric field in another table, but you can not link a numeric field in one table to a string field in another table.

NOTE: Some DBMS applications allow you to convert the field value to another data type in the index. For instance, the field in the table can be numeric, while the index converts the field value to a string. However, if you choose to use that field to link to another table, you must link to a field of the original data type. You can not link a string value to a numeric field that has been converted to a string in the index.

NOTE: If you are linking tables from two different ODBC data sources, MS SQL Server and Oracle, for example, you can only use string fields to link the tables. String fields are stored in databases in the same manner, regardless of the data source. Other types of values, however, may not be stored the same way in different data sources, so you can not link different data sources in Seagate Crystal Reports using anything other than string values.

CHANGING THE INDEX USED IN LINKING

When using the Smart Linking feature to link tables using a field that is a component of multiple indexes (two or more), Seagate Crystal Reports selects one of the indexes for the link. That index may or may not be the one you want to use. To determine the index in use and to change it, use the *Index* section of the Link Options dialog box.

To call up the dialog box, either:

- double-click the link line of interest,
- select the link line of interest and click the *Options* button at the bottom of the Visual Linking Expert, or
- right-click the link line of interest, and choose the **OPTIONS** command from the shortcut menu that appears.

The *Index* section of the Link Options dialog box has two parts:

1. The *Index In Use* text box

This text box displays the index that is currently in use. If you click the arrow, it lists the other indexes that are available for the link, as well as the option *No specific index*. If you are using an indexed database table and you do not see a particular index that you would expect to see on this list, use the *Add Index* button.

2. The *Fields in Index* text box

This text box displays the fields that are included in the index that is currently selected in the *Index In Use* list box.

If you select the *No specific index* option, the program will select an index for you the next time you print the report to the Preview Tab.

NOTE: *Not all DBMS applications support indexed tables. Verify that your database uses indexes before trying to select an index for linking. Refer to your DBMS documentation to find out if your DBMS can use indexes, and to learn how to create them.*

Methods of looking up tables (direct access databases)

When a single table is linked to two or more tables, Seagate Crystal Reports needs to know in what order it should look up and link data from the primary table to data in the second, third, etc., lookup table.

Seagate Crystal Reports offers three options for looking up records in two or more lookup tables from a single primary table:

1. *LOOK UP BOTH AT THE SAME TIME, Page 525*
2. *LOOK UP ALL OF ONE, THEN ALL OF OTHERS (A TO B, A TO C), Page 525*
3. *LOOK UP ALL THE COMBINATIONS OF THE TWO FILES, Page 526*

NOTE: *These options are not available if you are using data from an ODBC data source.*

These options are only available when you have a single table (a primary table) that is linked to two or more lookup tables. The primary table must be the *link from* table in each of the links. For instance, if you link from the Customer table to the Orders table and from the Customer table to the Credit table, these lookup options are available. However, if you link from the Customer table to the Orders table and from the Credit table to the Customer table, these options are not available.

In this example, for each method demonstrated three fields from three different linked tables will be shown. In each case, the Customer table is linked to the Credit table and the Orders table. The fields displayed are the Customer Name field from the Customer table, the Amount field from the Credit table, and the Order Amount field from the Orders table.

These are not necessarily actual link fields for the tables, but the data in these fields illustrates how data is retrieved using each of the three lookup methods.

LOOK UP BOTH AT THE SAME TIME

For each record in the Customer table, this option looks for a matching record in the Credit table and a matching record in the Orders table. Then it looks for the next matching record in the Credit table and the next matching record in the Orders table, etc. Once it finds all the matching records, it repeats the process with the next record in the Customer table.

<i>Customer Table</i>	<i>Credit Table</i>	<i>Orders Table</i>
<i>Customer Name</i>	<i>Amount</i>	<i>Order Amount</i>
Cyclists Incorporated	(\$1088.56)	\$1529.70
Cyclists Incorporated	(\$1260.12)	\$23.50
CyclePath Corp.	(\$1958.03)	\$49.50
CyclePath Corp.	(\$1076.43)	\$1702.60
CyclePath Corp.	(\$75.04)	
The Great Bike Shop	(\$138.98)	\$3269.70
The Great Bike Shop		\$5219.55
The Great Bike Shop		\$1538.20

Notice that for each line in the report, the value in the Amount field of the Credit table does not necessarily have any connection to the value in the Order Amount field of the Orders table. However, for each record in the Customer table, one record is selected from the Credit table, and one record is selected from the Orders table, at the same time.

Also notice that when the Credit table runs out of records for a given record in the Customer table, blanks are left in place of values until all related records from the Orders table are found. The same holds true if the Orders table runs out of records.

LOOK UP ALL OF ONE, THEN ALL OF OTHERS (A TO B, A TO C)

For each record in the Customer table, this option looks for all the matching records in the Credit table (Table B) and then looks for all the matching records in the Orders table (Table C). Then it repeats the process with the next record in the Customer table, and the next, etc.

<i>Customer Table</i>	<i>Credit Table</i>	<i>Orders Table</i>
<i>Customer Name</i>	<i>Amount</i>	<i>Order Amount</i>
Cyclists Incorporated	(\$1088.56)	
Cyclists Incorporated	(\$1260.12)	
Cyclists Incorporated		\$1529.70
Cyclists Incorporated		\$23.50
CyclePath Corp.	(\$1958.03)	
CyclePath Corp.	(\$1076.43)	
CyclePath Corp.	(\$75.04)	
CyclePath Corp.		\$49.50
CyclePath Corp.		\$1702.60
The Great Bike Shop	(\$138.98)	
The Great Bike Shop		\$3269.70
The Great Bike Shop		\$5219.55
The Great Bike Shop		\$1538.20

NOTE: If you want Table C data (the Orders table in this example) to appear in the report before Table B data (Credit table), you will need to change the links so that the A to C link comes first, followed by the A to B link. You do this in the Visual Linking Expert. To change the order of the links, delete the existing links and set up new links in the desired order.

LOOK UP ALL THE COMBINATIONS OF THE TWO FILES

For each record in the Customer table, this option looks for a matching record in the Credit table, and then finds all the matching records in the Orders table. Once it finds all the matching records in the Orders table, it repeats the process with the next record in the Credit table, then the next, etc. When it finds matching Orders records for all the Credit records that match the first Customer record, it moves to the next Customer record and repeats the process.

<i>Customer Table</i>	<i>Credit Table</i>	<i>Orders Table</i>
<i>Customer Name</i>	<i>Amount</i>	<i>Order Amount</i>
Cyclists Incorporated	(\$1088.56)	\$1529.70
Cyclists Incorporated	(\$1088.56)	\$23.50
Cyclists Incorporated	(\$1260.12)	\$1529.70
Cyclists Incorporated	(\$1260.12)	\$23.50
CyclePath Corp	(\$1958.03)	\$49.50
CyclePath Corp	(\$1958.03)	\$1702.60
CyclePath Corp	(\$1076.43)	\$49.50
CyclePath Corp	(\$1076.43)	\$1702.60
CyclePath Corp	(\$75.04)	\$49.50
CyclePath Corp	(\$75.04)	\$1702.60
The Great Bike Shop	(\$138.98)	\$3269.70
The Great Bike Shop	(\$138.98)	\$5219.55
The Great Bike Shop	(\$138.98)	\$1538.20

NOTE: If you want the program to look up the first matching record in Table C (the Orders table in this example), and then find all matching records in Table B (Credit table), the reverse of the current process, you will need to change your links so that the A to C link comes first, followed by the A to B link. You do this in the Visual Linking Expert. To change the order of the links, delete the existing links and set up new links in the order you want.

SQL join types (ODBC data sources)

Seagate Crystal Reports enables you to specify the type of join you want to use when linking SQL tables. An SQL join indicates how linked fields in two SQL tables are compared when records are read. The SQL Join Type options can be specified in the Link Options dialog box.

NOTE: When you link fields using SQL joins, no indexed fields are required.

The join types are:

- *Equal [=] join, Page 528*
- *Left Outer [= (+), * =] join, Page 529*

- *Right Outer [(+)=, =*] join, Page 529*
- *Greater Than [>] join, Page 530**Less Than [<] join, Page 531*
- *Greater Than Or Equal [>=] join, Page 532*
- *Less Than Or Equal [<=] join, Page 533*
- *Not Equal [!=, <>] join, Page 534*

Equal [=] join

The result set from an Equal join includes all the records where the linked field value in both tables is an exact match. In the following example, the Customer table is linked to the Orders table by the Customer ID field. When the program finds a Customer ID in the Orders table that matches a Customer ID in the Customer table, it displays information for the corresponding records in both tables.

SQL uses the following syntax to describe an Equal join:

```
SELECT Customer.'Customer ID' ,
       Customer.'Customer Name' ,
       Orders.'Order Amount'
FROM 'Customer' Customer,
     'Orders' Orders
WHERE Customer.Customer ID =
       Orders.Customer ID
```

This statement produces the following data:

<i>Customer Table</i>	<i>Customer Table</i>	<i>Orders Table</i>
<i>Customer ID</i>	<i>Customer Name</i>	<i>Order Amount</i>
52	Allez Distribution	25141.50
53	BG Mountain Inc.	19164.30
53	BG Mountain Inc.	1683.60
57	Hansen MTB Inc.	15716.40
58	La Bomba de Bicicleta	1956.20
60	Mountain Toad	24580.50
62	SFB Inc.	7911.80
63	Sierra Bicycle Group	19766.20
63	Sierra Bicycle Group	12763.95
64	Sierra Mountain	8233.50

Left Outer [= (+), *=] join

The result set from a Left Outer join includes all the records in which the linked field value in both tables is an exact match. It also includes a row for every record in the primary (left) table for which the linked field value has no match in the lookup table. For instance, you can use a Left Outer join to view all customers and the orders they have placed, but you also get a row for every customer who has not placed any orders. These customers appear at the end of the list with blanks in the fields that would otherwise hold order information:

<i>Customer Table</i>	<i>Customer Table</i>	<i>Orders Table</i>
<i>Customer ID</i>	<i>Customer Name</i>	<i>Order Amount</i>
52	Allez Distribution	25141.50
53	BG Mountain Inc.	19164.30
53	BG Mountain Inc.	1683.60
57	Hansen MTB Inc.	15716.40
58	La Bomba de Bicicleta	1956.20
60	Mountain Toad	24580.50
62	SFB Inc.	7911.80
63	Sierra Bicycle Group	19766.20
63	Sierra Bicycle Group	12763.95
64	Sierra Mountain	8233.50
54	Bicicletas Aztecas	
55	Deely MTB Inc.	

NOTE: Left Outer and Right Outer joins are handled differently in the SQL language from other join types. If the database is accessed through ODBC, Seagate Crystal Reports will use ODBC syntax in the SQL statement. If you are connecting to an SQL database directly (not through ODBC), Seagate Crystal Reports will use a syntax native to the database. For more information about what an Outer join looks like in an SQL statement, refer to Microsoft ODBC documentation or to the documentation for your SQL database.

Right Outer [(+) =, =*] join

The result set from a Right Outer join includes all the records in which the linked field value in both tables is an exact match. It also includes a row for every record in the lookup (right) table for which the linked field value has no match in the primary table. If you link the Customer table to the Orders table, you get one row in the table for each order a customer

has placed, as with an Equal join. You also get a row for every order found that can not be linked to a customer. Theoretically, this should not happen, but if an inexperienced sales person forgot to assign a customer ID to an order, you can quickly locate that order with a Right Outer join. The resulting table leaves a blank in any of the Customer fields for the order without a customer:

<i>Customer Table</i>	<i>Orders Table</i>	<i>Orders Table</i>
<i>Customer ID</i>	<i>Order ID</i>	<i>Order Amount</i>
52	6	25141.50
53	11	19164.30
53	21	1683.60
57	4	15716.40
58	20	1956.20
60	16	24580.50
62	19	7911.80
63	28	19766.20
63	32	12763.95
64	14	8233.50
	25	10320.87

NOTE: Left Outer and Right Outer joins are handled differently in the SQL language from other join types. If the database is accessed through ODBC, Seagate Crystal Reports will use ODBC syntax in the SQL statement. If you are connecting to a SQL database directly (not through ODBC), Seagate Crystal Reports will use a syntax native to the database. For more information about what an Outer join looks like in an SQL statement, refer to Microsoft ODBC documentation or to the documentation for your SQL database.

Greater Than [>] join

The result set from a Greater Than join includes all records in which the linked field value from the primary table is greater than the linked field value in the lookup table. As an example, a company may want to compare the salaries made by all their sales representatives to the salaries made by all their sales managers. The company executives want to make sure no sales representative is making more money than any manager. With this in mind, you can link the SalesRep table to the Manager table by the Salary field in each table using a Greater Than join:

```

SELECT SalesRep.'Last Name' ,
       SalesRep.'Salary' ,
       Manager.'Last Name' ,
       Manager.'Salary'
FROM 'SalesRep' SalesRep ,
     'Manager' Manager
WHERE SalesRep.'Salary' >
      Manager.'Salary'

```

This SQL statement might produce data similar to this:

<i>SalesRep Table</i>	<i>SalesRep Table</i>	<i>Manager Table</i>	<i>Manager Table</i>
<i>Last Name</i>	<i>Salary</i>	<i>Last Name</i>	<i>Salary</i>
Davolio	\$35,000.00	Fuller	\$32,000.00
Davolio	\$35,000.00	Brid	\$30,000.00
Davolio	\$35,000.00	Buchanan	\$29,500.00
Dodsworth	\$48,300.00	Hellstern	\$45,000.00
Dodsworth	\$48,300.00	Fuller	\$32,000.00
Dodsworth	\$48,300.00	Brid	\$30,000.00
Dodsworth	\$48,300.00	Buchanan	\$29,500.00
Dodsworth	\$48,300.00	Martin	\$35,000.00
Patterson	\$30,000.00	Buchanan	\$29,500.00

In this table, there is no relationship established between sales representatives and sales managers. Since all managers have seniority over all sales representatives, a company might find it necessary to check if any representatives make more money than any managers, evidence of a salary problem that needs to be remedied.

Less Than [<] join

The result set from a Less Than join includes all records in which the linked field value in the primary table is less than the linked field value in the lookup table. Using the Less Than join, you can compare sales representative and manager salaries in a different direction. Once again, the Salary field in each table is used as the link field. This time, though, you link from the Manager table to the SalesRep table using a Less Than join on the linked Salary fields:

```

SELECT Manager.'Last Name' ,
       Manager.'Salary' ,
       SalesRep.'Last Name' ,
       SalesRep.'Salary'
FROM 'Manager' Manager ,

```

```

SalesRep' SalesRep
WHERE Manager.'Salary' <
SalesRep.'Salary'

```

This SQL statement produces a slightly different table than that produced by the Greater Than join:

<i>Manager Table</i>	<i>Manager Table</i>	<i>SalesRep Table</i>	<i>SalesRep Table</i>
<i>Last Name</i>	<i>Salary</i>	<i>Last Name</i>	<i>Salary</i>
Fuller	\$32,000.00	Davolio	\$35,000.00
Fuller	\$32,000.00	Dodsworth	\$48,300.00
Brid	\$30,000.00	Davolio	\$35,000.00
Brid	\$30,000.00	Dodsworth	\$48,300.00
Buchanan	\$29,500.00	Davolio	\$35,000.00
Buchanan	\$29,500.00	Dodsworth	\$48,300.00
Buchanan	\$29,500.00	Patterson	\$30,000.00
Martin	\$35,000.00	Dodsworth	\$48,300.00
Hellstern	\$45,000.00	Dodsworth	\$48,300.00

Greater Than Or Equal [>=] join

The result set from a Greater Than Or Equal join includes all records in which the linked field value in the primary table is greater than or equal to the linked field value in the lookup table. The example here is identical to the example for the Greater Than join, except that it uses the Greater Than Or Equal join:

```

SELECT SalesRep.'Last Name' ,
       SalesRep.'Salary' ,
       Manager.'Last Name' ,
       Manager.'Salary'
FROM 'SalesRep' SalesRep ,
     'Manager' Manager
WHERE SalesRep.'Salary' >=
       Manager.'Salary'

```

This statement might produce data such as this:

<i>SalesRep Table</i>	<i>SalesRep Table</i>	<i>Manager Table</i>	<i>Manager Table</i>
<i>Last Name</i>	<i>Salary</i>	<i>Last Name</i>	<i>Salary</i>
Davolio	\$35,000.00	Fuller	\$32,000.00
Davolio	\$35,000.00	Brid	\$30,000.00

<i>SalesRep Table</i> <i>Last Name</i>	<i>SalesRep Table</i> <i>Salary</i>	<i>Manager Table</i> <i>Last Name</i>	<i>Manager Table</i> <i>Salary</i>
Davolio	\$35,000.00	Buchanan	\$29,500.00
Davolio	\$35,000.00	Martin	\$35,000.00
Dodsworth	\$48,300.00	Hellstern	\$45,000.00
Dodsworth	\$48,300.00	Fuller	\$32,000.00
Dodsworth	\$48,300.00	Brid	\$30,000.00
Dodsworth	\$48,300.00	Buchanan	\$29,500.00
Dodsworth	\$48,300.00	Martin	\$35,000.00
Patterson	\$30,000.00	Brid	\$30,000.00
Patterson	\$30,000.00	Buchanan	\$29,500.00

Less Than Or Equal [<=] join

The result set from a Less Than Or Equal join includes all records in which the linked field value in the primary table is less than or equal to the linked field value in the lookup table. The example here is identical to the example for the Less Than join, except that it uses the Less Than Or Equal join:

```
SELECT Manager.'Last Name' ,
       Manager.'Salary' ,
       SalesRep.'Last Name' ,
       SalesRep.'Salary'
FROM 'Manager' Manager' ,
     SalesRep' SalesRep
WHERE Manager.'Salary' <=
       SalesRep.'Salary'
```

This SQL statement produces data similar to the following:

<i>Manager Table</i> <i>Last Name</i>	<i>Manager Table</i> <i>Salary</i>	<i>SalesRep Table</i> <i>Last Name</i>	<i>SalesRep Table</i> <i>Salary</i>
Fuller	\$32,000.00	Davolio	\$35,000.00
Fuller	\$32,000.00	Dodsworth	\$48,300.00
Brid	\$30,000.00	Davolio	\$35,000.00
Brid	\$30,000.00	Dodsworth	\$48,300.00
Brid	\$30,000.00	Patterson	\$30,000.00
Buchanan	\$29,500.00	Davolio	\$35,000.00

<i>Manager Table</i>	<i>Manager Table</i>	<i>SalesRep Table</i>	<i>SalesRep Table</i>
<i>Last Name</i>	<i>Salary</i>	<i>Last Name</i>	<i>Salary</i>
Buchanan	\$29,500.00	Dodsworth	\$48,300.00
Buchanan	\$29,500.00	Patterson	\$30,000.00
Martin	\$35,000.00	Davolio	\$35,000.00
Martin	\$35,000.00	Dodsworth	\$48,300.00
Hellstern	\$45,000.00	Dodsworth	\$48,300.00

Not Equal [!=, <>] join

The result set from a Not Equal join includes all records in which the linked field value in the primary table is not equal to the linked field value in the lookup table. This type of join can be used to find possible combinations of items when a table is joined to itself (a self-join). For example, a company can have a table listing all products they sell. When they decide to hold a sale where their customers buy one item and get the second item half price, they may need a list of all possible two item combinations:

```
SELECT Product1.'Product Name',  
       Product2.'Product Name',  
FROM 'Product' Product1  
     'Product' Product2  
WHERE Product1.'Product Name' !=  
       Product2.'Product Name'
```

In this SQL statement, the Product table is opened twice. The first time, it is given the alias name Product1. The second time, it is given the alias name Product2. Then the Product Name field is used to link from the Product1 table to the Product2 table. This is the same table, but since it has been opened twice using different aliases, Seagate Crystal Reports will consider it two separate tables. A Not Equal join is used to link the tables by the Product Name field. As a result, each product is paired with every other product offered, but is not paired with itself:

<i>Product1</i>	<i>Product2</i>
<i>Product Name (check names)</i>	<i>Product Name</i>
Xtreme Adult Helmet	Xtreme Mtn Lock
Xtreme Adult Helmet	InFlux Lycra Glove
Xtreme Adult Helmet	Roadster Micro Mtn Saddle
Xtreme Mtn Lock	Xtreme Adult Helmet
Xtreme Mtn Lock	InFlux Lycra Glove

Using SQL and SQL databases

<i>Product1</i>	<i>Product2</i>
<i>Product Name (check names)</i>	<i>Product Name</i>
Xtreme Mtn Lock	Roadster Micro Mtn Saddle
InFlux Lycra Glove	Xtreme Adult Helmet
InFlux Lycra Glove	Xtreme Mtn Lock
InFlux Lycra Glove	Roadster Micro Mtn Saddle
Roadster Micro Mtn Saddle	Xtreme Adult Helmet
Roadster Micro Mtn Saddle	Xtreme Mtn Lock
Roadster Micro Mtn Saddle	InFlux Lycra Glove

NOTE: The symbol!= is used to represent a Not Equal join, if the ODBC data source driver for the data being accessed supports this symbol. If not, the default symbol <> is used to represent a Not Equal join. Search for Self join in Seagate Crystal Reports online Help.

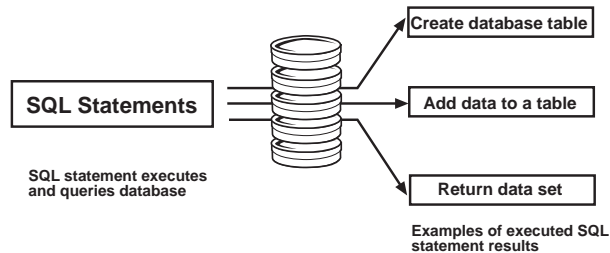
Perhaps the most popular and most powerful database formats are DBMS applications based on the Structured Query Language (SQL). SQL databases usually work over a client/server network architecture, providing an SQL Server to create, store, and manipulate database files, tables, fields and records, and an SQL Client interface allowing workstation users not only to design and work with database files, but also to retrieve useful and meaningful data that will help them in their everyday work.

What is SQL?

SQL is a query language designed for organizing, managing, developing and querying large relational databases over computer networks. SQL is a common language in the Information Science (IS) and Information Management industry. The language has been standardized by the American National Standards Institute (ANSI) and the International Standards Organization (ISO), meaning that there are specific features that must be present in any version of SQL produced by a software company in order for that version to be officially called SQL. Many software vendors add more advanced features to their version of SQL in an effort to improve the language and attract customers, but it must retain the original standards established by ANSI and ISO.

You should realize that SQL is not a true computer language. It cannot be used to create stand-alone computer applications or operating systems. SQL is often referred to as a sub-language, since it can be used within other languages or applications. Most importantly, the purpose of the SQL language is specific to working with relational databases.

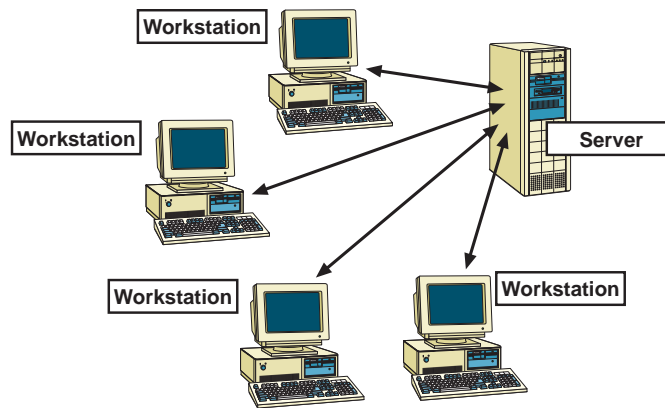
The syntax of the SQL language is built on a system of sending SQL statements to the SQL database server. Each statement is a request to perform a database operation, such as creating a database file, adding tables and fields to a database, adding records to tables, or retrieving data from databases. The SQL server analyzes the SQL statement and performs the required operation. For example, if the statement is a request for data, the server gathers the data and returns it to the client workstation for the user to view.



An SQL query is an SQL statement designed specifically to request data from one or more SQL databases. Some SQL applications require that you type in an SQL query directly using a text editor, while others provide graphical user interfaces that lead you through the process of querying an SQL database. In the latter case, the application must create an SQL statement based on the information you provide. This statement is the actual SQL query, and it is the SQL query that is used to request the data. Seagate Crystal Reports falls into this second category of SQL-compliant applications.

CLIENT/SERVER ARCHITECTURE

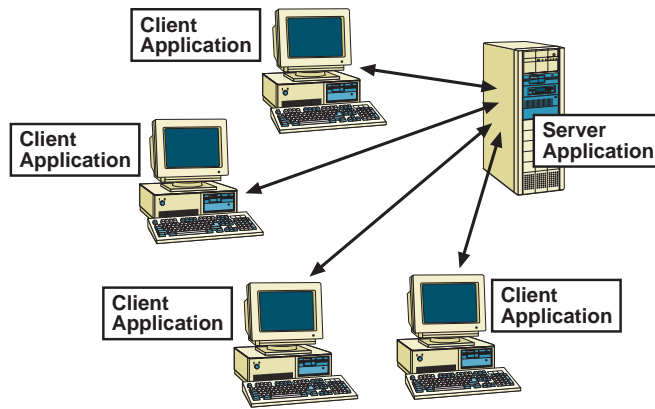
One of the most powerful features of SQL DBMS applications is their ability to efficiently use the client/server architecture of a network.



A simple network structure consists of one or more network servers that provide a common location where all users on the network can obtain data and applications. Many network servers also provide network security, automated services such as backing up data, and network resource monitoring to provide the best service possible to all workstations on the network. Because of the high processing demands required by a network server, the computer used as the server is often a high-powered, fast machine that may contain multiple processors, multiple hard drives, and multiple CD-ROM drives.

A network client is a single computer workstation that is used regularly by one or more company employees. A user works on the client and accesses data and applications from the server over the network. Large processing jobs that require a lot of time and resources are handled by the server, and the finished results are sent back to the client. This provides more efficient time management for users because the local workstation has less processing time and more “up” time available to the user.

Many modern computer applications are based on this client/server architecture. A simple client/server application has two parts: a server-based application that is located on a network server machine, and a client-based application that is located on a user's workstation. The server application handles complex, time-consuming, or power-demanding processes, taking advantage of the network server's power and resources, while the client application provides an easy-to-use user interface designed to help get the work done faster and better than it could otherwise be done.



Often, a client/server application will be available with a certain number of seats, depending on the cost of the application. Each seat represents either a single client workstation, or a single client user (depending on the software vendors' specifications) that can be connected to the client/server software. Software vendors often sell additional seats for their applications, each seat coming with a complete set of client application software.

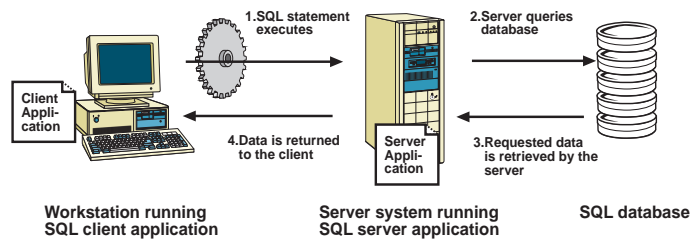
Do not confuse server applications with network server computers. Both are often referred to as servers. However, a server application resides on a network server, taking advantage of the hardware and operating system capabilities of the server machine. While a network server is a physical machine to which network clients are connected by cables or some other connection device.

SQL DBMS

An SQL Database Management System is a common example of a client/server software package. A standard SQL DBMS will include an SQL server application that handles all the actual work of building and working with databases and database data. The DBMS will also include at least one set of SQL client software (one seat) that can connect to the SQL server over your network. SQL client software usually consists of, at the very least, an SQL statement editor that you can use to write and execute SQL statements, and an underlying communications layer that works with the SQL server application over the network.

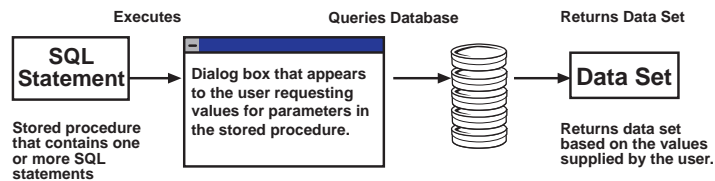
When you execute an SQL statement, the client software passes the statement to the communications layer, which sends the statement over the network to the server software. The SQL server analyzes the statement, performs the requested operation, and returns any data requested to the client software. If the server returns any data, the client software displays the data to the user.

SQL Client communicating with SQL server



STORED PROCEDURES

In addition to the common relational database attributes (tables, fields, records, etc.) many SQL DBMS systems support stored procedures. A stored procedure is a compiled SQL program, consisting of one or more SQL statements. A stored procedure can be used to define an SQL query that you can use over and over again. Furthermore, variables, conditional expressions, and variable arguments can be defined in the stored procedure so that you are prompted to provide information before the procedure is executed.



Since stored procedures can return a result set, they can provide a specific set of data when executed. In fact, Seagate Crystal Reports allows you to execute a stored procedure on an SQL database and use the returned data to design a report. If the stored procedure is designed to prompt a user for information to base its query on, Seagate Crystal Reports will prompt you for that information when you select the stored procedure for your report. See *How to select a stored procedure from an SQL database and change stored procedure parameters*, Page 566.

How does Seagate Crystal Reports use SQL?

When you connect to an SQL database, or to any ODBC database, Seagate Crystal Reports acts as an SQL client application, connecting to your SQL server through your network.

When you design a report that accesses SQL data, Seagate Crystal Reports builds an SQL query. This query can be edited if you know SQL and you

feel that the query can be further optimized. If you choose the SHOW SQL QUERY command from the Database Menu, the Show SQL Query dialog box displays the SQL query that Seagate Crystal Reports has built.

This SQL query is a representation of the SQL statement that Seagate Crystal Reports sends to the SQL server. By interpreting as much as possible from the report design into an SQL query, Seagate Crystal Reports can off-load much of the report processing onto the server machine. Rather than having to sift through an entire database to find the data you requested, Seagate Crystal Reports lets the server do the sifting and gets back a much smaller set of data, thus reducing the time and resources your workstation must use in order to finish the report.

The SQL language

Since Seagate Crystal Reports uses the SQL language to access client/server databases through ODBC, you can better understand the report generating process by understanding some of the SQL clauses (commands) used:

SELECT

The SELECT clause indicates specific data items to retrieve from the database tables. The item retrieved may be the values in a database field (column), or it may be the result of a calculation performed while gathering the data. For example:

```
SELECT
    TABLEA . ' CUSTNAME ' ,
    TABLEA . ' STATE '
```

DISTINCT

The DISTINCT clause forces the query to retrieve only unique (distinct) sets of data. When using the DISTINCT clause, a row of results will only be retrieved once. The previous SELECT statement can be modified to use the DISTINCT clause:

```
SELECT DISTINCT
    TABLEA . ' CUSTNAME ' ,
    TABLEA . ' STATE '
```

FROM

The FROM clause indicates the sources of the database fields specified in the SELECT clause. FROM lists actual database tables that include the fields and records containing the requested data. The FROM clause generated by Seagate Crystal Reports precedes the name of each table with the alias it uses to identify the table in your report. The following example illustrates the FROM clause used with the SELECT clause:

```

SELECT
    TABLEA. 'CUSTNAME' ,
    TABLEA. 'STATE'
FROM
    `TABLEA` TABLEA

```

WHERE

The WHERE clause has two purposes:

1. WHERE can specify record selection criteria.
2. WHERE can specify how two database tables are joined.

When WHERE is used to specify record selection criteria, it includes a search condition in order to determine which records (rows of data) are to be retrieved. For example:

```

SELECT
    MYTABLE. 'SALESPERSON' ,
    MYTABLE. 'SALESTOTAL'
FROM
    `MYTABLE` MYTABLE
WHERE
    MYTABLE. 'SALESTOTAL' < 10000.00

```

If WHERE is used to specify how two tables are linked, an SQL join operator sits between the two table names. See *SQL join types (ODBC data sources)*, Page 527. The following is an example of the WHERE clause joining two tables:

```

SELECT
    CUSTOMER. 'CUST_ID' ,
    CUSTOMER. 'CUST_NAME' ,
    ORDERS. 'AMOUNT'
FROM
    `CUSTOMER` CUSTOMER ,
    `ORDERS` ORDERS
WHERE
    CUSTOMER. 'CUST_ID' = ORDERS. 'CUST_ID'

```

ORDER BY

The ORDER BY clause specifies that the database records retrieved be sorted according to the values in a specific field. If you do not use the ORDER BY clause, the program retrieves records in the order in which they appear in the original database. If you specify more than one field after the ORDER BY clause, the program sorts the records according to the values in the first field specified, then, within that sort, the program sorts the records by the values in the second field specified, and so on.

The following SQL statement uses the ORDER BY clause:

```
SELECT
    MYTABLE.'COMPANY' ,
    MYTABLE.'CITY' ,
    MYTABLE.'STATE'
FROM
    'MYTABLE' MYTABLE
ORDER BY
    MYTABLE.'STATE' ASC ,
    MYTABLE.'CITY' ASC
```

NOTE: *ASC indicates that the values in the field are sorted in ascending order rather than descending order (DESC). Ascending order sorts letters from A to Z and numbers from 0 to 9.*

GROUP BY

The GROUP BY clause retrieves a set of summary data. Instead of retrieving the data itself, GROUP BY groups the data and summarizes each group with an SQL aggregate function. The server returns only the summarization information for each group to Seagate Crystal Reports. For example:

```
SELECT
    MYTABLE.'STATE' ,
    MYTABLE.'ZIPCODE' ,
    SUM (MYTABLE.'SALES' )
FROM
    'MYTABLE' MYTABLE
GROUP BY
    MYTABLE.'STATE' ,
    MYTABLE.'ZIPCODE'
```

Server-side processing

Server-side allows you to set up a report that performs the majority of its processing on the server and pushes only relevant details to your computer. Server-side processing provides you with a number of benefits:

- Less time connected to the server.
- Less memory needed to process the report on your computer.
- Lower transfer time from the server to the client.

Here's how server-side processing works: by using SQL pass-through technology to send an SQL statement to ODBC and retrieve an initial set of data, Seagate Crystal Reports off-loads much of the data retrieval and sorting work onto the server system, thus freeing up local memory and resources for more important tasks. That is why server-side processing only works for reports that have been sorted and grouped; if a report has not been sorted and grouped (for example, if it is a simple list report), then there is no processing to push to the server. You should also note that server-side processing only works for reports based on SQL data sources (you could not, for example, use server-side processing for a report based on a query, since a query is not an SQL data source).

Keep in mind that in order to perform the grouping on the server, your report must conform to the following conditions:

- The *Perform Grouping on Server* option (in the Options dialog box) must be enabled. For more information, see *How to enable server-side processing*, Page 574.
- The report must use some form of grouping.
- The report must be at least partially hidden (at the very least, the Details section must be hidden). Since the server will process those sections that are hidden, the greater the portion of the report that is visible, the greater the amount of processing that must take place on the client side. If the Details section is shown, server-side processing will not be possible.
- In most cases, formula fields must be processed on the client side. If grouping is based on a formula field, or if a formula is used in a summary field or in record selection, then all the records must be transferred to the client side before the formula can be evaluated. This will increase the amount of time required to run the report. Therefore, you may want to use SQL expressions as an alternative to formulas.
- In order for a report to be processed on the server, any running totals appearing in the report must be based on summary fields (since the data needed for the running totals will be pulled over to the client side).
- In order for a report to be processed on the server, the report must not contain Average or Distinct count summaries.
- The report must not contain Top N values.
- The report must not contain specified value grouping.

NOTE: *When a report contains Date and Time fields, server-side processing works if you group on day (for Date fields) or if you group on seconds (for Time fields). Server-side processing will not work if you group on month or year, or on minutes and hours.*

NOTE: When you drill-down on a hidden section of a report, with the processing being done on the server, connection to the server will be automatically initiated. If the client is disconnected from the server (for example, if you download a report onto your laptop and you work on it from a remote location), then drilling-down on data will produce an error.

NOTE: If you save a report that has been partially processed on the server using the *Save Data with Report* option, the program will save only those records that have been transferred to the client side. In other words, if you have drilled-down on the subreport data and there is a tab for that data in Seagate Crystal Reports, those records will be saved with the report.

How server-side grouping affects the SQL query

When a report pushes most of its processing to the server, this by necessity alters the SQL query. Thus, when the *Perform Grouping on Server* option is enabled, individual aspects of server-side processing will modify the SQL statement in different ways.

- If you enable the *Use Indexes Or Server For Speed* option (in the Report Options dialog box), the program will add an ORDER BY clause to the SQL statement.
- If you group on a linkable data type in the DBMS, the program will add a GROUP BY clause to the SQL statement. The program uses the GROUP BY clause to perform the grouping on the server.
- If you summarize on a linkable data type, the program will add a summary field to the SELECT clause of the SQL statement.
- If you drill-down on a linkable data type, the program will add a WHERE clause to the SQL statement.
- If you group in descending order on a linkable data type, the program will add an ORDER BY clause to the SQL statement.

The statement also varies between tabs:

- If you are working in the Preview Tab, the statement includes the GROUP BY clause, as well as any aggregates that the report is pushing to the server.
- If you are drilling-down, the statement will vary depending on the underlying data and the level of drill-down. With each drill-down, the WHERE criteria changes. Also, if you drill-down to the details, the statement will not include a GROUP BY clause (since you no longer have any groups on that drill-down tab).

To view the current SQL statement for the active tab, choose the SHOW SQL QUERY command from the Database Menu. The Show SQL Query dialog box will appear, displaying the SQL statement. If you want, you

can edit the statement directly in this dialog box. You can also use the SQL Expression editor to edit SQL expression to be processed on the server.

Remapping database fields

The Map Fields dialog box allows you to link report fields to their corresponding database fields when you have made changes to the structure of the database, or when you have created a report based on one database from a template of another report based on some other database that has the same table and field structure. In this way, the dialog box helps you to make sure your reports print with the current version of the active database.

When you first create a report, the report draws its fields from the database as it exists at the time. If you change the structure of the database after you create the report, the program needs to adapt the report to the new structure.

If you make changes to the active database fields that require you to remap the corresponding report fields, you can display the Map Fields dialog box by choosing any of these commands from the Database Menu:

- VERIFY DATABASE,
- VERIFY ON EVERY PRINT,
- SET LOCATION, and
- CONVERT DATABASE DRIVER.

You can use each of these commands for a specific function; however, any of these commands will open the Map Fields dialog box if the program detects a mismatch between the field names in the report and the field names in the database. In order to detect any possible mismatches, the program checks each field name in the report against the field names in the database. If one of the field names does not match any of the field names in the database, the Map Fields dialog box will appear.

NOTE: *Report fields that are left unmapped will be removed from the report.*

Using the Verify Database process

When you choose the VERIFY DATABASE command from the Database menu, the program checks the active databases and reports whether it detected any changes. If it detects changes, the report must be adapted to prevent errors. If you click Yes, the program attempts to adapt the report to the new database structure.

The program displays the Map Fields dialog box if it detects either of these types of changes to the database:

- the name of a database field that is used in the report has changed, or
- the database has been upsized from a PC data source to an SQL data source.

For a tutorial on the Map Fields dialog box, see *How to remap database fields, Page 576*. Seagate Crystal Reports automatically adapts the report (and does not display the Map Fields dialog box) if it detects any of these changes:

- fields have been added to the database,
- fields that are not used in the report have been deleted from the database,
- field positions have changed in the database, or
- data types have changed for fields in the database.

For more information, search for VERIFY DATABASE command in Crystal Reports online Help.

Using the Verify on Every Print process

The VERIFY ON EVERY PRINT command is a lock that triggers the VERIFY DATABASE command every time you print.

- If there is a check mark beside the Verify on Every Print command, the command is active. It will trigger the Verify Database command every time you print. See *Using the Verify Database process, Page 545*.
- If there is no check mark beside it, the command is inactive. By default the command is inactive.

Using the Set Location process

When you choose the SET LOCATION command from the Database Menu and specify a new location for the active database, the program checks the database for changes.

The Set Location command will display the Map Fields dialog box if it detects any of the following changes in the database structure:

- a database field has been deleted,
- a database field has been renamed, or
- the database is a completely new database.

NOTE: *The program will check for these changes only if the databases have different names or if the database name has changed. If the databases have the same name, the Map Fields dialog box will not appear, and you will need to verify the database when you have finished setting*

the location. For more information, see Using the Verify Database process, Page 545.

For more information, search for SET LOCATION command in Seagate Crystal Reports online Help.

Using the Convert Database Driver process

When you choose the CONVERT DATABASE DRIVER command from the Database Menu and specify the database driver to use when running your report, the program checks the database for changes. It displays the Map Fields dialog box if it detects changes in the database structure. Search for CONVERT DATABASE DRIVER command in Seagate Crystal Reports online Help.

Using the Map Fields dialog box

The Map Fields dialog box contains four list boxes:

- The upper left list box displays the names of all unmapped report fields (for which the program detects a change in the active database). The top name is selected by default.
- The upper right list box displays the names of unmapped database fields (in which the program detects a change). Since the *Match Type* check box is toggled on by default, this list box displays only the names of unmapped database fields of the same type as the unmapped report field you selected in the upper left list box. To display all unmapped database fields, regardless of type, toggle the *Match Type* check box off.
- The lower left list box displays the names of mapped report fields. When you map fields in the upper list boxes, they will appear in the lower list boxes.
- The lower right list box displays the names of mapped database fields. When you map fields in the upper list boxes, they will appear in the lower list boxes.

For each database field that you have changed, select the report field and the database field in the upper sections and click *Map*. The field names will move from the upper list boxes to the lower list boxes.

You do not have to remap every report field. For example, if you delete a database field, it is not necessary to remap its corresponding report field, since you will not need that field in your report. You can click *OK* to close the dialog box without remapping each field listed in the upper left list box.

On some occasions, you might want to unmap or unlink report and database fields that you have already mapped. For example, you might mistakenly map the wrong fields or want to map a report field to a database field that you already mapped. In these cases, you can select a report field in the lower list boxes (the program then automatically selects

the database field) and click *Unmap*. The field names will move from the lower list boxes to the upper boxes.

NOTE: Seagate Crystal Reports does not automatically refresh the report data when you close the Map Fields dialog box. If you want to refresh your data, click the Refresh button on the standard toolbar.

For additional information

This chapter has only touched on some of the more important aspects of database access, relational databases, and SQL. If you are interested in learning more about database topics, refer to the documentation provided with your DBMS application.

In addition, there are hundreds of books available on the market that discuss database theory and design in depth. Look for the computer-related section at your local bookstore.

HANDS-ON (Working With Databases)

This section provides step-by-step instructions for performing several common procedures related to accessing database files from within Seagate Crystal Reports. Use these procedures to get started working with the program quickly.

How to open Access queries through DAO

Microsoft Access queries can be used in Seagate Crystal Reports as separate data sets, just like Access tables. When you open an Access database through the DAO engine (*Microsoft Access, Page 587*), any queries in the database can automatically be read.

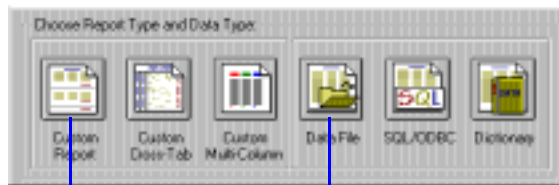


- 1 Click the NEW button on the standard toolbar. The Report Gallery appears.



2 Click Custom...

The Report Gallery expands.



3 Click Custom Report.

4 Click Data File.

The Choose Database File dialog box appears.

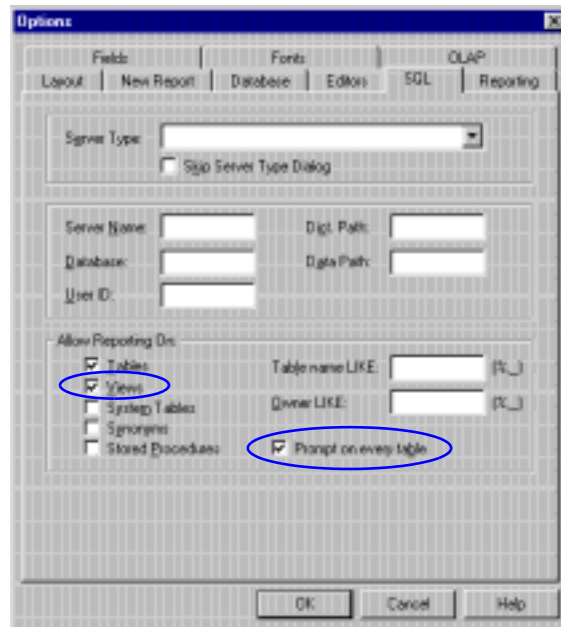
- 5 Locate and highlight the Microsoft Access database (*.MDB) file that contains the query you want to use in your report.
- 6 Click *Open*. When the selected database file contains more than one table, the Select Tables dialog box appears (if the database only contains one table, the Select Tables dialog box will not appear). Highlight the tables you want to include from the list and click *OK*. The Design Tab appears in the application window, with the Insert Fields dialog box active.
- 7 All of the tables and queries you selected from your Access database appear in the list box on the Database Tab of the Insert Fields dialog box. Queries appear at the end of the list, after tables. Locate your query on the Database Tab, and double-click the name of the query on the list. The query expands to display all the fields it contains.
- 8 Select any fields you want to use in your report, and add them to the Design Tab.

NOTE: You can not use Access action queries or update queries in Seagate Crystal Reports. However, you can use Access select queries and cross-tab queries.

How to open Access queries through ODBC

ODBC gives you more control over which parts of a database you can use. For this reason, using an Access query through ODBC requires a few extra steps.

- 1 Choose the **OPTIONS** command from the File Menu. The Options dialog box appears. Click the **SQL** Tab to display SQL and ODBC options.



2 Make sure either the **Views** or the **Prompt on every table** check box is toggled on.

- Selecting the *Views* option automatically displays any available queries in your Access database.
 - Selecting the *Prompt on every table* option displays the *Allow Reporting On* dialog box every time you log on to an ODBC data source. This dialog box provides the same options as the *Allow Reporting On* section on the **SQL** Tab of the Options dialog box, but provides those options for every ODBC data source you log on to.
- 3 In addition, you can specify *Table name LIKE* and *Owner LIKE* options, if you wish.

- *Table name LIKE* is based on the SQL LIKE clause. This option allows you to specify the kinds of table names you want to appear in the Choose SQL Table dialog box. You can use the underscore character (_) or the percent sign character (%) as wildcards with this function. The underscore character specifies any single character, while the percent sign signifies any character string. For example, DAV_ matches DAVE only, while DAV% matches DAVE and DAVID. *Table name LIKE C%* would display only those tables that have a table name beginning with the letter C.
 - *Owner LIKE* is also based on the SQL LIKE clause. The *Owner LIKE* option allows you to select the Owner (or Creator or Alias) of the table, not the table name itself. For example *Owner LIKE C%* would display only those tables that have an owner beginning with the letter C.
- 4 Click *OK* to exit the Options dialog box.
 - 5 Create a new report. When you choose SQL/ODBC as the source of your data, the Log On Server dialog box appears.

6 Choose the ODBC data source for your Access database, then click *OK*.



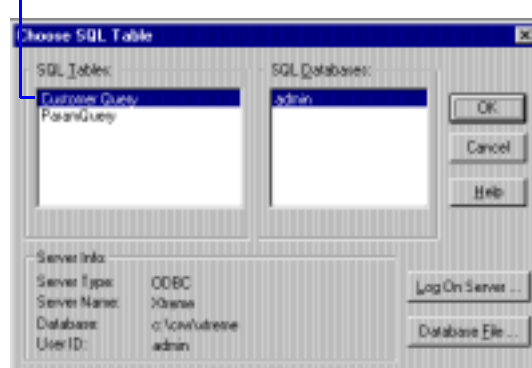
- 7 If you did not specify a particular Access database file with your Access ODBC data source, the Select Database dialog box appears. Locate and select the database that contains the Access query you want to use, and click *OK*.
- 8 If you selected the *Prompt on every table* check box in the Options dialog box, the Allow Reporting On dialog box now appears. Otherwise, skip to Step 10.

9 Make sure the Views check box is toggled on and then click OK.



The Choose SQL Table dialog box appears.

10 Highlight your query in this list box, and then click OK.



11 The Design Tab appears with the Insert Fields dialog box active. Your Access query, and all fields associated with that query, appear on the Database Tab of the Insert Fields dialog box.

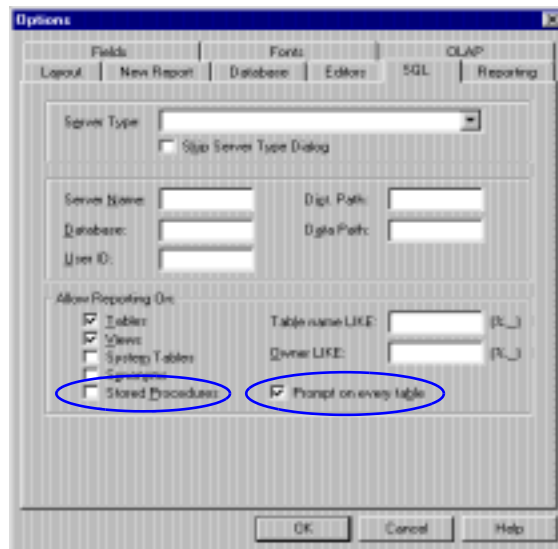
NOTE: You can not use Access action queries or update queries in Seagate Crystal Reports. However, you can use Access select queries and cross-tab queries.

How to open Access parameter queries

Access parameter queries can only be opened when you open an Access database via ODBC. Make sure you have an ODBC data source set up for your Access database before attempting this procedure. See *How to set up an ODBC data source*, Page 556.

NOTE: When you design a parameter query in Access, you must provide a prompt for the query and you must specify a data type for the parameter. First, with your query open in Design View in Microsoft Access, enter a prompt in the Criteria cell for the field that will act as a parameter. Then, choose the PARAMETERS command from the Query Menu in Access, and specify a data type for the parameter you just created. Make sure the prompt appears exactly as it does in the Criteria cell. For complete instructions, refer to your Access documentation. If you do not set up your parameter query correctly, Seagate Crystal Reports will not be able to use it.

- 1 In Seagate Crystal Reports, choose the OPTIONS command from the File Menu. The Options dialog box appears. Click the SQL Tab to activate it.



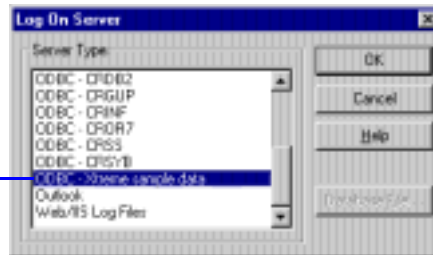
2 Make sure either the *Stored Procedures* or the *Prompt on every table* check box is toggled on.

- Selecting the *Stored Procedures* option automatically displays any available stored procedures when you log on to an ODBC data source. Seagate Crystal Reports treats Access parameter queries much like it treats SQL stored procedures. So, to use a parameter query, the *Stored Procedures* option must be toggled on.
- Selecting the *Prompt on every table* option displays the Allow Reporting On dialog box every time you log on to an ODBC data source. This dialog box provides the same options as the *Allow*

Reporting On section on the SQL Tab of the Options dialog box, but provides those options for every ODBC data source you log on to.

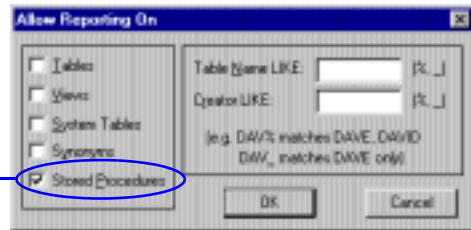
- 3 In addition, you can specify *Table name LIKE* and *Owner LIKE* options if you wish.
 - Table name LIKE is based on the SQL LIKE clause. This option allows you to specify the kinds of table names you want to appear in the Choose SQL Table dialog box. You can use the underscore character (_) or the percent sign character (%) as wildcards with this function. The underscore character specifies any single character, while the percent sign signifies any character string. For example, DAV_ matches DAVE only, while DAV% matches DAVE and DAVID. Table name LIKE C% would display only those tables that have a table name beginning with the letter C.
 - Owner LIKE is also based on the SQL LIKE clause. The Owner LIKE option allows you to select the Owner (or Creator or Alias) of the table, not the table name itself. For example Owner LIKE C% would display only those tables that have an owner beginning with the letter C.
- 4 Click *OK* to exit the Options dialog box.
- 5 Create a new report. When you choose SQL/ODBC as the source of your data, the Log On Server dialog box appears.

6 Choose the ODBC data source for your Access database, then click *OK*.



- 7 If you did not specify a particular Access database file with your Access ODBC data source, the Select Database dialog box appears. Locate and highlight the database that contains the Access parameter query you want to use, and then click *OK*.
- 8 If you toggled on the *Prompt on every table* check box in the Options dialog box, the Allow Reporting On dialog box now appears. Otherwise, skip to Step 11.

9 Make sure the Stored Procedures check box is toggled on, and then click OK when finished.



10 The Choose SQL Table dialog box appears. Access parameter queries appear in the SQL Tables list box as follows:

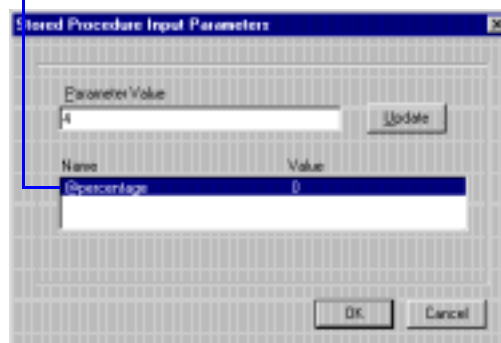
`Proc(QueryName)`

11 Highlight your query in this list box, and then click OK.



The Stored Procedure Input Parameters dialog box appears.

12 Highlight a parameter in this list box.



13 Assign a value by typing it in the Parameter Value text box and click Update.

The value displayed in the *Name* list box will be updated.

14 Repeat Steps 12 and 13 for each parameter in your Access parameter query.

15 Click **OK**.

You can change parameter values at any time by choosing the **STORED PROCEDURE PARAMETERS** command from the Database Menu.

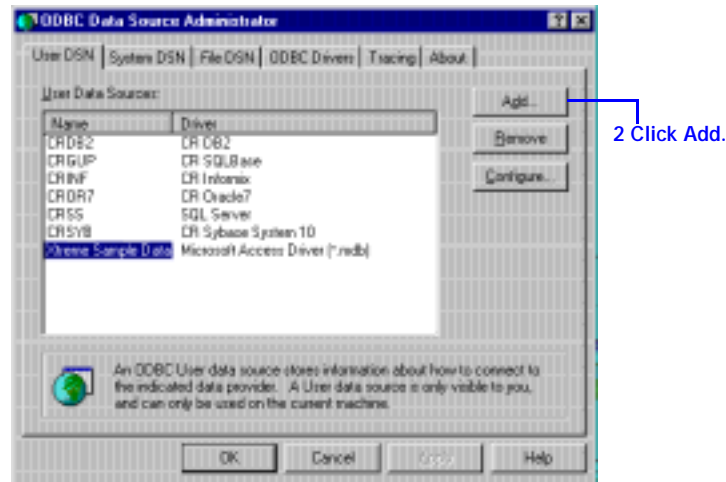
16 Create your report using the fields in the parameter query. Only the records that satisfy the parameter values you specified in the Stored Procedure Input Parameters dialog box are used in your report.

NOTE: *You can not use Access action queries or update queries in Seagate Crystal Reports. However, you can use Access select queries and cross-tab queries.*

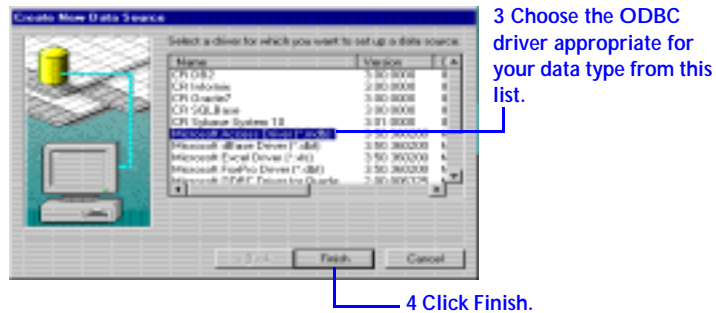
How to set up an ODBC data source

To set up an ODBC data source, you must first have an ODBC driver installed for the type of data you want to use. Many DBMS applications automatically install and set up ODBC drivers. If you are not sure whether ODBC drivers have been installed for your data, refer to the documentation that came with your DBMS application.

1 From the Program Manager, double-click the ODBC Administrator icon in the appropriate program group. The ODBC Data Source Administrator dialog box appears.



The Create New Data Source dialog box appears.



If a driver does not appear for your data type, then the ODBC driver has not been correctly installed. Refer to the documentation for your DBMS application.

- 5 Click the *Finish* button. An ODBC Data Source Setup dialog box that is specific to the ODBC driver you selected appears.

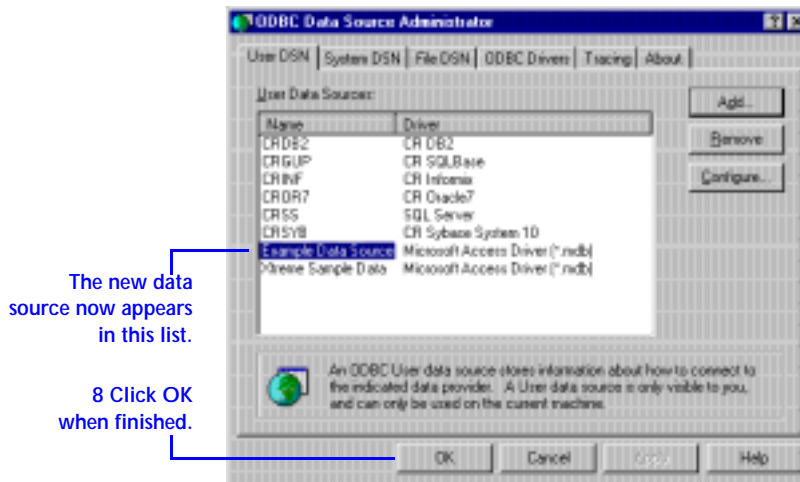
NOTE: If an error message appears instead of the Setup dialog box, you do not have the correct ODBC drivers installed on your system for the type of data you selected.

- 6 Type the name for your new ODBC data source here.



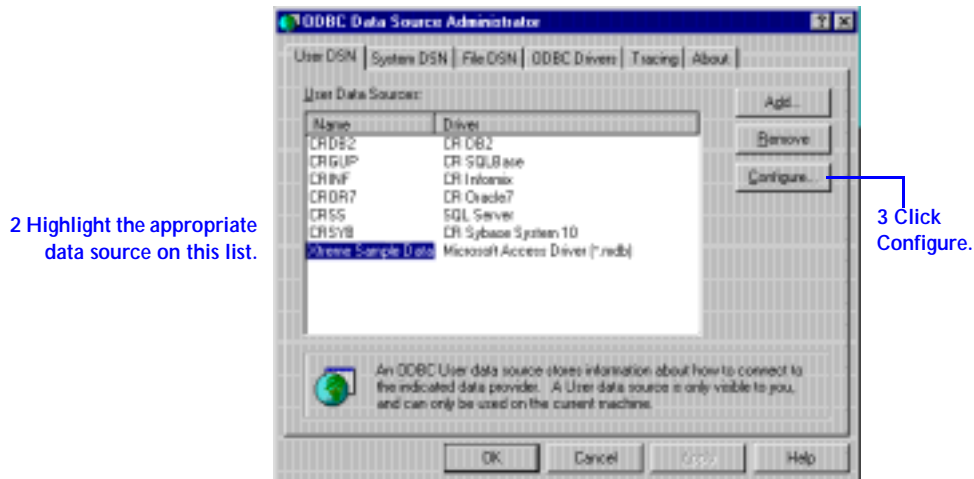
NOTE: The dialog box that appears may look different from the one shown here, depending on the type of data you are using. This dialog box is specific to the Access 97 ODBC driver. For more information about using the dialog box that appears for your data, click the Help button.

- Click OK. The new ODBC data source appears in the ODBC Data Source Administrator dialog box.

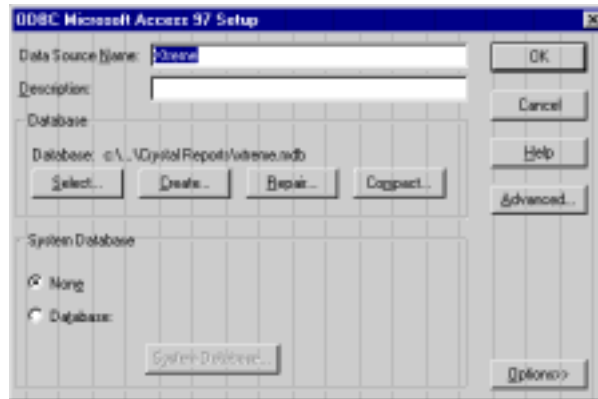


How to check settings for an ODBC data source

- From the appropriate program group or Windows 95 and Windows 98 folder, run the ODBC Administrator application. The ODBC Data Source Administrator dialog box appears.



The ODBC Data Source Setup dialog box appears.



- 4 The ODBC Data Source Setup dialog box that appears is specific to the data source you selected, and contains controls and information for setting up your data source. Check the settings in this dialog box to make sure the information matches your system and database.

NOTE: The dialog box that appears may look different from the one shown here, depending on the type of data you are using. This dialog box is specific to the Access 97 ODBC driver. For more information about using the dialog box that appears for your data, click the Help button.

- 5 Make any changes necessary, and then click OK.
- 6 Click OK to close the ODBC Data Source Administrator dialog box.

How to log on to an ODBC data source

- 1 Choose the LOG ON SERVER command from the Database Menu. The Log On Server dialog box appears.

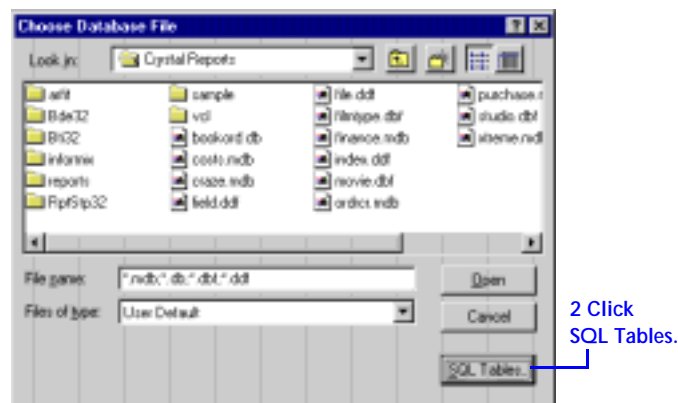


2 Choose the ODBC data source for the database file you want to open, and then click OK.

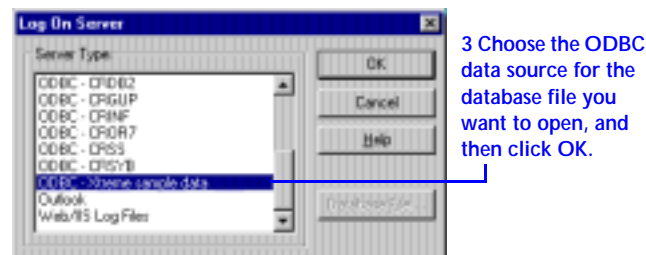
- 3 If the data source requires a user name and password, or any other log on information, a log on dialog box appears. Type in the log on information you usually use to access this database, and click *OK*.
 - If you did not specify a database with the ODBC data source, the Select Database dialog box appears. Use the *Drives*, *Directories*, and *Database Name* controls to select the database file, and then click *OK*.
- 4 The Choose SQL Table dialog box appears if the data source contains more than one table. Choose a database table from the *SQL Tables* list box and then click *OK* to add the table to your report.

How to add an ODBC database table to a report

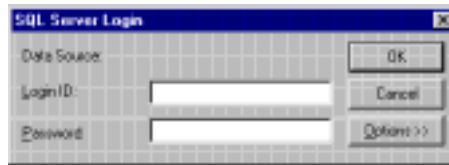
- 1 Choose the **ADD DATABASE TO REPORT** command from the Database Menu. The Choose Database File dialog box appears.



The Log On Server dialog box appears.



- 4 If the data source requires a user name and password, or any other logon information, the Login dialog box appears.



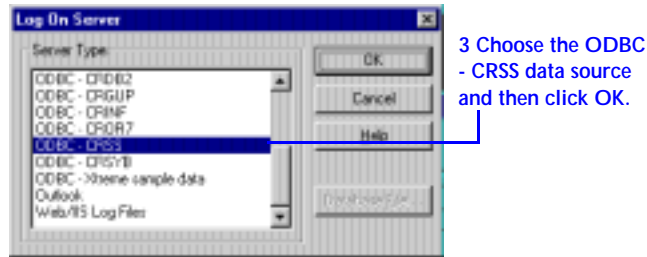
5 Enter the required information and then click OK to log on.

- 6 If the data source you selected includes a database file specification, or if you specified a database table in Step 3, skip to Step 8.
- 7 The Select Database dialog box appears. Use the *Drives*, *Directories*, and *Database Name* controls to select the database file, and then click *OK*.
- 8 The Choose SQL Table dialog box appears.
 - Choose a database table from the *SQL Tables* list and click *OK* to add the table to your report, or
 - Click the *Log On Server* button to log on to another ODBC data source.

How to log on to MS SQL Server via ODBC

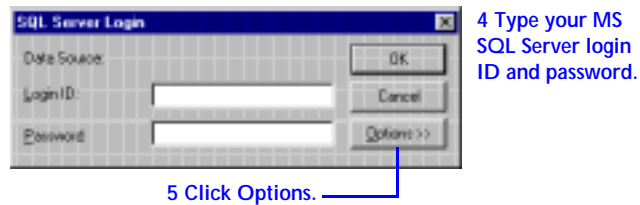
NOTE: This section is intended as an example of how to log on to a Microsoft SQL Server data source from Seagate Crystal Reports. Your SQL server application or any other password-protected data source may require different steps. This is intended only as an example of one type of SQL database.

- 1 Verify the settings for the Microsoft SQL Server data source using ODBC Administrator. See *How to check settings for an ODBC data source*, Page 558.
- 2 From Seagate Crystal Reports, choose the LOG ON SERVER command from the Database Menu. The Log On Server dialog box appears.

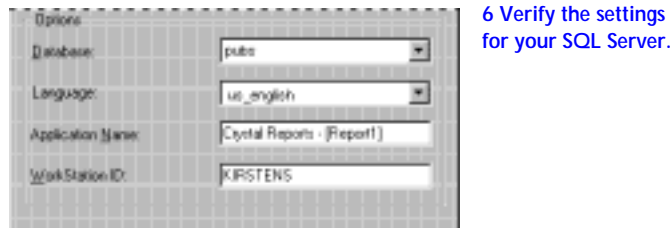


The ODBC - CRSS data source is automatically created during Seagate Crystal Reports setup procedure. This data source allows you to open MS SQL Server databases.

The SQL Server Login dialog box appears.



The Options section of the SQL Server Login dialog box appears.



- 7 Verify the name of the SQL Server database you want to open, the database language you want to use, the name of the application you are using (Seagate Crystal Reports), and the name of your computer workstation. Make any changes necessary.
- 8 Click **OK**, and the Choose SQL Table dialog box appears. Choose an SQL Server database table from the *SQL Tables* list box and then click **OK** to add the table to the report.

How to log off an ODBC data source

- 1 Choose the LOG OFF SERVER command from the Database Menu. The Log Off Server dialog box appears.
- 2 Highlight the ODBC data source you want to log off from this list.
- 3 Click Log Off.

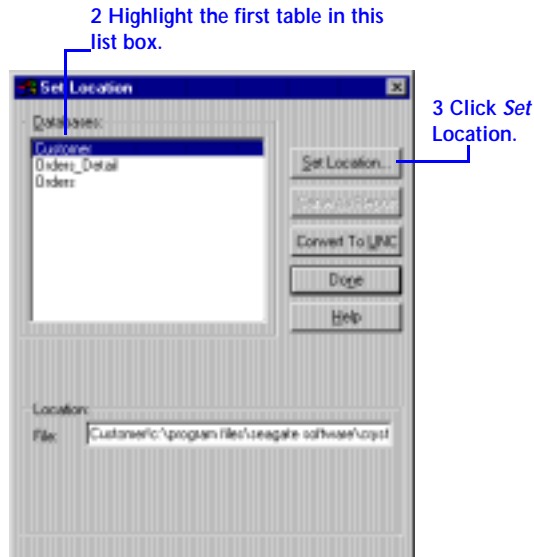


The ODBC data source is removed from the *Logged On Servers* list box.

- 4 Click *Done* when finished.

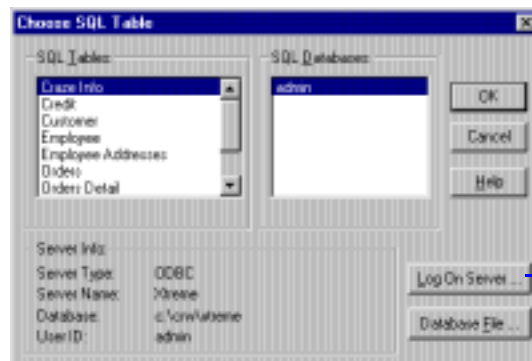
How to change the ODBC data source accessed by a report

- 1 Choose the SET LOCATION command from the Database Menu. The Set Location dialog box appears with a list of table aliases for the tables displayed in the report. The dialog box will display location and logon information for the table you select below the list of tables.



- 4 Log on to the original ODBC data source, if you are not logged on already. You must log on to the old data source before you can modify a report to use a new data source. Since you must be logged on to the old data source, the old data source must be available on the local machine.
 - If the machine is no longer connected to the old server, you can install an ODBC data source with the name of the old data source and have it point to the new database server. Log on to this data source as you would log on to the “old” data source.
 - If you are using the same data source name to connect to a new server, you must configure that data source under ODBC Admin or the ODBC Control Panel, and make it point to the new server.

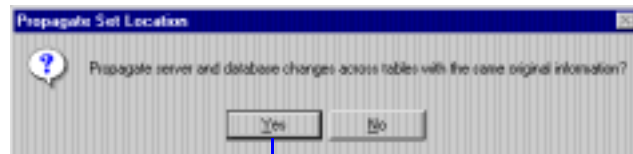
After you log on to the old data source, the Choose SQL Table dialog box appears with a list of tables in the *SQL Tables* list box, and with the old data source in the *SQL Databases* list box.



— You should now be logged on to both the old and the new data sources.

— The new data source should now appear in the *SQL Databases* list box of the Choose SQL Table dialog box.

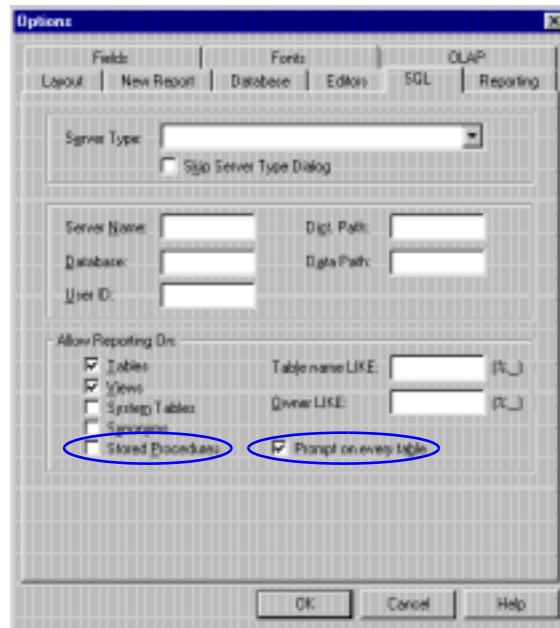
- 6 Click the new data source to display its tables, then select the appropriate table from this list. The table you choose should correspond to the first table you selected in the Set Location dialog box.
- 7 After clicking *OK* the program prompts you to change the location of all tables in the report to the location you specified for the first table.



- 9 Close the Set Location dialog box, and choose the *VERIFY DATABASE* command from the Database Menu to refresh the table definitions in the report.
- 10 Log off the old data source.
- 11 Save the report.

How to select a stored procedure from an SQL database and change stored procedure parameters

- 1 Choose the OPTIONS command from the File Menu. The Options dialog box appears. Click the SQL Tab to activate it.



- 2 Make sure either the *Stored Procedures* or the *Prompt on every table* check box is toggled on.

- Selecting the *Stored Procedures* option automatically displays any available stored procedures when you log on to an SQL database.
 - Selecting the *Prompt on every table* option displays the *Allow Reporting On* dialog box every time you log on to an ODBC data source. This dialog box provides the same options as the *Allow Reporting On* section on the SQL Tab of the Options dialog box, but provides those options for every ODBC data source you log on to.
- 3 In addition, you can specify *Table name LIKE* and *Owner LIKE* options if you wish.

- *Table name LIKE* is based on the SQL LIKE clause. This option allows you to specify the kinds of table names you want to appear in the Choose SQL Table dialog box. You can use the underscore character (_) or the percent sign character (%) as wildcards with this function. The underscore character specifies any single character, while the percent sign signifies any character string. For example, DAV_ matches DAVE only, while DAV% matches DAVE and DAVID. *Table name LIKE C%* would display only those tables that have a table name beginning with the letter C.
- *Owner LIKE* is also based on the SQL LIKE clause. The *Owner LIKE* option allows you to select the Owner (or Creator or Alias) of the table, not the table name itself. For example *Owner LIKE C%* would display only those tables that have an owner beginning with the letter C.

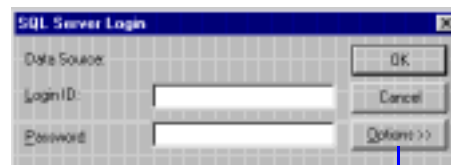
NOTE: For more information on the SQL LIKE clause, refer to your SQL documentation.

- 4 Click OK to exit the Options dialog box.
- 5 Create a new report based on the SQL database that contains the stored procedure you want to use. When you choose *SQL/ODBC* as the source of your data, the Log On Server dialog box appears.



6 Highlight the ODBC data source for your SQL Server on this list, and then click OK.

The SQL Server Login dialog box appears.



7 Enter required information and then click OK to log in.

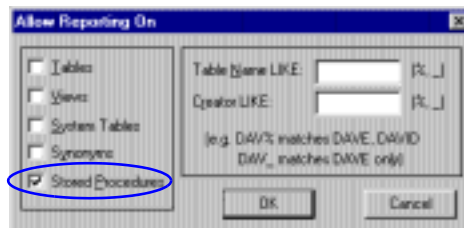
8 Click Options.

The Options section of the SQL Server Login dialog box appears.



9 Verify the settings for your SQL Server.

- 10 Click **OK**. If you toggled on the *Prompt on every table* check box in the Options dialog box, the Allow Reporting On dialog box now appears. Otherwise, skip to Step 12.



11 Make sure the Stored Procedures check box is toggled on, and then click **OK**.

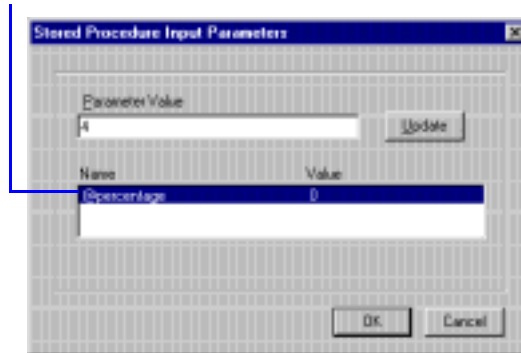
The Choose SQL Table dialog box appears.

- 12 Select an SQL stored procedure from this list, and then click **OK**.



- 13 The stored procedure is added to the report, and the Stored Procedure Input Parameters dialog box appears.

14 Highlight a parameter from this list box.



15 Enter a value in the Parameter Value text box, and then click Update.

NOTE: Under the native driver for MS SQL Server, stored procedure input parameters are limited to 64 characters, rather than 255.

The value displayed in the *Name* list box is updated.

- 14 Repeat Steps 14 and 15 for each parameter that appears in the *Name/Value* list box.
- 15 Click **OK** when finished. You can change parameter values at any time by choosing the **STORED PROCEDURE PARAMETERS** command from the Database Menu.

How to set up an A to B, A to C link

NOTE: This tutorial demonstrates how to set up an A to B, A to C report using the *Cust*, *Credit*, and *Orders* tables in the *ORDRCR.MDB* sample database. The *ORDRCR.MDB* database is located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or in the directory in which the program resides. Use the instructions here as a guideline for creating A to B, A to C reports with your own database files.



- 1 Click the **NEW** button on the standard toolbar. The Report Gallery appears.
- 2 Click *Custom*, and the dialog box expands.
- 3 Select the type of custom report you want to create, and click *Data File*. The Choose Database File dialog box appears.
- 4 Select the *ORDRCR.MDB* database file from the File Name list box, and then click **OK**.

The Select Tables dialog box appears.

- 5 Click *Select All* to include all tables, and then click *OK*.

The Visual Linking Expert appears.

- 6 Link the {credits.CUST} field to the {orders.CUSTOMER} field and the {cust.NUMBER} field.

NOTE: *Linking will not occur if you click the Smart Linking button. For more information about linking, search for Visual Linking Topics Index in Seagate Crystal Reports online Help.*

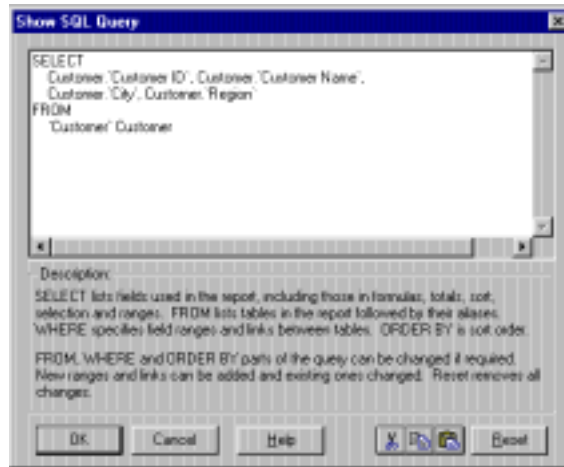
- 7 Select one of the link lines in the Visual Linking Expert, and click *Options*. The Link Options dialog box appears.
- 8 Click the *Look up all of one, then all of others* option button in the *When linking to two files from this file* section of the Link Options dialog box. This option establishes an A to B, A to C link.
- 9 Click *OK* to return to the Visual Linking Expert. The option you selected affected all links. To make sure this option is in effect, click the link line that you did not select in the last step.
- 10 Click *Options*, and verify the *Look up all of one, then all of others* setting in the Link Options dialog box.
- 11 Click *OK* in the *Link Options dialog box*, then click *OK* again back in the Visual Linking Expert. See *LOOK UP ALL OF ONE, THEN ALL OF OTHERS (A TO B, A TO C)*, Page 525.

You have now established an A to B, A to C relationship among the three tables.

How to edit an SQL query

NOTE: *This section is only valid for reports using ODBC data sources. Seagate Crystal Reports automatically generates an SQL query when you design a report based on one or more ODBC data source. This query is sent to the ODBC data source(s) as an instruction to gather the data needed by the report.*

- 1 Choose the *SHOW SQL QUERY* command from the Database Menu. The Show SQL Query dialog box appears.



- 2 Click anywhere inside the *SQL Query* edit box to begin making changes.
- 3 Use the ANSI SQL language to fine-tune the SQL query.

NOTE: *You can not change the SELECT clause of the SQL statement.*

You can cut, copy, or paste any part of the query to or from the Clipboard if needed. See *The SQL language, Page 540*.

- 4 Click *OK* when finished.

How to use an ACT! database

ACT! is a powerful Contact Management application that stores all your contact information in a database format similar to xBASE databases (dBASE, Clipper, and FoxPro). See *ACT!, Page 595*.

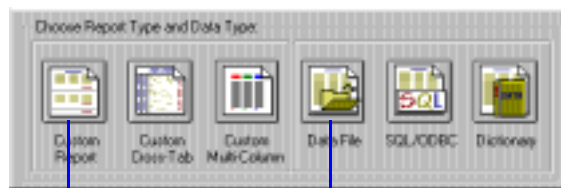


- 1 Click the **NEW** button on the standard toolbar. The Report Gallery appears.



2 Click Custom.

The Report Gallery expands.



3 Click Custom Report.

4 Click Data File.

The Choose Database File dialog box appears.

- 5 Use the controls in the Choose Database File dialog box to locate and highlight the file CRW.ACT. This file is located in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or in the directory in which the program resides. Click **OK** when finished. The Choose File for ACT! dialog box appears.
- 6 Use the controls in this dialog box to locate and highlight your ACT! database.
- 7 Click **OK**. The Design Tab appears in the application window. Create your report using fields from your ACT! database.

How to open the NT Event Log



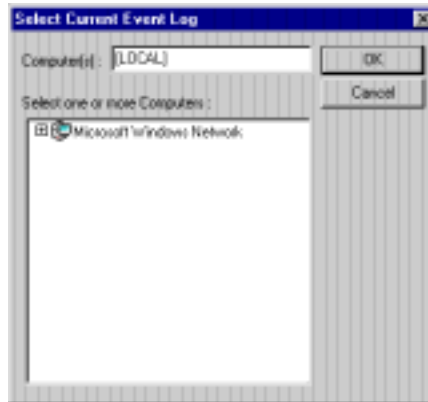
If you are using a Windows NT system, the 32-bit version of Seagate Crystal Reports gives you the ability to generate reports based on the NT Event Log. For your convenience, the program comes with a pre-designed report that you can run using your own Event Log as a data source. The report, EVENTDTL.RPT, is located in the \REPORTS\101\NTEVENT\ directory.



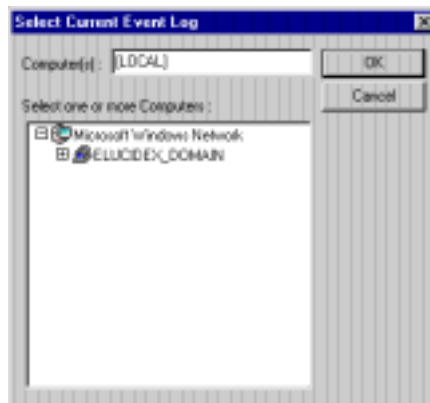
NOTE: This report is only available with the Professional version of the program and is not available on floppy disks.



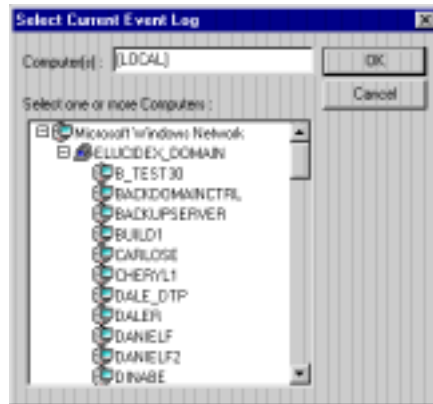
- 1 Open the EVENTDTL.RPT report file in Seagate Crystal Reports.
- 2 Click the REFRESH button on the standard toolbar. A dialog box will appear asking if you want to refresh data.
 - If you click *No*, the original report will appear.
 - If you click *Yes*, the Select Current Event Log dialog box appears:



- 3 The computer referenced in the *Computer(s)* text box is the computer on which the sample report is based. To change the computer, click on the plus (+) sign to the left of *Microsoft Windows Network*. The directory structure will expand to display the network group to which your computer is connected. The Select Current Event Log dialog box now looks similar to the following:



- 4 You can now click on the plus (+) sign to the left of the network group to display individual machines connected to the group. The Select Current Event Log dialog box now looks similar to the following:



- 5 From this point, you simply need to select the NT machine for which you would like to generate an NT Event Log Report. When you select a machine, that name will appear in the *Computer(s)* text box.

NOTE: If you select a non-NT machine, the following error message appears: *The RPC server is unavailable. You can run this report only from NT machines.*

- 6 Click **OK**. A new NT Event Log Report appears. This report contains information for the machine you selected via the Select Current Event Log dialog box.

You can now print the report or review it in the Preview Tab. When you are ready to save the report, save the report to a new file name. When you want to update the report, simply refresh the report data. When you want to run a report on a different NT event log, open the original report (EVENTDTL.RPT) and repeat Steps 2-6.

How to enable server-side processing

- 1 Choose **REPORT OPTIONS** from the File Menu. The Report Options dialog box appears.
- 2 Toggle the *Perform Grouping on Server* check box on. Note that this check box will be inactive if *Use Indexes or Server for Speed* is toggled off.

- 3 Click OK.

NOTE: You can also enable or disable this option quickly by toggling the check mark beside the **PERFORM GROUPING ON SERVER** command (Database Menu) on or off as needed. If Use Indexes or Server for Speed is toggled off in the Report Options dialog box, this command will be inactive.

How to remap altered database fields

Use the Map Fields dialog box to remap existing report fields in the active database if they have been altered.

- 1 With the report active in the Design Tab, choose **VERIFY DATABASE** from the Database Menu. The Verify Database message box appears.
 - If the program detects no changes in the active database, the message box displays this message: "The database is up to date." In this case, simply click *OK* and return to your work.
 - If the program detects a change(s) in the active database, the message box displays this message: "The database file ["database name"] has changed. Proceed to fix up the report?"
- 2 Click *Yes*. If the program detects that a field name has been altered in the active database, the Map Fields dialog box appears.

NOTE: The program automatically adapts the report to changes in other data within the database (number of fields, field position, data type, etc.). It is not necessary to remap fields in which these changes have been made. For more information, search for *Verify Database* command in *Seagate Crystal Reports online Help*.

- 3 Highlight the first report field that you want to remap in the upper left list box.
- 4 In the upper right list box, highlight the unmapped database field to which you want to remap the selected report field.
- 5 Click the *Map* button.

The highlighted report and database fields no longer appear in the upper list boxes. Instead, they appear in the corresponding lower list boxes.
- 6 Repeat Steps 3 through 6 for each unmapped report field you want remapped.

NOTE: If the names of any report fields remain in the upper left list box when you exit the dialog box, the program removes them from your report.

- 7 Click **OK**. The program remaps the report fields to the altered database fields.

How to remap database fields

The following example is designed to help you understand how easy it is to adapt an existing report when you make changes in the active database. You must have Microsoft Access and Seagate Crystal Reports running on the same machine in order to complete this tutorial.

- 1 In Seagate Crystal Reports, create a report using the Customer Table of xtreme.mdb. Place the Customer Name field in the Details section of your report. See *HANDS-ON (Report Creation and Design), Page 101*.
- 2 In Microsoft Access, open the xtreme.mdb database and the Customer table.
- 3 Right-click the Customer Name field heading and choose **RENAME COLUMN** from the shortcut menu. The program highlights the field heading to indicate that it is ready for editing.
- 4 Type "Cust Name" (do not include the quotation marks) and press Enter. The new name appears in the field heading, replacing "Customer Name."
- 5 Save the database.
- 6 On the Design Tab in Seagate Crystal Reports, note that the field is still labelled "Customer Name."
- 7 Choose **VERIFY DATABASE** from the Database Menu. The Verify Database message box appears, asking you whether you want to fix the report.
- 8 Click **Yes**. The Map Fields dialog box appears, with the Customer Name report field is highlighted in the upper left section.
- 9 Click the Cust Name field in the upper right section. This will highlight that field name.
- 10 Click **Map** to remap the report field to the altered database table. The two field names will be removed from the upper sections and moved to the lower sections of the dialog box.
- 11 Click **OK** to return to the report.

NOTE: On the Design Tab of Seagate Crystal Reports, notice that the field is still labelled "Customer Name." The label will not change until you refresh the data, activate the Preview Tab, or select the field in your report. You also have the option of changing the label manually.

- 12 Click the Customer Name field. Note that the field name changes to Cust Name.
- 13 Once again, choose VERIFY DATABASE from the Database Menu. The Verify Database message box appears, stating that the database is up to date. Click *OK* to return to your report.

You have successfully remapped a report field to an altered database table.

NOTE: Make sure to change your xtreme.mdb database back to its original state after completing this tutorial.

26

Data Sources

What you will find in this chapter...

Introduction, Page 580

Four types of data, Page 581

Direct access database files, Page 581

ODBC data sources, Page 601

Crystal SQL Designer files, Page 615

Crystal Dictionary files, Page 617

Introduction

Seagate Crystal Reports can access data stored in almost any common database format, as well as many uncommon formats. In addition, Seagate Crystal Reports leverages the full benefits of query (.QRY) files and dictionaries (.DC5). See *The Crystal SQL Designer, Page 465*, and *Dictionaries, Page 487*.

This section discusses the many different types of data that Seagate Crystal Reports can access, and explains the data access layers involved in connecting to the data. If you are not sure what Database Management System (DBMS) your company uses, contact your IS manager or your network administrator.

Why you should read this

The principal purpose of Seagate Crystal Reports is simply to access data stored in databases and to produce reports on that data. This goal is one of the oldest uses of computers and remains one of the most common and most necessary. Seagate Crystal Reports is designed to make that task easier, less time-consuming, and more powerful.

This idea of accessing data remains at the root of every report produced. By understanding how Seagate Crystal Reports accesses data, you will gain a better knowledge of the reporting process, as well as a better knowledge of the type of data with which the program can work.

In addition, understanding the data access process will help you troubleshoot problems you may encounter while trying to open a particular database file. This is especially useful for IS managers, or for anyone who provides data access support for a group of users.

Most of the information in this chapter is designed for experienced Seagate Crystal Reports users and IS managers, and covers technical aspects of Database Management Systems (DBMS) and data storage techniques. A familiarity with computers; the Windows, Windows 95 and Windows 98, or Windows NT operating system; and at least one DBMS application is assumed.

A note to developers

This section concentrates on the principles of data access. However, most of the same concepts can be applied to any application that accesses data through Crystal Report Engine, or through any of the Crystal Report Engine development tools described in the Technical Reference. For that reason, the Seagate Crystal Reports, as used in this chapter, refers to both the application and the Report Engine unless otherwise specified.

NOTE: *Most of the file names mentioned in this chapter are for the 16-bit version of the program unless otherwise specified. File names for the 32-*

bit version are similar, but will have some aspect indicating 32-bit. For example, PDSODBC.DLL is the 16-bit ODBC translation file, while P2SODBC.DLL is the 32-bit ODBC translation file.

Four types of data

The data that Seagate Crystal Reports can access falls into four general categories:

1. *Direct access database files, Page 581*
2. *ODBC data sources, Page 601*
3. *Crystal SQL Designer files, Page 615*
4. *Crystal Dictionary files, Page 617*

Each type of data must be accessed using a specific set of DLLs and other data access-related files. Once you understand the process the program uses to access each type of data, you will have a better understanding of the report creation process and the elements used to create powerful reports with your data. See *The Crystal SQL Designer, Page 465* and *Dictionaries, Page 487*.

NOTE: *When accessing any type of data, Seagate Crystal Reports relies on the database drivers to provide field names, field types, and field lengths. This information is provided by either the database engine or the ODBC database driver.*

Direct access database files

Seagate Crystal Reports can access many of the most common PC database formats directly. In other words, the program has the built-in capabilities needed to directly open database files and tables designed in dBASE, FoxPro, Clipper, Btrieve, Paradox, and Microsoft Access, among others. This functionality exists as soon as you install Seagate Crystal Reports. Once the program is installed on your system, you can immediately begin creating reports based on these databases by selecting the appropriate file.

Advantages

Accessing the database directly is the fastest way to read the data. Seagate Crystal Reports only needs to talk to a single data access layer that provides contact with the data. Report results can be obtained quickly in almost any system environment.

In addition, data access is simple. Direct access database files are point-and-click data sources. You need only select the required database files, and Seagate Crystal Reports will read all the stored data.

Disadvantages

When you access a database directly through Seagate Crystal Reports, only that database type can be used by the report. You can not switch to a different type of database or table without creating a new report.

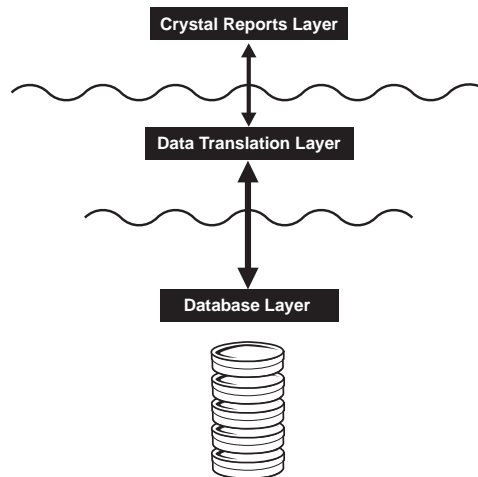
For example, if you design a report based on Btrieve data, you can not change the tables accessed by the report to Paradox data. Seagate Crystal Reports communicates with Btrieve data using a Btrieve-specific syntax, a syntax that is not compatible with Paradox data.

If you access data through ODBC, on the other hand, the syntax used is always the SQL language, regardless of the actual database type. See *ODBC data sources, Page 601*.

Three layers

Direct access of database files from Seagate Crystal Reports requires three layers:

1. *Seagate Crystal Reports, Page 583*
2. *Data Translation, Page 583*
3. *Database, Page 583*



Seagate Crystal Reports uses the data translation layer to talk to the database and access its data.

Seagate Crystal Reports

Seagate Crystal Reports operates as an interface through which you can format, arrange, select, and sort the data stored in database files. It obtains data by communicating with one or more files in the data translation layer that can actually read the database. Since Seagate Crystal Reports can work with many forms of data, it must rely on other files in order to work directly with the data. Seagate Crystal Reports can then use a native method of communication to talk to the translation files.

Data Translation

Data is translated through a set of DLLs specific to Seagate Crystal Reports. The program uses the DLLs specific to a certain data type to understand how data is organized for that type and to present it correctly when your report is printed, previewed, or exported.

NOTE: Seagate Crystal Reports comes with all the data translation files for each of the direct access database types that it supports. For complete information on all required files, refer to the Runtime File Requirements online Help (RUNTIME.HLP).

Database

The database file consists of one or more tables. Different DBMS applications store database information differently. For example, dBASE stores each database table as a separate file. Access, on the other hand, can store several tables, along with queries, macros, and other database elements, all in a single file.

When Seagate Crystal Reports accesses a database file directly, it automatically retrieves information about all of the tables and fields in that file. You may not use all of the tables or fields, but the program will make them available to you. In other words, when a dBASE file is opened, only one table in the dBASE file is available. However, when an Access file is opened, every table in that file is available, even if you never use them all.

NOTE: Seagate Crystal Reports will also open queries in an Access database through the DAO engine or ODBC and will allow you to report on query fields, as with table fields. See DAO, Page 589 and Access, Page 606.

Common database formats

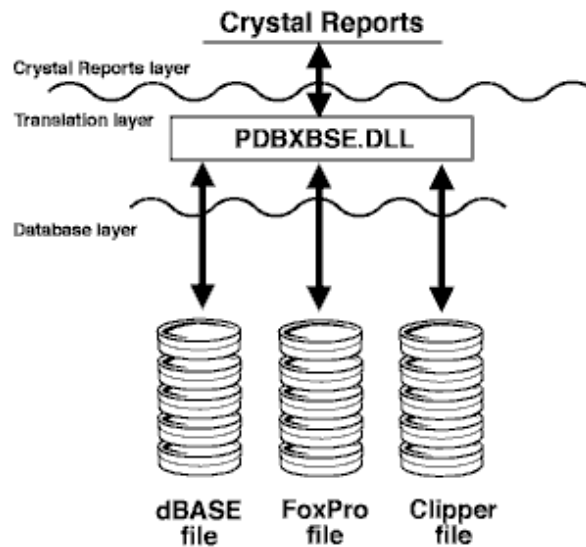
Although Seagate Crystal Reports uses the same three-tiered system for obtaining data from all direct access database file formats, each format requires a different set of Dynamic Link Libraries (DLLs). However, some formats expand the basic three-tiered structure.

The following sections cover the systems used by Seagate Crystal Reports to access data from some of the most popular database formats.

dBASE, FoxPro, Clipper

The dBASE database format remains one of the most popular database management systems (DBMS) used in business. For that reason, Seagate Crystal Reports has been designed to open dBASE data simply and directly through the xBase engine (inside PDBXBSE.DLL). FoxPro and Clipper are dBASE compatible database formats, and Seagate Crystal Reports uses the same DLL to access files created by any of these three DBMS applications.

NOTE: The PDBXBSE.DLL translation layer supports FoxPro files up through version 2.5. See Visual FoxPro, Page 614.



The file PDBXBSE.DLL handles all translation between Seagate Crystal Reports and the dBASE, FoxPro, or Clipper files. Each database file contains only a single database table, but there is no limit to the number of files that can be accessed by a report.

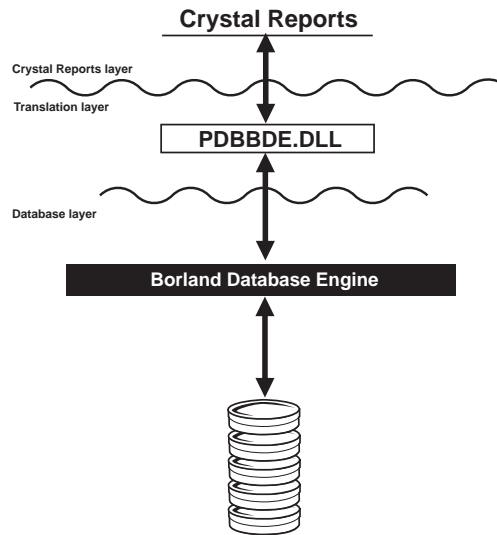
NOTE: dBASE data can also be accessed through the Borland Database Engine (BDE) using the translation file PDBBDE.DLL. To see how the BDE communicates with database data, see Paradox, Page 585. The BDE, however, does not support FoxPro or Clipper data.

Paradox

Files created with Paradox (.DB) are made available to other applications through the Borland Database Engine (BDE). The BDE is made up of several files installed by Seagate Crystal Reports in the \IDAPI directory by default:

- ILD01.DLL
- IDDBAS01.DLL
- IDR10009.DLL
- IDODBC01.DLL
- IDASCI01.DLL
- IDAPI01.DLL
- IDBAT01.DLL
- IDQRY01.DLL

The BDE does the actual work with the Paradox data, retrieving the requested tables and fields. Since the BDE works so closely with the actual data, it combines with the Paradox database file to create the database layer in the three layer data access model. Seagate Crystal Reports accesses the BDE through the PDBBDE.DLL translation file.



The 32-bit version of the BDE uses different files. Otherwise, Seagate Crystal Reports uses 32-bit Paradox files in the same way it uses the 16-bit Paradox files, accessing them through the P2BBDE.DLL 32-bit translation file.

The files that make up the 32-bit version of the BDE are:

- BLW32.DLL
- IDDR32.DLL
- CEEUROPE.BLL
- IDODBC32.DLL
- CHARSET.BLL
- IDPDX32.DLL
- EUROPE.BLL
- IDQBE32.DLL
- IDAPI32.DLL
- IDR20009.DLL
- IDAPIINST.DLL
- IDSQL32.DLL
- IDASCI32.DLL
- OTHER.BLL

- IDBAT32.DLL
- USA.BLL
- IDDBAS32.DLL
- CW3215.DLL

Microsoft Access

Microsoft Access provides several means for opening its database files. Each method has its advantages and disadvantages, and the technique that you should use may depend on how your data is set up. Below are descriptions of two techniques for opening Access data from Seagate Crystal Reports through the Jet engine and through the DAO engine. The third technique uses Microsoft's Open Database Connectivity (ODBC) standard, and is described in *Access, Page 606*.

NOTE: *You can maintain Access security when opening database files with Seagate Crystal Reports by running SYSD32.EXE and select the Access SYSTM.MDW file. In this case, the program will look to SYSTM.MDW when opening an Access database and the user will be prompted for the Access password (as required) in Seagate Crystal Reports.*

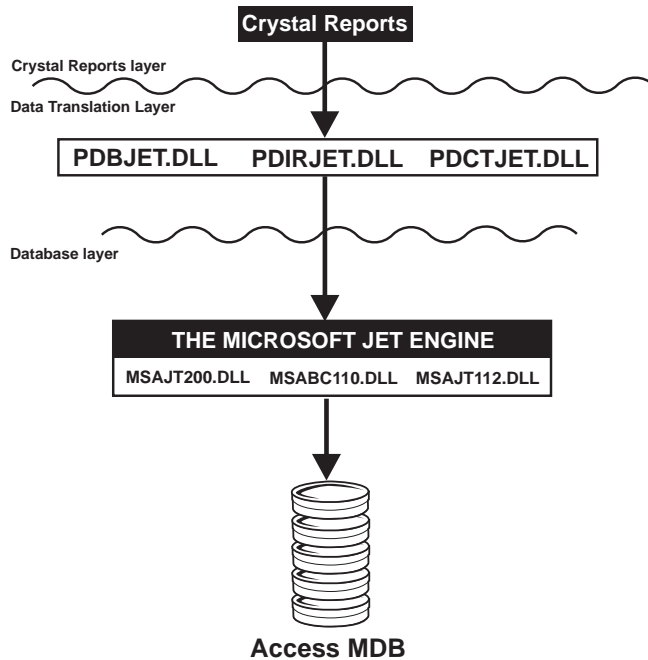
NOTE: *When you open an Access database using the Jet or DAO engine, Seagate Crystal Reports opens the entire database and loads information about all tables and queries from the database. To do this, Seagate Crystal Reports must reserve a large section of your computer's memory (called a buffer) in advance. Computer memory restrictions limit this buffer to 65,536 bytes (64K). This restricts the size of your Access database to about 80 tables, depending on the number of fields in your tables.*

Jet

The Microsoft Jet Database Engine is the part of the Microsoft Access Database Management System that actually handles your database data. As a user, you usually do not work directly with the Jet engine. It acts as a gateway through which Access data is made available to applications. For this reason, the Jet engine must be used regardless of the overall method used to access your Access data. You will see the Jet engine in other sections that discuss Access data.

Since the Jet engine is so closely tied to Access data, Seagate Crystal Reports considers it a part of the actual database. In the following diagram, the files for the Jet engine appear in the database layer. Seagate Crystal Reports uses three files to translate information to and from the Jet engine:

1. PDBJET.DLL
2. PDIRJET.DLL
3. PDCTJET.DLL



Reading Access data through the Jet engine is the most direct route. Therefore, it is the fastest method for reading the data. However, Jet does not allow you to read Access queries. If you need to open Access queries from Seagate Crystal Reports, you should use the DAO engine (DAO, Page 589) or ODBC (Access, Page 606).

NOTE: If you toggle the *Use Indexes* check box on using the *Database Tab* of the *Options* dialog box, Seagate Crystal Reports can pass much of the data retrieval process, including simple selection formulas, down to the Jet engine, improving performance and speed. Search for *Options* dialog box in Seagate Crystal Reports online Help.

NOTE: Seagate Crystal Reports provides all the files necessary for reading Access tables through the Jet engine. For more information on required files, refer to the *Runtime File Requirements* online Help (RUNTIME.HLP).

DAO

Microsoft's new Data Access Object (DAO) Engine for 32-bit versions of Access 2.0 and later, provides all the functionality of the Jet engine but also adds many new data access features. DAO uses Microsoft's Object Linking and Embedding (OLE) technology (installed with Windows 95, Windows 98, and Windows NT) to provide access to Access data through an object-oriented approach.

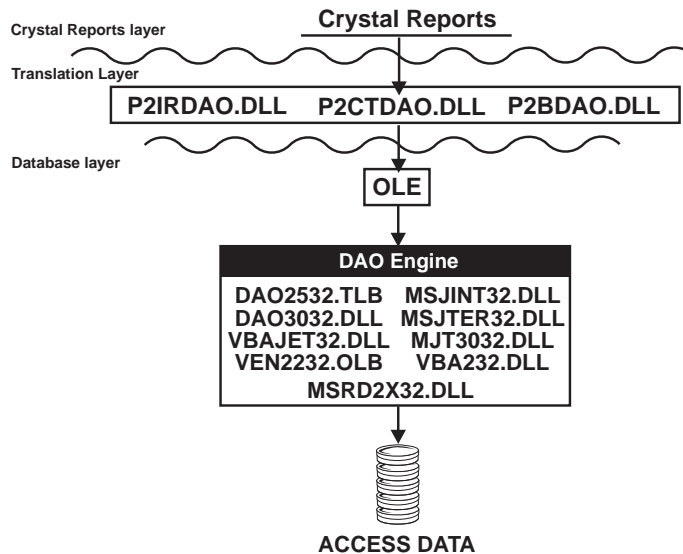
In addition to Access database tables, Seagate Crystal Reports can open and use Access queries through DAO. If you are not familiar with Access queries, refer to your Access documentation. See also *How to open Access queries through DAO*, Page 548.

NOTE: *Access Parameter queries and cross-tab queries can only be opened through an ODBC connection. See How to open Access parameter queries, Page 552. Access Action queries are not supported by Seagate Crystal Reports.*

NOTE: *When opening Access queries in a report, make sure the Views and Stored Procedures options are toggled on using the SQL Tab of the Options dialog box in Seagate Crystal Reports. This ensures that the queries will be visible when you open the Access database.*

The DAO engine greatly broadens the possibilities available to Access database users. Because DAO expands and builds on the basic functionality of the Jet engine, while working primarily with the actual Access database data, DAO is also considered part of the database layer. To translate information and data to and from DAO, Seagate Crystal Reports uses the DAO translation files P2BDAO.DLL, P2CTDAO.DLL, and P2IRDAO.DLL. Compare these files to the translation layer for accessing MS Access data directly through the Jet engine. For more information, see *Jet*, Page 587.

NOTE: *The Jet engine is incorporated into the DAO engine and does not appear as a separate engine in the diagram below.*



NOTE: Seagate Crystal Reports provides all the files necessary for reading Access data through the DAO engine. Because the program supports the most recent version of DAO, there is also native support for VSFoxPro (see Visual FoxPro, Page 614). For more information on required files, refer to the Runtime File Requirements online Help (RUNTIME.HLP).

Secured Microsoft Access Databases

If you will be using secured Access databases, the SystemDB parameter in the Windows Registry database (32-bit systems) or CRW.INI (16-bit systems) must be set to point at the path where the SYSTEM.MDA or SYSTEM.MDW (Access 95) file is located. On Windows 95, Windows 98, and Windows NT systems, the SystemDB parameter is located in the following Registry key:

```

\\HKEY_LOCAL_MACHINE\Software\Crystal
Software\Jet\3.0\Engines\Jet
  
```

Seagate Crystal Reports includes two utilities that take care of setting this parameter for you:

1. SYSDB16.EXE (16-bit systems changes CRW.INI)
2. SYSDB32.EXE (32-bit systems changes Registry key)

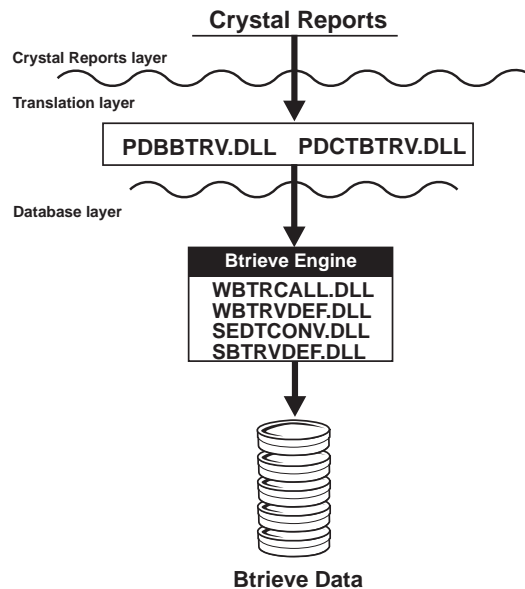
These utilities are installed in the \CRW16 directory (16-bit), \Program Files\Seagate Software\Crystal Reports directory (32-bit), or in the directory in which the program resides. Simply run the appropriate utility and point it at the location of the SYSTEM.MDA or SYSTEM.MDW file.

Btrieve

The 16-bit version of Seagate Crystal Reports uses two translation files to communicate with the 16-bit Btrieve engine:

1. PDBBTRV.DLL
2. PDCTBTRV.DLL

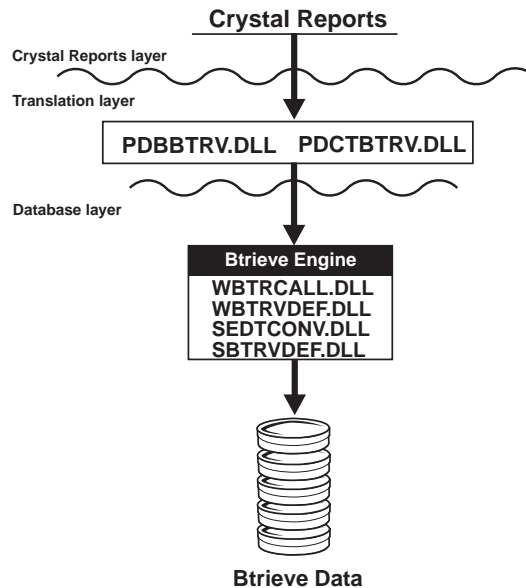
These files work with the Btrieve files WBTRVDEF.DLL, WBTRCALL.DLL, SBTRVDEF.DLL, and SEDTCONV.DLL for most data access operations.



The rest of the Btrieve engine is a complex collection of DLLs and EXEs that are specific to the version of Btrieve you are using. For more information on the different 16-bit Btrieve engine files, search for *Btrieve* in Seagate Crystal Reports online Help, and refer to your Btrieve documentation.

NOTE: Btrieve must be configured correctly for Seagate Crystal Reports to read Btrieve databases. If Btrieve is already configured correctly on your system, Seagate Crystal Reports can use your Btrieve data immediately upon installation. Seagate Crystal Reports automatically installs the Btrieve files that it requires to read Btrieve data. Refer to your Btrieve documentation to make sure the Btrieve engine is configured correctly.

The 32-bit version of Seagate Crystal Reports connects to the 32-bit Btrieve engine through a similar set of Btrieve translation files:



The primary difference between 32-bit Btrieve and 16-bit Btrieve is the Btrieve engine itself. For more information on the Btrieve engine, refer to your Btrieve documentation.

NOTE: When you open a Btrieve database, Seagate Crystal Reports opens the entire database and loads information about all the tables in the database. To do this, Seagate Crystal Reports must reserve a large section of your computer's memory, called a buffer, in advance. Computer memory restrictions limit this buffer to 65,536 bytes (64K). This restricts the size of your Btrieve database to about 80 tables, depending on the number of fields in each table.

Btrieve DDF files

Seagate Crystal Reports does not determine the definitions of Btrieve data files directly from the data files themselves. It needs a set of Btrieve Data Dictionary Files (.DDF) that contain file, field, and index information. Seagate Crystal Reports uses WBTRVDEF.DLL and SBTRVDEF.DLL to parse these DDF files. The following are the required DDFs which must all reside in the same directory:

- FILE.DDF
- FIELD.DDF
- INDEX.DDF

A set of DDFs normally contain definitions for multiple Btrieve data files. Once one of the DDFs is selected when creating a new report, Seagate Crystal Reports immediately adds all the data files defined in that DDF into the report. Seagate Crystal Reports also takes the path defined in the DDFs as the default path of the data files. The DDFs and data files can reside in different locations.

NOTE: Be sure to study your Btrieve documentation for more information on Btrieve DDFs and on configuring the Btrieve engine.

Exchange

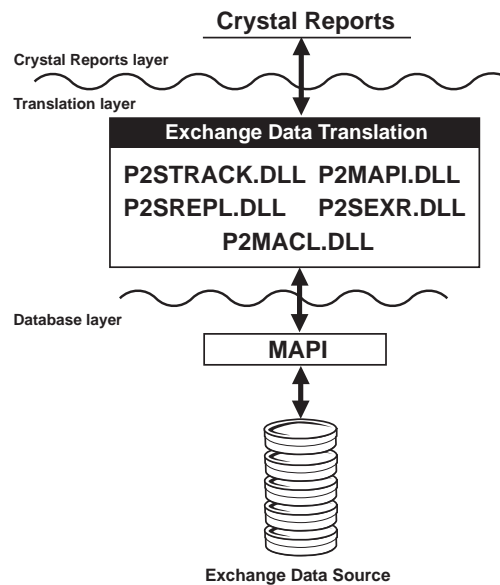
Exchange is Microsoft's successor to MS Mail. Exchange, however, includes not only e-mail, but also management of group scheduling, electronic forms, groupware, and Internet connectivity. An Exchange folder can contain standard notes (mail), files, and instances of Exchange forms. All of this data is stored in the Exchange Information Store.

Seagate Crystal Reports can report on data contained in the Exchange Information Store. Exchange data sources available for reporting include:

- Message Tracking Logs (32-bit only)
- Address Lists (32-bit only)
 - Personal Address Books
 - Global Address Lists
 - Distribution Lists
- Exchange Folder Contents (32-bit only)
 - mail messages
 - Exchange Form applications
 - properties of OLE documents

- Exchange Administrator (32-bit only)
 - properties of Exchange mailboxes on the Exchange Server
 - properties of public folders on the Exchange Server
 - replica list of public folders
 - ACL (Access Control List) of public folders

You can use each Exchange data source like a database table and you can link each Exchange data source to other data sources. For example, you can join the Message Tracking Log to an Address List by using an e-mail address as the link field.



The data translation file used to access the Exchange data source depends on the data source that is being accessed. The following table lists each of the Exchange data translation files and describes their purpose:

<i>File name</i>	<i>Data source</i>
P2STRACK.DLL	Message Tracking Logs (32-bit only)
P2SMAPI.DLL / PDSMAPI.DLL	Exchange Folder Contents and Address Lists
P2SEX.R.DLL	Properties of Exchange Mailboxes and Public Folders (32-bit only)

<i>File name</i>	<i>Data source</i>
P2SREPL.DLL	Replica Lists of Public Folders (32-bit only)
P2MACL.DLL	Access Control Lists (ACL) of Public Folders (32-bit only)

NOTE: PDSMAPI.DLL works with 16-bit Seagate Crystal Reports while P2SMAPI.DLL works with 32-bit Seagate Crystal Reports. Also, PDSMAPI.DLL is the only Exchange driver available for 16-bit Seagate Crystal Reports.

Exchange translation files work directly with the Microsoft Messaging API (MAPI). MAPI acts as a database engine for Exchange data.

How Seagate Crystal Reports treats Exchange data

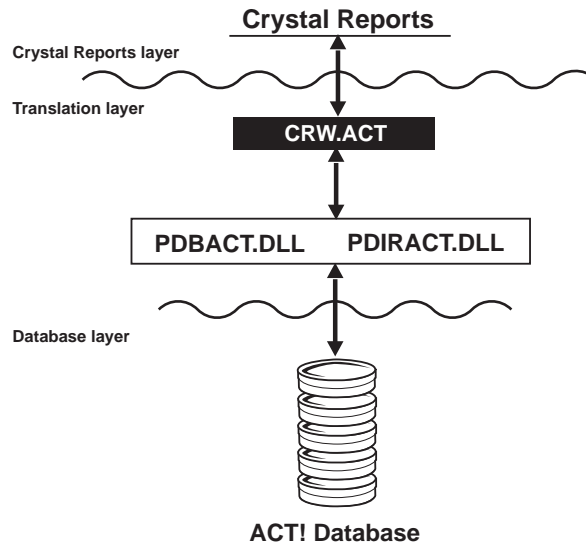
Seagate Crystal Reports treats Exchange Administrator data (Public Folder Admin, Public Folder ACL, Public Folder Replica, and Mailbox Admin server types) as a physical database server. To access this data, you must log on using a SQL/ODBC server and select the appropriate tables from the Choose SQL Table dialog box.

When you log on to any of the Exchange Administrator servers, you must select a profile (or profiles). Each profile represents an Exchange Server.

NOTE: Refer to your Microsoft Exchange documentation for more information about how to set up and create Exchange profiles.

ACT!

Symantec's ACT! contact management software stores information in a relational database format similar to the xBase format. See *dBASE, FoxPro, Clipper*, Page 584. Seagate Crystal Reports can read this data and lets you produce reports based on your contact information.

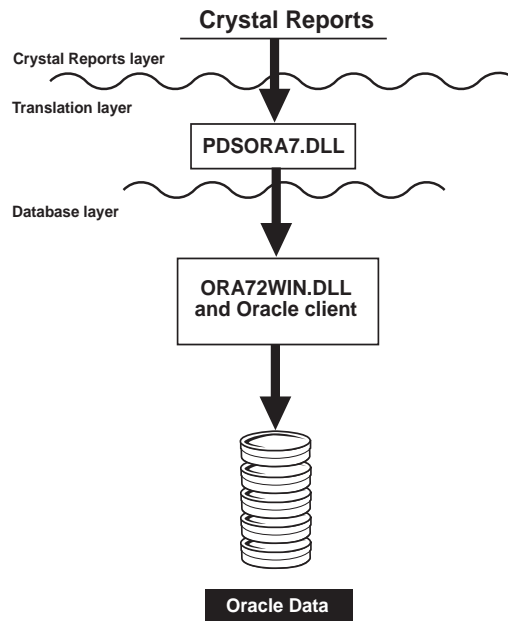


You open ACT! data by selecting the CRW.ACT file from Seagate Crystal Reports when you create a new report. CRW.ACT must be installed in the same directory as the program. This file forces Seagate Crystal Reports to load the PDBACT.DLL and PDIRACT.DLL translation files. This step is important because ACT! data looks like xBase data to Seagate Crystal Reports, so it will use the PDBXBSE.DLL translation file unless instructed otherwise. If this happens, the data will be translated as xBase data rather than ACT! data, and may not appear correctly in your report. See *How to use an ACT! database*, Page 571.

Oracle 7

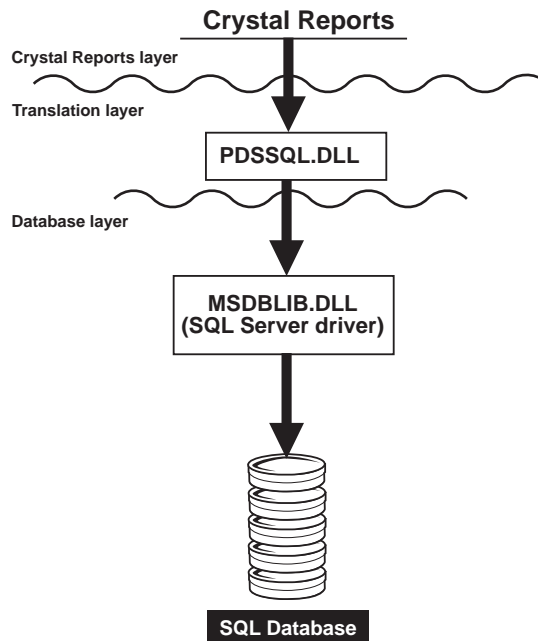
This version of Seagate Crystal Reports supports direct access to Oracle 7 SQL databases. This accessibility is provided by the PDSORA7.DLL translation file (installed with the program). This file can communicate with the Oracle 7 database driver ORA72WIN.DLL, which works directly with Oracle databases and clients, retrieving the data you need for your report.

NOTE: In order for Seagate Crystal Reports to use Oracle 7 SQL databases the Oracle client software must be installed on your system, and the location of the ORA72WIN.DLL file must be in the PATH statement of your AUTOEXEC.BAT file.



Microsoft SQL Server 6.x

Seagate Crystal Reports provides direct access to databases created by Microsoft's SQL Server, versions 6.0 and 6.5. The PDSSQL.DLL file installed with the program translates requests to the SQL server and then returns data from the server. It communicates directly with the Microsoft SQL Server driver MSDBLIB.DLL.

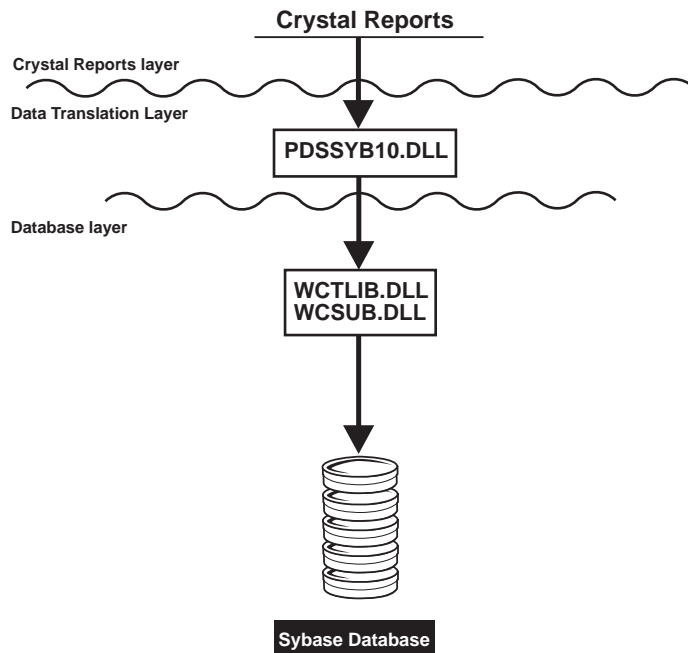


NOTE: Network administrators and IS managers who run Microsoft's Systems Management Server for BackOffice can run reports on Systems Management Server data. Systems Management Server uses SQL Server to store system data, so the files used to access that data are the same files shown here for SQL Server.

Sybase System 10/11

Seagate Crystal Reports opens SQL data created by Sybase System 10 or System 11 directly through the PDSSYB10.DLL, installed with Seagate Crystal Reports. This translation file works with the Sybase database drivers WCTLIB.DLL and WCSUB.DLL to read Sybase System 10/11 data. If your Sybase server is correctly configured, you will be able to read Sybase data as soon as Seagate Crystal Reports is installed.

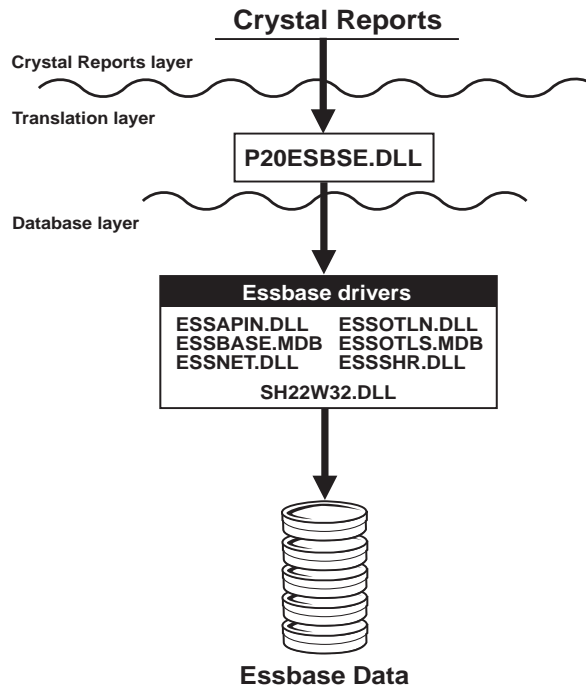
NOTE: The 32-bit Sybase drivers are LIBCT.DLL and LIBCS.DLL.



Hyperion Essbase

Essbase is a highly powerful database format based on the OLAP (On-Line Analytical Processing) model. OLAP presents data in dimensions rather than tables. Users can look at relationships between data on an as-needed basis, drilling-down on dimensions to find the exact data they need in a matter of seconds.

Seagate Crystal Reports opens Essbase data directly through the P2OESBSE.DLL translation file. This file works with the complex engine that drives Essbase. The power of OLAP is combined with the power of Seagate Crystal Reports to produce the most informative and comprehensive reports.

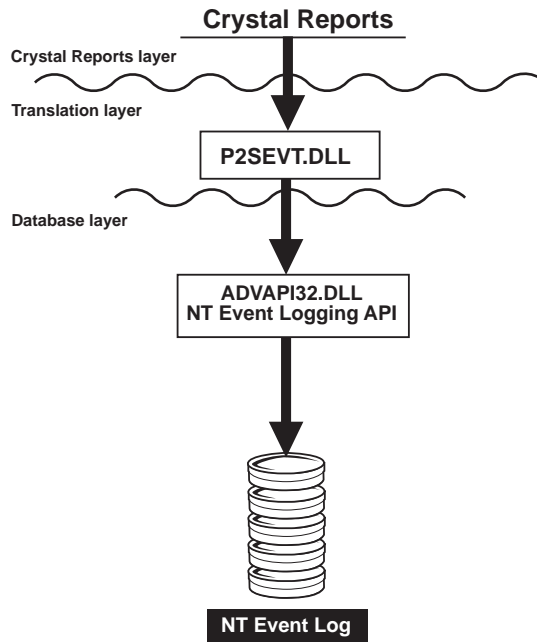


NOTE: Essbase data can only be accessed from the 32-bit version of Seagate Crystal Reports.

NT Event Log

If using Windows NT version 3.51 or later, you can use Seagate Crystal Reports to report on the NT Event Log. The Event Log is a database used by network administrators to record and keep track of different types of events that can occur on a Windows NT Workstation or on a Windows NT server.

Seagate Crystal Reports provides the translation file P2SEVT.DLL for working with NT Event Log data. This file communicates with the Event Logging API in ADVAPI32.DLL, a part of the Windows NT operating system.



NOTE: The NT Event Log can only be reported on with the 32-bit version of Seagate Crystal Reports.

ODBC data sources

Open Database Connectivity (ODBC) is a standard developed by the Microsoft Corporation through which many different types of data can be accessed by a single application. An application need only communicate with one set of files (ODBC) to be able to work with any source of data that can be accessed by ODBC.

There are hundreds of Database Management Systems (DBMS) available for personal computers, and thousands of applications that access DBMS data. Normally, a company that designs an application that accesses data, such as Seagate Crystal Reports, must develop a means for the application to communicate with each type of data that a customer might want to use. Seagate Crystal Reports does this with the databases that it can access directly.

On the other hand, if a DBMS simply provides a means by which ODBC can access its data, the DBMS data becomes an ODBC data source. Any

application that can communicate with ODBC (such as Seagate Crystal Reports), will instantly have access to any ODBC data source. With ODBC drivers available for most common DBMS products, the range of data types that Seagate Crystal Reports can use is almost unlimited.

Advantages

Perhaps the biggest advantage to accessing data through ODBC is the ability to access a wide range of data with just one interface. Since most popular Database Management Systems now offer ODBC drivers, with more appearing every day, Seagate Crystal Reports can use any type of data you have.

Because of the extreme flexibility built into ODBC, you can use the same report file with different ODBC data sources. For example, you might design a report using an Oracle data source, and later, if your company switches to Microsoft SQL Server, you can simply change the ODBC data source used by your report. The only requirement is that the new data source must have the same structure (tables and fields) that the original data source had (although table names can be different). See *How to change the ODBC data source accessed by a report*, Page 563.

Experienced SQL (Structured Query Language) programmers also benefit from the ODBC standard. Since Seagate Crystal Reports uses SQL to communicate with ODBC, SQL programmers and Database Administrators can view and edit the SQL statements sent to ODBC, controlling exactly how data is retrieved from the data source.

Finally, by using SQL pass-through technology to send an SQL statement to ODBC and retrieve an initial set of data, Seagate Crystal Reports off-loads much of the data retrieval and sorting work on to the server system, freeing up local memory and resources for more important tasks. In addition, only the data specified by the SQL statement is returned to Seagate Crystal Reports, reducing network traffic and the use of network resources. By working more efficiently with the original data, Seagate Crystal Reports saves you time and effort, and lets you concentrate on the design process and other more important work.

Disadvantages

Because of the many layers involved in passing data through ODBC from a database to an application, ODBC data sources often take more time to return data than other directly accessed data sources. First, Seagate Crystal Reports must request some data. The request must be translated by the ODBC translation layer into a format that ODBC understands (an SQL statement). ODBC must determine where the requested data exists, and pass the request on to the ODBC data source. For more information, see *DBMS Translation (ODBC data source) Layer*, Page 605. The data source must analyze the request and translate it again into a format that can be understood by the DBMS. This complex process not only takes time, but it can also fail at any of several possible levels.

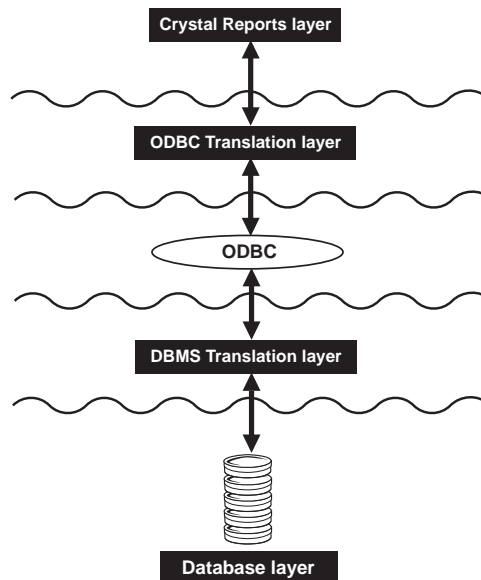
In addition, ODBC data sources must be correctly configured and set up in the ODBC.INI and ODBCINST.INI files before they can be used. If you create a report on one system and try to open it on another system that does not have the same ODBC data source set up, Seagate Crystal Reports will not be able to connect to the data.

When working with ODBC, you should also be aware that the SQL language used by ODBC is based on the standards set for the SQL language by the American National Standards Institute (ANSI). Some SQL-based DBMS applications, however, provide additional features to the SQL language that are specific to that DBMS. If your data uses features unique to your DBMS, ODBC will not be able to translate those features (though in many cases it will still retrieve most of the data). See *The SQL language, Page 540*.

Five layers

The process by which Seagate Crystal Reports accesses data from an ODBC data source consists of five layers:

1. *Seagate Crystal Reports Layer, Page 604*
2. *ODBC Translation Layer, Page 604*
3. *ODBC Layer, Page 604*
4. *DBMS Translation (ODBC data source) Layer, Page 605*
5. *The Database Layer, Page 606*



By using the Structured Query Language (SQL), all five layers can conveniently pass data from the database to your report.

Seagate Crystal Reports Layer

When working with ODBC data, Seagate Crystal Reports generates an SQL statement that requests the appropriate data from ODBC. The powerful SQL generator built into Seagate Crystal Reports is designed to create an SQL statement that will let the ODBC data source or ODBC itself do as much of the report generation as possible, returning only the data needed to produce the report. This SQL statement can be viewed and fine-tuned by anyone familiar with the SQL language. See *How to edit an SQL query*, Page 570.

ODBC Translation Layer

Seagate Crystal Reports uses the Dynamic Link Library PDSODBC.DLL to communicate with ODBC. This file is unique to Seagate Crystal Reports environment and provides your report with access to any ODBC data source. This is the driver that actually passes data to and from ODBC.

ODBC Layer

ODBC is a set of several DLLs and INI files built into the Windows environment that act as a gateway through which database requests and data can pass. Any database file or format that is to be used via ODBC must be set up as an ODBC data source.

In 16-bit Windows (Windows 3.x), the primary DLLs that make up ODBC are:

- ODBC.DLL, and
- ODBCINST.DLL.

Information about ODBC data sources is stored in:

- ODBC.INI, and
- ODBCINST.INI.

ODBC uses these files to access information about the data source.

In 32-bit Windows (Windows 95, Windows 98, and Windows NT), the ODBC DLLs are:

- ODBC32.DLL (32-bit version of ODBC.DLL),
- ODBC32.DLL (32-bit version of ODBCINST.DLL), and
- ODBCINT.DLL (ODBC 2.5 and later).

Although information regarding data sources is still recorded in ODBC.INI and ODBCINST.INI, 32-bit ODBC uses the Windows Registry database to retrieve information about individual data sources.

NOTE: For more information on ODBC and the ODBC files, see the Microsoft ODBC documentation.

ODBC uses the SQL language for all transactions between Seagate Crystal Reports and ODBC. Even if the database does not normally use SQL to create and work with tables, the ODBC driver provided by the database (the DBMS translation layer) must communicate with ODBC using SQL. For most users, this feature of ODBC is transparent, but more advanced users often take advantage of the features of the SQL language used by ODBC.

DBMS Translation (ODBC data source) Layer

This layer consists of one or more drivers provided by a DBMS that allow ODBC to communicate with the database. Seagate Crystal Reports ships with several ODBC drivers for many of the most common database formats. If you are unsure whether you can use an ODBC driver to access the data in your database, refer to the documentation for your DBMS application. Most DBMS applications that run on a Windows-based platform offer an ODBC driver.

When a DBMS provides an ODBC driver, it must register the driver with ODBC on the machine on which it has been installed. It does this by assigning a name to the driver and recording the filename in the ODBCINST.INI file. Usually, this step is handled automatically when the DBMS application is installed on the system. However, your network system or DBMS application may require that you register the ODBC driver manually with the ODBC Setup application. For more information about registering an ODBC driver with ODBC, refer to the documentation for your DBMS.

Once an ODBC driver is registered, you need to establish an ODBC data source using that driver. The ODBC data source is the object that you connect to when accessing data from Seagate Crystal Reports through ODBC. Data sources are recorded in the ODBC.INI file. The data source keeps track of the DBMS translation files (ODBC drivers) and, sometimes, the database itself. An ODBC data source can specify just a database format, such as Oracle, Gupta, Sybase SQL, or MS SQL Server. Some users, however, prefer to actually specify a particular database. In this case, the ODBC data source extends across both the DBMS translation layer, and the database layer.

If you are using a client/server database, such as an SQL server, the ODBC drivers communicate with the database server through the

Database Communication Layer, the same layer that your database client uses to communicate with the database server.

NOTE: *ODBC drivers find their specific DBMS client files on the local machine mainly through key directories that the DBMS client has installed in the search path (specified in AUTOEXEC.BAT). The important thing to remember is that a workstation client on a local PC must be able to connect to its server successfully. If you are not sure how to verify this, contact your IS manager.*

For Seagate Crystal Reports and the ODBC drivers, it does not matter what kind of platform your database server exists on. It is the DBMS client that connects and communicates with the server; Seagate Crystal Reports and the drivers need only communicate with the DBMS client. For more information, see *Using SQL and SQL databases*, Page 535.

The Database Layer

The database file which the ODBC data source refers to can be located anywhere on a system. Once the ODBC data source is set up, Seagate Crystal Reports does not need to know the actual location and format of the data. Thus, the database can have any format and can be located anywhere on a network, as long as ODBC can communicate with it through the ODBC data source.

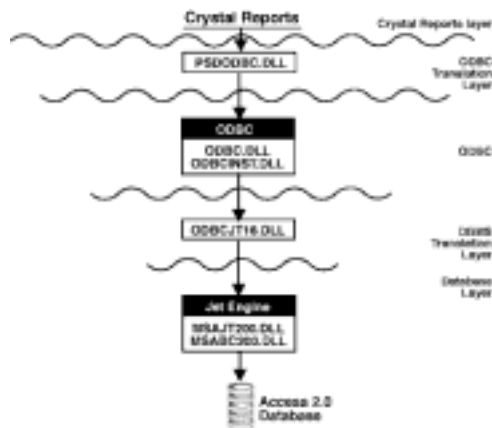
Common ODBC database formats

Access

Although Microsoft Access files can be opened directly by Seagate Crystal Reports (see *Microsoft Access*, Page 587), you may wish to use ODBC for these files instead. When communicating with Access databases, ODBC uses a translation file that communicates with the Microsoft Jet Database Engine. The Jet Database Engine is an example of a DBMS-specific ODBC driver.

The Jet engine is the part of the Access DBMS that does all of the actual work with an Access database. Jet is a required component for working with Access data. Since the Jet engine is an integral part of all Access databases, it is shown here as part of the database layer.

NOTE: *The diagram shown here illustrates the files required by Seagate Crystal Reports to work with databases designed with the 16-bit version of Microsoft Access 2.0. If you are using a different version of Access, refer to the Runtime File Requirements online Help (RUNTIME.HLP) for information on the specific files required to open your Access data.*



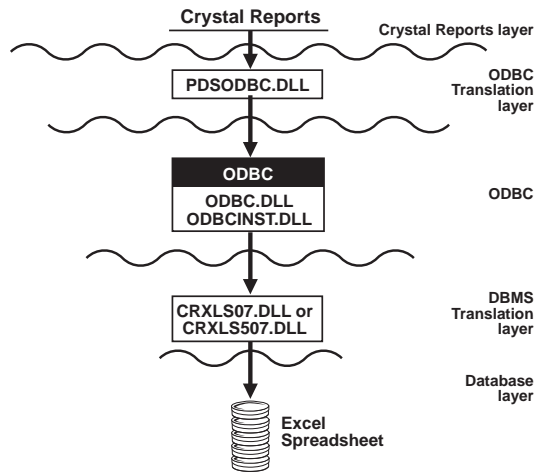
Excel

You can convert Microsoft Excel spreadsheets into databases that can be read by Seagate Crystal Reports through ODBC. In Excel 4.0 and earlier, use the **SET DATABASE** command on the Data Menu. In Excel 5.0 and later, use the *Define* command on the Insert | Name Menu. Once converted, spreadsheet rows become records, and spreadsheet columns become fields. (For more information on converting your spreadsheets to database format, refer to your Excel documentation). Once the spreadsheet is converted, you can set up an ODBC data source for the file, and then select it from Seagate Crystal Reports.

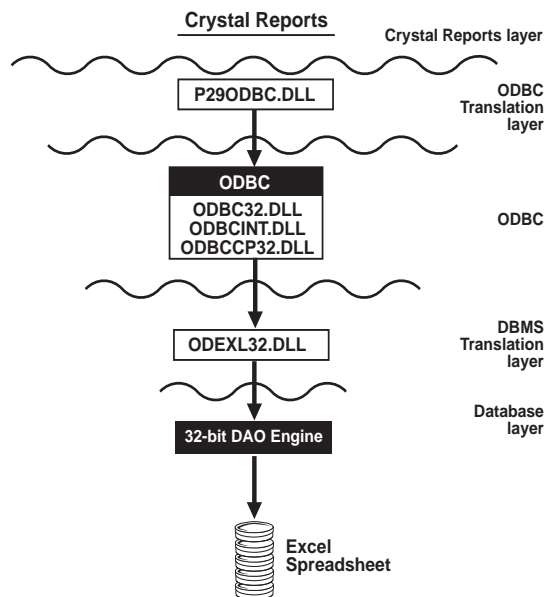
NOTE: *If you are using Excel 7 or later, you can export your spreadsheets as Access database tables, and read them from Seagate Crystal Reports as you would read any other Access tables. For more information, refer to your Excel documentation.*

Seagate Crystal Reports reads Excel databases for 16-bit Windows environments through the CRXLS07.DLL translation file (for Excel version 4.0 and earlier) or through the CRXLS507.DLL (for Excel version 5).

These drivers are installed by Seagate Crystal Reports. ODBC can communicate with the appropriate driver to read the converted Excel spreadsheet.

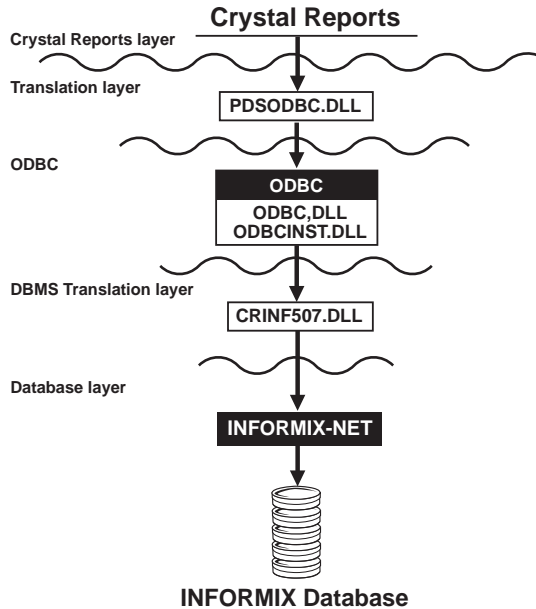


If you are using a 32-bit Windows system, you can set up an ODBC data source for 32-bit Excel spreadsheets using the 32-bit DAO engine. The DAO engine is installed on your system when you install the 32-bit version of Seagate Crystal Reports. However, you must set up an ODBC data source manually for your Excel spreadsheet. See *How to set up an ODBC data source*, Page 556.



INFORMIX

Seagate Crystal Reports accesses INFORMIX databases through ODBC. The INFORMIX client, called INFORMIX-NET, should be installed on your machine. Otherwise, Seagate Crystal Reports will provide the driver that ODBC uses to communicate with the INFORMIX database engine.



NOTE: The 32-bit version of Seagate Crystal Reports provides the 32-bit ODBC driver CRINF509.DLL for reading 32-bit INFORMIX data.

SQL Databases through INTERSOLV DataDirect

There are many different SQL Database Management Systems available on the market, and most of them can be accessed through ODBC. Seagate Crystal Reports automatically installs and sets up several ODBC data sources, allowing you to access many of the most popular SQL databases, including:

- Oracle
- Sybase SQL Server
- MS SQL Server
- Gupta SQLBase

- Scalable SQL
- DB2/2
- ASCII Text

NOTE: ASCII Text is not really an SQL database format, but Seagate Crystal Reports can read text files through ODBC in much the same way.

Seagate Crystal Reports provides the INTERSOLV DataDirect ODBC drivers for these SQL database formats. Not all SQL databases are accessed through these drivers, but as a convenience, the program automatically sets up these drivers for you during installation. Seagate Crystal Reports still communicates with ODBC through the PDSODBC.DLL translation file, but the DataDirect drivers provide ODBC with easy access to the actual databases.

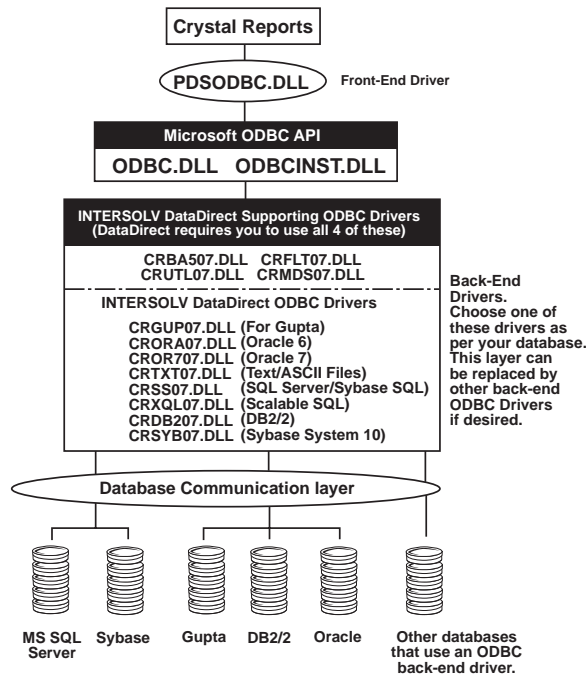
NOTE: If you are using an SQL database not accessed by the INTERSOLV drivers, refer to your DBMS documentation for more information about the required ODBC drivers.

Do not confuse SQL databases with the SQL language. Structured Query Language (SQL) is a specialized computer language used to design, build, and read database files. See *Using SQL and SQL databases*, Page 535.

SQL databases are any collection of computer applications that depend on the SQL language for database creation and manipulation. SQL DBMS applications are usually designed to run as large client/server applications spread across a network.

To open an SQL database, ODBC uses a set of four DataDirect ODBC support drivers (these are the same for every SQL database format), a DataDirect ODBC driver specific to the database format, and the Database Communication Layer that actually communicates directly to the database file. The files provided for this DBMS translation layer are all INTERSOLV DataDirect drivers.

NOTE: ODBC does not have to use the INTERSOLV DataDirect drivers to access the SQL databases shown here. Most SQL DBMS applications provide their own ODBC drivers. However, Seagate Crystal Reports sets up the INTERSOLV drivers for you automatically.



NOTE: The 32-bit version of Seagate Crystal Reports provides 32-bit INTERSOLV drivers for accessing SQL databases. These 32-bit drivers are named CR*09.DLL instead of CR*07.DLL.

As mentioned previously, Seagate Crystal Reports automatically creates several ODBC data sources for the SQL database formats supported by INTERSOLV DataDirect. These data sources appear in the Log On Server dialog box:

- ODBC-CRDBM supports DB2/2
- ODBC-CRGUP supports Gupta
- ODBC-CROR7 supports Oracle 7
- ODBC-CRORA supports Oracle 6
- ODBC-CRSS supports MS SQL Server and Sybase SQL Server
- ODBC-CRXQL supports Scalable SQL
- ODBC-CRSYB supports Sybase System 10

INTERSOLV DataDirect Library

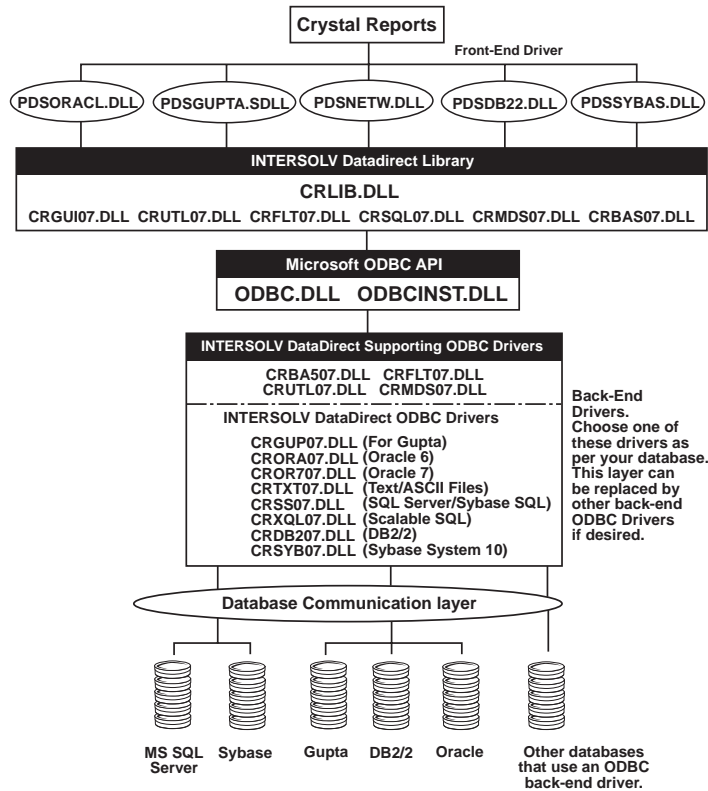
Instead of communicating directly with ODBC through the PDSODBC.DLL file, Seagate Crystal Reports can use the INTERSOLV DataDirect Library that ships with Seagate Crystal Reports. This front-end driver uses the ODBC standard as an underlying layer. However, instead of using PDSODBC.DLL to communicate with ODBC, Seagate Crystal Reports uses a specific PDS*.DLL file appropriate to the SQL database being accessed.

DataDirect Library vs. ODBC

The strength of the DataDirect Library over ODBC direct is mainly its ability to pass proprietary SQL syntax to specific servers. For example, because Oracle has its own PDS driver, an SQL developer working with Oracle data is sometimes able to pass more precise SQL statements to the server. With the Data Direct Library, a developer can pass SQL language features that are unique to a particular DBMS from Seagate Crystal Reports. When using ODBC direct, the PDSODBC.DLL is a common DLL that is used for all DBMS types, and the use of proprietary SQL syntax based on specific servers may not be entirely possible.

DataDirect Library structure

With the INTERSOLV DataDirect Library, Seagate Crystal Reports uses an ODBC translator specific to the SQL database format being accessed. This file, in turn, communicates with the DataDirect Library. The DataDirect Library makes the final translation of the SQL statement to ODBC.



NOTE: The 32-bit version of Seagate Crystal Reports provides 32-bit INTERSOLV drivers for accessing SQL databases. These 32-bit drivers are named CR*09.DLL instead of CR*07.DLL.

INTER SOLV DataDirect Library databases

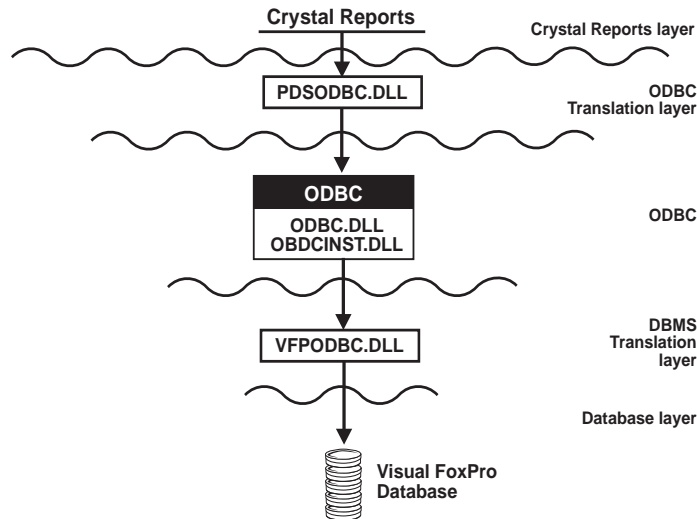
- Oracle
- Sybase SQL Server
- MS SQL Server
- Gupta SQLBase
- Scalable SQL
- DB2/2

NOTE: The ODBC data sources that Seagate Crystal Reports installs for the *INTERSOLV DataDirect Library* appear in the *Log On Server* dialog box without the "ODBC-" prefix, which is used by the data sources that go through ODBC direct.

Visual FoxPro

Microsoft Visual FoxPro data is accessed through ODBC, while FoxPro data from version 2.5 and earlier is accessed directly through the xBase engine. If you are using FoxPro version 2.5 or earlier, see *dBASE, FoxPro, Clipper*, Page 584.

Seagate Crystal Reports provides the ODBC driver VFPODBC.DLL, allowing ODBC to work with Visual FoxPro data.



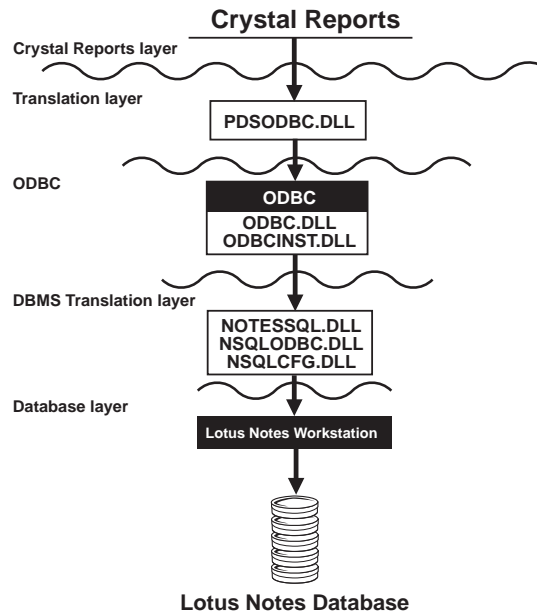
NOTE: Because the program supports the latest version of DAO, there is native support for VSFoxPro 5.0 (For more information, see *DAO*, Page 589).

Lotus Notes

A Lotus Notes database can be read by Seagate Crystal Reports through ODBC. The Lotus Notes DBMS translation layer consists of three files:

1. NOTESSQL.DLL
2. NSQLODBC.DLL
3. NSQLCFG.DLL

These files use the drivers installed by the Lotus Notes Workstation to work with the Lotus Notes database. The Workstation component of Lotus Notes must be installed on the local machine.

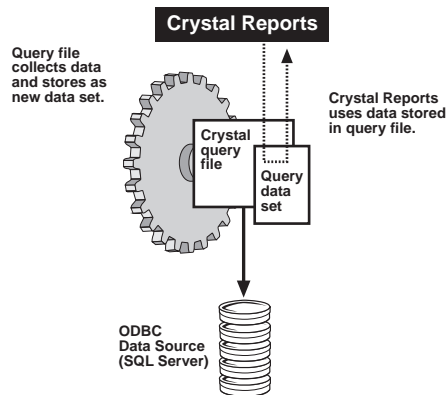


Crystal SQL Designer files

The Crystal SQL Designer is a query which is simply a request for a specific set of data from a database. Once the data is gathered, it can be stored as a Crystal SQL Designer file (.QRY). The Crystal SQL Designer file can then be used much like a database table. The data it gathers from your SQL databases becomes a new data set that can be added to reports.

A Crystal SQL Designer file gathers data from ODBC data sources (such as SQL servers) by means of SQL (Structured Query Language). The SQL Designer sends an SQL statement with instructions to gather and return a specific set of data is sent directly to the SQL DBMS. The DBMS handles all of the actual data gathering, sorting, and grouping, according to the instructions in the SQL statement. Only the final set of data is returned to the SQL Designer and stored as a query file.

NOTE: If you are not familiar with SQL, see *SQL join types (ODBC data sources)*, Page 527.



First, you refine an SQL statement and create a query file that contains only the data you need. Then you design your reports based on the query file instead of on the original databases. Most of the data gathering process is done on the SQL server when you design the query. When you design your report, Seagate Crystal Reports only needs to work with a small set of data, saving you time and trouble. For more information, see *How to create a new query*, Page 470.

Advantages

While there are many reasons for using the Crystal SQL Designer, the primary one is the ability to off-load most of the data retrieval process to a server and store the resulting data as a separate data set. By using this SQL pass-through technique, where data retrieval tasks are passed through to the server, you retrieve your data faster and more efficiently. Any time you are working with SQL data, you should consider building a query file before designing your report.

In addition, the Query Expert provides for more control over your data with the SQL language. Seagate Crystal Reports provides some SQL language features when accessing SQL or ODBC data, but the Query Expert is a powerful query tool that provides more powerful SQL data access features. The Query Expert allows aggregate functions in an SQL statement and supports all data query elements of the SQL language. If you know the SQL language, you can perform complex SQL tasks using UNION operations and sub-queries. See *The SQL language*, Page 540.

Disadvantages

Since a query represents a complete data set, any records, fields, or tables that were not included when the query was created will not be available when using the query to build a report. A report can not be any more complex than the data it accesses, so by using a query, you limit your reporting options to the data in the query.

In addition, a query can not be used with any other source of data. If you decide to use a query in your report, you can not include an additional data source, such as a database table or another query file, to use in the report.

Crystal Dictionary files



A dictionary (.DC5) file is a structured and simplified view of organizational data that you can create for any of the individuals in your organization that are using Seagate Crystal Reports. With a dictionary, end users only see the subset of tables and fields they need.

NOTE: The application for creating dictionaries is only available with the Professional edition of Seagate Crystal Reports. This application is designed for IS and Database Managers who need to provide alternatives to accessing data for users. Both the Standard and Professional editions of Seagate Crystal Reports can open and use dictionary files.

A dictionary is an optional source of data for Seagate Crystal Reports. It provides a convenient filter, clarifying and simplifying complex data access techniques for end users, but the user can still access data directly from the database. Dictionaries simply provide all the convenience without the headaches.

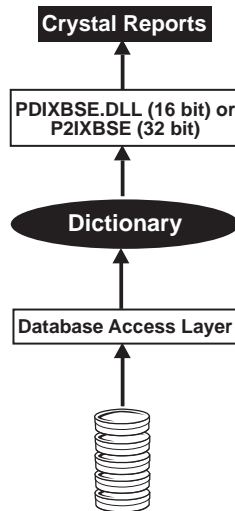
If you choose to design a report by using a dictionary, you can not use any other data source in that report. This includes other dictionaries, Seagate Crystal Reports, ODBC data sources, direct access databases, and all other data sources. The purpose of a dictionary is to provide fast, easy to understand access to a particular set of data. Connecting to other sources of data within the same report would defeat this purpose. See *How to create a new dictionary*, Page 489.

Dictionaries allow you to:

- design a single, dynamic view of all the data that is necessary to create organizational reports and queries,
- create a dictionary that contains multiple data sources, tables, and links,
- organize the data and rename tables and fields to make it easier for users to understand the content and purpose of the data, and
- create complex data-manipulation formulas that users can access without the need to understand formula concepts.

Dictionaries reduce support cost and time, increase user productivity, and reduce data misuse, loss, and damage.

Once created, the dictionary acts as a filter, providing a view of complex data that is clear and easy for any user to understand. The complexity of your data will not stop end users from creating powerful reports.



Seagate Crystal Reports reads the dictionary file by using the PDIXBSE.DLL file (P2IXBSE.DLL for 32-bit). This translation file is based on the xBase engine used to access dBASE, FoxPro and Clipper databases, but it provides all the flexibility needed to read dictionaries. See *dBASE, FoxPro, Clipper*, Page 584.

NOTE: If you upgraded from an earlier version of Seagate Crystal Reports that allowed dictionary files, the older dictionary files (.DCT) were based on the Btrieve engine. If you convert those older files to new dictionary files, the new files will use the xBase translation layer instead of Btrieve. However, the Btrieve engine installed by the earlier version of Seagate Crystal Reports must remain on your system for the new dictionary application to read the older dictionary files.

The Database Access Layer is the layer through which the dictionary file actually reads the original database data. Dictionaries must read database data using the same routes that Seagate Crystal Reports uses to read the data. The sections on direct access database layers and ODBC data sources describe the files dictionaries need for reading data.

The benefit of dictionaries is that this Database Access Layer is completely transparent to the user. The dictionary displays a view of data in Seagate Crystal Reports that may or may not match the actual data, but that is easily accessible and convenient for users.

Finally, dictionaries provide an easy means of changing the originally accessed data without changing the view of data seen by users. For example, your original database may contain Price, Quantity, and Cost fields, and you decide that Cost can be calculated from Price and Quantity, so you eliminate the Cost field. By simply updating the dictionary to calculate Cost instead of getting it directly from the database, your users never know the difference. This is also useful when the entire underlying database format is changed. Once again, just update the dictionary.

Dictionary files are often created by an IS manager who controls a company database. The IS manager can work with data that is organized and classified to create simple, easy-to-use dictionaries for company employees. In each dictionary file, the employees will find only the data they need, since the original data has been manipulated or customized by the IS manager for varying usage.

A

Report Processing Model

What you will find in this appendix...

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What is a “pass”?, Page 622

Pre-pass #1, Page 622

Pass #1, Page 622

Top/bottom N and group sorting, Page 623

Pass #2, Page 623

Multi-pass reporting

What is a “pass”?

A pass is a process that Seagate Crystal Reports uses each time the data is “read” and manipulated. Therefore, if a report reads and manipulates the data twice, it is considered to be a two-pass report. This feature is one that is very powerful in the data access and reporting industry because it allows for complex reporting and formula manipulation. Therefore, percent of subtotal calculations are possible due to the two-pass reporting capabilities of Seagate Crystal Reports. Some reports can be one-pass, yet in most cases two-passes will be issued. The following section offers a brief overview of the two-pass reporting concept. Following the written description is a visual representation of this process.

Pre-pass #1

When previewing a report, the first elements to be evaluated are “flat” formulas. Flat formulas are those that do not contain database fields. For example, $100 * 30$ would be a flat formula. Flat formulas are evaluated at the beginning of the print preview process and are never evaluated again. This process is known as “BeforeReadingRecords”. If you were to place a flat formula field (i.e., $100 * 30$) in the Details section, the result would be 3000 for each record displayed.

Pass #1

Once the “BeforeReadingRecords” process has taken place, Seagate Crystal Reports will begin reading the database records. During the record reading process the following will occur:

1. Record Retrieval.
2. Evaluate “recurring” formulas. These formulas are those that contain database fields but do not contain references to subtotals or summary information that would require data manipulation in the second pass. This evaluation time is known as “WhileReadingRecords”.
3. Apply the record selection criteria. If the selection criteria is based on a database field that is indexed (i.e., {company.LASTNAME} = “SMITH”), then Seagate Crystal Reports rejects records not equal to SMITH immediately after evaluating the recurring formulas. The reason for this is that the selection criteria may include recurring formulas. (i.e., {table.FIELD} = {@Formula}).
4. Totaling. A typical report usually contains groups, sorts, and subtotals and Seagate Crystal Reports tries to process as many of these in the first pass as possible. As the records are processed they are divided into groups based on the group field specified in the report. Each of these groups is sent to an internal “totaler”. This counting mechanism stores a subtotal of each group, in memory,

which is then used later in the report process.

5. Store the saved records. After the totaling process is complete, all of the records and totals are stored into a “saved records” object. This object stores data in memory and on disk in the form of temporary files. Saved records are used during the report's second pass for two-pass calculations, group sorting, etc. Therefore, the second pass of the report does not actually read the database again, instead it uses the saved records object.

Steps 1 to 5 are an iterative process that will repeat for each record being read.

Top/bottom N and group sorting

Top/Bottom N is a process that allows a user to select either the Top or Bottom N groups. N is the number you specify. Before you can use the Top N feature, your data must be subtotaled or summarized. The group sorting allows you to specify the order in which your “groups” are printed. This sort order is based on the subtotaled or summarized field, not the grouping field.

This process, an intermediate step between passes, actually occurs in between the first and second pass of the report process and does not actually require the records to be read. Instead it only looks at the grouping information stored in the saved records object and orders the groups as specified.

Pass #2

After completing the Top N/Group sort process, Seagate Crystal Reports enters into a second pass of the data. This means that the program will look at the saved records object for the current information and continue with the following elements of Pass #2.

1. Read records that are contained in the saved records object. These records are read one at a time along with their respective subtotals.
2. Once the subtotal or summary information is available, the group selection formula can be applied. The group selection formula allows the user to select groups based on the subtotaled or summary field, not the grouping field. For example, you may only want the groups that have a subtotal greater than X.

HINT: The Group Selection Formula Editor can be used for record selection formulas, however it is not recommended. If, for example, you chose to use a typical selection such as:

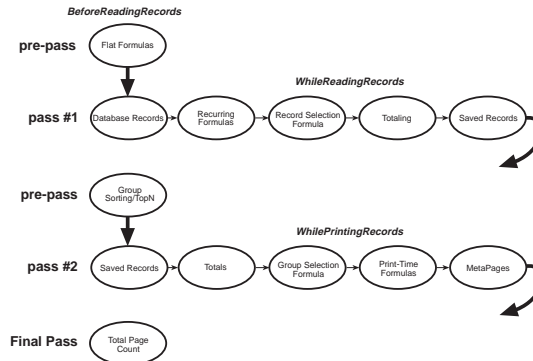
`{company.LASTNAME} = "SMITH"`

in the Group Selection Formula Editor, the records that are displayed on your report may be correct, however, the subtotals, summaries and grand totals will most likely be incorrect. All of the subtotal/grand total

information is calculated in Pass #1 and therefore, if you decide to filter out records in Pass #2 the subtotals will not be modified accordingly.

3. Evaluation of print time formulas. This process is known as “WhilePrintingRecords”. This would include formulas that have been explicitly defined as “WhilePrintingRecords” in the formula itself as well as formulas that refer to subtotals or summary fields. Examples of print-time formulas are:
 - % of subtotals
 - running totals or running averages
 - formulas explicitly marked “WhilePrintingRecords”
4. MetaPage Generation. These pages are generated to display your report to screen. MetaPages are similar to a standard Windows Meta File. Essentially each page is a “recording” of the individual report pages. Therefore, all of the lines, boxes, fields, etc., are stored in the MetaPages. This method of storing report pages is much more efficient than storing the pages as bitmaps.

The following diagram is a flow-chart of the multi-pass report process:



B

Product Support

What you will find in this chapter...

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E-mail support, Page 627

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Product support

Seagate Crystal Reports is a powerful report writer for the Windows environment. Seagate Software, Inc. is proud of the quality of the product and has spent a great deal of time trying to make it intuitive to use. If, however, there is something you can not figure out how to do, you should consult the extensive online help system. The help system can be accessed by clicking on any *Help* button, by pressing the F1 key, or by choosing the commands provided in the Help Menu. The help system contains all of the information from the User's Guide, as well as in-depth explanations and numerous examples of all the reporting concepts.

NOTE: Product support plans vary from region to region. Contact your local distributor for a list of product support plans available in your region. See README.HLP for a list of international distributors.

Web support

WEB SITE

The Seagate Software Web Page can be accessed through:

<http://www.seagatesoftware.com/>

Seagate Crystal Reports

The Crystal Reports Web Page can be accessed through:

<http://www.seagatesoftware.com/crystalreports>

The Crystal Reports Technical Support Page can be accessed through:

<http://www.seagatesoftware.com/crystalreports/techsupp/>

Technical Support Sites

Technical Support Questions can be submitted through the Web at:

<http://webacd.seagatesoftware.com>.

Seagate Crystal Info

<http://seagatesoftware.com/crystalinfo/techsupp/>

Seagate Holos

<http://seagatesoftware.com/holos/techsupp/>

E-mail support

E-MAIL

- support@webacd.seagatesoftware.com

To submit a Technical Support issue by e-mail:

- E-mail a "blank" message to the address above. Leave everything blank and the system will send you back a 'Main Form' to fill in.
- Once you have filled in and submitted the Main Form, a Product Form will be sent to you. The Product Form is used to gather the particulars of your question.

E-MAIL NOTIFICATION SERVICE

- <http://maillist.seagatesoftware.com/subscribe.asp>
 - Seagate Software's E-mail Notification Service helps subscribers remain up-to-date on current events, latest patches and updates for their products, as well as new product releases. Please visit <http://maillist.seagatesoftware.com/subscribe.asp> to select the type of information you would like to receive on the particular product(s) you want.
 - Each product that you select will add your e-mail address to that particular topic's notification group. You may select multiple products and you may select both marketing and technical information. You will then see a confirmation page that simply asks you to verify your information. If all of the information is correct, you may click the button to continue. If there is a problem, you will be able to return to this page and make any changes necessary. You may unsubscribe from any list at any time.

Fax support

Another efficient way to receive support on Seagate Crystal Reports is to fax in your technical support request. To do this, first fill in the bottom part of the Technical Support Request form in the product. This form appears when you choose the TECHNICAL SUPPORT REQUEST command from Seagate Crystal Reports Help Menu. When you have completed the form, click the *Print* button to print it.

Fax the completed form to Seagate Software 24 hours a day, Monday through Friday. After a technical support representative has had a chance

to review your fax, one of the support representatives will respond to you by return fax the next business day.

NOTE: Product support plans vary from region to region. Contact your local distributor for a list of product support plans available in your region. See README.HLP for a list of international distributors.

Seagate Fax Support (604) 681-7163

Technical support

Seagate Software offers several levels of telephone support for Seagate Crystal Reports.

- Priority Support provides customers with toll-free access, priority queue handling, and extended calling hours. Details are outlined in Priority Support below.
- All registered users of Seagate Crystal Reports are entitled to free telephone support as outlined below in Standard Technical Support.

Priority Technical Support

Priority Support packages are available for sale to registered users of Seagate Crystal Reports. This service gives customers:

- A full year of unlimited toll-free access to Technical Support,
- Priority call handling, and
- Extended calling hours.

Please call (604) 681-3435 or (800) 877-2340 for more information.

Standard Technical Support

Registered users of Seagate Crystal Reports are entitled to free telephone support (subject to availability) for 60 days from the time of purchase. Telephone support is available from 8 a.m. to 4 p.m., P.S.T., Monday through Friday. If you are calling from outside the Vancouver, B.C. area, long distance charges apply.

Before you call technical support, make sure you do the following:

- check the manual,
- check the online help system, and
- check the Internet (www.seagatesoftware.com).

Please have the following information available:

1. Serial number.
 - If you are registered, you can find the serial number by choosing the ABOUT CRYSTAL REPORT DESIGNER command on the Help Menu.
 - If you are not registered, you will need to register first to obtain your serial number.
2. Product name and version number.
3. Operating system you are using (i.e., Windows 95 and Windows 98, Windows NT, or Windows 3.1) and whether you are using a 16-bit or 32-bit version of Seagate Crystal Reports.
4. Version of database and other software you are using with Seagate Crystal Reports (if required) - Btrieve, Sybase, Paradox, etc.
5. Technical Support Request form from the product.
6. Network information, if you are on a network.
7. Contents of AUTOEXEC.BAT and CONFIG.SYS files.
8. A list of steps necessary to recreate the problem.
9. The database type you are using.
10. The programming environment (if applicable).

NOTE: Product support plans vary from region to region. Contact your local distributor for a list of product support plans available in your region. See README.HLP for a list of international distributors.

Telephone Number (604) 669-8379

Knowledge Link

Access the same information Seagate Software's Technical Support Agents use. Knowledge Link is a locally stored knowledge base that is updated every two weeks via e-mail. Contact Sales for more information.

Product registration

When using Seagate Crystal Reports for the first time, a dialog box will appear that asks for your name, address, and related information. Then the program will suggest that you register the program to receive your product Serial Number. The program will ask for the Serial Number the

next time you run Seagate Crystal Reports. When you enter the Serial Number, you have completed the registration process. You can register the program using four different methods:

1. If you have access to the Internet, fill out the Product Registration form on the Seagate Software web site at:

www.seagatesoftware.com/crystalreports/register/

You can also go directly to the Registration form by choosing the **PRODUCT REGISTRATION** command from the Help | Seagate Software on the Web Menu. The procedure will immediately transmit a registration number back to you so you can enter it into the product.

2. Print the Registration Form and then fax it to Seagate Software at (604) 681-5147. Seagate will then fax back to you a registration number that can be entered into the product the next time it asks for it.
3. Fill out the enclosed Registration Form and mail it to Seagate Software. Seagate will mail a registration number back to you so you can enter it into the product.

Registering the program will ensure that you are kept up to date with all product advancements, and it will allow Seagate to provide quality technical support to people that are properly registered with Seagate Software.

Registration FAX Numbers

USA/Canada (604) 681-5147
United Kingdom +44 (0) 181 231 0649
Australia +6 2 9955 7682
Hong Kong +852 2893 2727
Singapore +65 777 8786

Product return policy

If you are not satisfied with Seagate Crystal Reports for any reason, you can return it to the original place of purchase for a refund within 30 days of the purchase date.

Product replacement policy

If Seagate Crystal Reports diskettes or documentation are defective, then please contact Seagate Software, Inc., within 30 days of the purchase date. Fax the description of the problem and Seagate will solve it as quickly as possible. Please fax the description of the defect to (604) 681-2934.

NOTE: Replacement policies vary from region to region. Contact your local distributor for a list of replacement policies available in your region. See README.HLP for a list of international distributors.

C

Seagate Software International Office Directory

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Middle East Regional Office (ME & Northern Africa), Page 645

North/South American Head Office

Canada

Seagate Software, Inc.

840 Cambie Street

Vancouver, BC V6B 4J2

Canada

Sales

Telephone: 604-681-3435

Toll-Free: 1-800-877-2340

Fax: 604-681-2934

E-Mail: sales@img.seagate.com

Product Support

Phone: 604-669-8379

Fax: 604-681-7163

E-Mail: support@webacd.seagate.com (Available in English only)

Web browser: <http://webacd.seagate.com> (Available in English only)

Mailing Address: Please refer to the address of the Seagate Software office nearest you.

Product Registration

Seagate Crystal Reports Web Registration: <http://www.seagate.com/crystalreports/register>

Seagate Crystal Info Web Registration: <http://www.seagate.com/crystalinfo/register>

Fax: 604-681-5147

Mailing Address: Please see addresses listed on the registration card included in your package.

USA and Latin America

Seagate Software, Inc.
Suite 270 – 510 Thornall Street
Edison, NJ 08837
USA

Sales

Telephone: 732-321-6500
Fax: 732-321-6504

Product Support

Please see the Product Support section listed under Canada

Product Registration

Please see the Product Registration section listed under Canada

Asia/Pacific Offices

Australia

Seagate Software Pty Ltd
Level 9, 52 Alfred Street
Milsons Point
Sydney, NSW 2061
Australia

Sales

Telephone: +61 2 9955 4088
Sales +1-800-647-006
Fax: +61 2 9955 7682

Product Support

Please see the Product Support section listed under Canada

Product Registration

Fax: +61 2 9955 7692

Mailing Address: please see addresses listed on the registration card included in your package.

On-line registrations: please see the product registration section listed under Canada.

Hong Kong

Seagate Software (HK)

20/F 83 Wanchai Road

Wanchai

Hong Kong

Sales

Telephone: +852 2575 2576

Fax: +852 2893 2727

Product Support

Please see the Product Support section listed under Canada

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Mailing Address: please see addresses listed on the registration card included in your package.

On-line registrations: please see the product registration section listed under Canada.

Japan

Seagate Software KK

Bridgestone Bldg. 2F

2-13-12 Hirakawa-cho,

Chiyoda-Ku,

Tokyo 102-0093

Sales

Telephone: +81.3. 5226. 3601

Fax: +81. 3 .5226 .3606

E-Mail: sales_jp@img.seagatesoftware.com

Product Support

Fax support: +81.3.5226.3605

Support E-Mail: support_jpimg.seagatesoftware.com

Product Registration

Fax Registration: +81.3.5226.3605

Seagate Crystal Reports Web Registration: <http://www.seagatesoftware.com/crystalreports/register>

Seagate Crystal Info Web Registration: <http://www.seagatesoftware.com/crystalinfo/register>

Singapore

Seagate Software IMG
14 Science Park Drive
03-02 The Maxwell
Singapore Science Park
Singapore 118226

Sales

Telephone: +65 777 0533

Fax: +65 777 8786

Product Support

Please see the Product Support section listed under Canada

Product Registration

Mailing Address: please see addresses listed on the registration card included in your package.

On-line registrations: please see the product registration section listed under Canada.

Europe/Middle East/Africa Offices

United Kingdom - EMEA and Northern European Head Office

Seagate Software

The Broadwalk

54 The Broadway

Ealing, London

W5 5JN

UK

Sales

Telephone: +44 (0) 181 566 2330

Fax: +44 (0) 181 231 0600

Product Support

<i>Country</i>	<i>Telephone</i>	<i>Language</i>
UK	+44 (0) 181 231 0638	English
Austria	+ 43 (0) 1 79 5672 85	German
Switzerland	+ 41 (0) 1 800 9134	German
Switzerland	+ 41 (0) 1 800 9130	French
Belgium	+ 32 (0) 2 713 12 35	French
Netherlands	+ 31 (0) 20 346 9201	English
Ireland	+ 353 (0) 1 407 30 30	English
Sweden	+ 46 (0) 85 87 711 45	English

Fax: +44 (0) 181 231 0600 (English, German, French)

E-Mail: support@webacd.seagate.com (available in English only).

Web browser: <http://webacd.seagate.com> (available in English only).

Product Registration

Fax: + 44 (0) 181 231 0649

Seagate Crystal Reports Web Registration: <http://www.seagatesoftware.com/crystalreports/register>

Seagate Crystal Info Web Registration: <http://www.seagatesoftware.com/crystalinfo/register>

Mailing Address: Please see addresses listed on the registration card included in your package.

Scotland

Seagate Software IMG
Ascada House
Garbett Road
Kirkton Campus
Livingston, West Lothian
EH54 7DL
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Sales

Telephone: +44 (0) 1506 410444

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Product Support

Please see the Product Support section listed under Northern European Head Office

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Sweden

Seagate Software
Kanalvagen 10C
194 61 Upplands Vasby
Sweden

Sales

Telephone: +46 8 590 04150

Fax: +46 8 590 04110

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Product Registration

Please see the Product Registration section listed under Northern European Head Office.

On-line registrations: please see the product registration section listed under Northern Europe.

Netherlands

Seagate Software
Hojel City Center
Gebouw D, 4e etage
Graadt van Roggenweg 328
Postbox 19127
3501 DC Utrecht
The Netherlands

Sales

Telephone: +31 30 298 2124

Fax: +31 30 298 2125

Product Support

Please see the Product Support section listed under Northern European Head Office

Product Registration

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Germany – Central European Head Office

Seagate Software GmbH

2nd Floor

Frankfurter Strasse 21-25

D-65760 Eschborn

Germany

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Fax: +49 (0) 6196 9559 10

Product Support

Telephone: +49 (0) 699 509 6180

E-Mail: support@webacd.seagatesoftware.com (Available in English only)

Web browser: <http://webacd.SeagateSoftware.com> (Available in English only)

Product Registration

Fax: +49 (0) 6995 09 6182

Seagate Crystal Reports Web Registration: <http://www.seagatesoftware.com/crystalreports/register>

Seagate Crystal Info Web Registration: <http://www.seagatesoftware.com/crystalinfo/register>

Mailing Address: Please refer to the addresses listed on the registration card included in your package.

Switzerland

Seagate Software GmbH

World Trade Center

PO Box 112

Leutschenbachstrasse 95

CH-8050 Zurich

Switzerland

Sales

Telephone: +41 1 308 3922

Fax: +41 1 308 3500

Product Support

Please see the Product Support section listed under Central European Head Office

Product Registration

Fax: +49 (0) 6995 09 6182

Mailing Address: please see addresses listed on the registration card included in your package.

On-line registrations: please see the product registration section listed under Central Europe.

France – Southern European Head Office

Seagate Software

62 bis, avenue Andre Morizet

F-92643 Boulogne Billancourt

Cedex

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Sales

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Seagate Crystal Reports Web Registration: <http://www.seagatesoftware.com/crystalreports/register>

Seagate Crystal Info Web Registration: <http://www.seagatesoftware.com/crystalinfo/register>

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Product Registration

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Web browser: <http://webacd.Seagatesoftware.com> (Available in English only)

Product Registration

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On-line registrations: please see the product registration section listed under Northern Europe.

Middle East Regional Office (ME & Northern Africa)

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E-Mail: kboueiri@img.seagatesoftware.com

E-Mail: support@webacd.seagatesoftware.com (Available in English only)

Web browser: <http://webacd.Seagatesoftware.com> (Available in English only)

Product Registration

Mailing Address: please see addresses listed on the registration card included in your package.

On-line registrations: please see the product registration section listed under Northern Europe.

Glossary

Absolute formatting	Formatting that is always applied to an object. See also <i>Conditional Formatting</i> .
Access	To access data means to retrieve data.
Acrobat Reader	An application used to review and print online manuals.
Active database	An active database is a database that has been selected for use in a report. You activate databases with the NEW command on the File Menu and the ADD DATABASE TO REPORT command on the Database Menu.
Active Server Page	Active Server Pages are web pages that run under Microsoft's Internet Information Server (IIS) version 3.0 and later. Active Server Pages combine HTML, VBScript or JScript, and ActiveX controls to create dynamic web pages that can be viewed from any of the most popular web browsers. The Quik Reports for Windows Engine Automation Server, the Crystal Design-Time ActiveX Control, and the Crystal Active Data Driver can be combined to create active web sites in Microsoft Visual InterDev that display reports from an Internet or intranet site.
ActiveX Control	A Custom Control for Visual Basic 4.0 and above that incorporates the Object Linking and Embedding (OLE) technology. Formerly known as an OLE Control (OCX).
Aggregate functions	An operation that summarizes data (sums, calculates an average, identifies a maximum value, etc.). The term "Aggregate functions" is often associated with SQL data sources.
Alias	An alias is an alternative name assigned to a database. If a database is called CUSTOMER.DB, for example, you can assign the alias customer, cust, company, DB1, or any other name that suits your needs. Aliases make it easier for you to use a report created with a database whose name and/or location has changed since the report was created.

Area

An area is a group of related sections (i.e., Details A and Details B) that all share the same characteristics but can be formatted differently.

Argument

An argument is an item, or one of a group of items, that receives the action of a function. It provides information that the function needs in order to operate. The Truncate function, for example, can not operate by itself. It needs an argument that identifies the item to be truncated. Thus, in the formula:

```
Truncate ({orders.ORDER AMOUNT})
```

«where Truncate is the function and {orders.ORDER AMOUNT} is the argument, the value of the {orders.ORDER AMOUNT} field is the item that needs to be truncated.»

Array

An array is a group of values, separated by commas. Arrays are used with a variety of Seagate Crystal Reports functions: Average ({array}), Maximum ({array}), etc. In these functions, the array is the argument for the function. The function works on the items in the array. Items in an array can be constants, data fields, or formula results.

Arrowhead

A symbol to show that a field is indexed.

Attribute

An attribute is a quality applied to an object (i.e., font size, color, etc.).

Auto arrange

When you place a field on your report, the program allocates a space equal to the field width as specified in your database. Often that field width is far larger than the values that actually appear in each of the fields. To create neat-looking reports, it is often necessary to resize the fields so that the space allotted more closely matches the size of the field values. Once you have resized the fields you often need to reposition them for proper balance. Auto Arrange will do this for you. Simply choose the **AUTO ARRANGE REPORT** command from the Format Menu.

Bitmap

A graphic file that can be added to a report.

BLOB field

A BLOB field is a field containing BLOB data. A BLOB (Binary Large Object) is simply a bitmapped graphic that has been entered into a database. Placing a BLOB field on your report allows you to access these graphics as you would other data types.

Boolean expression

A Boolean expression is an expression that defines a logical relationship between two or more items. A Boolean expression is either TRUE or FALSE. $A > 5$ And $B < 10$ is a Boolean expression that uses the Boolean operator And. For the expression to be TRUE, both conditions (joined with the And operator) must be true. The value of A must be greater than

5 and the value of B must be less than 10. If the values do not fall into those ranges, then the expression is FALSE. Boolean expressions are useful in If-Then-Else formulas. For example:

```
If A>5 And B<10 Then
    "In Range"
Else
    ""
```

This formula says: if the Boolean expression A>5 and B<10 is TRUE, print "In Range" otherwise (if the Boolean expression is FALSE), print nothing (as designated by the empty string "").

Boolean formulas

Boolean formulas are formulas that return a Yes/No (TRUE/FALSE) value. For example, the Boolean formula {orders detail.QUANTITY} > 6 compares the value in the {orders detail.QUANTITY} field to 6. If the value is greater than 6 it returns a Yes; if it is 6 or less, it returns a No. Contrast this with a non-Boolean formula like {orders detail.QUANTITY} * 6. In this case the program returns a number, the value of {orders detail.QUANTITY} multiplied by 6. All record selection formulas and group selection formulas must be Boolean.

Browser

A browser is an application that enables viewing of documents in HTML format.

Calculated data field

A calculated data field is a field that holds a value that comes from a calculation rather than coming directly from a database. For example, if the database you are using includes a {file.SALES} field and a {file.COST} field but no Gross Profit field, you can still show gross profit on your report by using a calculated data field. To create a calculated data field, you create a formula that subtracts {file.COST} from {file.SALES}. The formula calculates a Gross Profit value for each row and prints that value wherever you place the formula field.

Case-sensitive

Case-sensitive means that a program differentiates between uppercase and lowercase letters when evaluating a text string. Thus, a case-sensitive search for the word "house" will return only the value "house," but a non-case-sensitive search will return "house," "House," "HOUSE," and similar mixed-case strings. Seagate Crystal Reports operators (Equal, In string, etc.) are case-sensitive.

Column

A column is the display of data from a single field or formula. Columns run up and down the page. The words *column* and *field* are sometimes used interchangeably in the documentation. Compare with Row.

Comments	Comments are blocks of descriptive text that accompany formulas. Seagate Crystal Reports ignores comments when it runs the formula.
Concatenate	To concatenate is to join two or more text strings together to form a single contiguous string.
Condition	In an If-Then-Else formula, the condition is the If part of the formula, the set of circumstances that must take place (be true) to trigger the Then (or consequence) part of the formula. In the formula <i>If $x < 5$ Then x Else 5</i> , the expression $x < 5$ is the condition.
Conditional formatting	Conditional formatting is formatting that applies only if certain situations occur. For example, you can conditionally format numeric database fields to display in red when negative.
Conditional formatting formulas	Conditional formatting formulas are expressions that apply specific attributes to objects or sections only if certain criteria is met.
Conditional properties	Conditional properties are properties that are performed on an object only if a comparison statement returns a value of True.
Confidence threshold	A percentage (<i>C</i>) used when the Seagate Document Import Tool converts a report. If fewer than <i>C</i> percent of the fields are located correctly, the conversion will fail.
Consequence	In an If-Then-Else formula, the consequence is the Then part of the formula; the action that takes place if the If condition is met. In the formula <i>If $x < 5$ Then x Else 5</i> , the expression <i>Then x</i> is the consequence.
Constant	<p>A constant is a value that is fixed and unchanging as opposed to a variable value, which can take on various values depending on the circumstances.</p> <p>The value 5 is a constant; the value of the Quantity field (which may be 5 sometimes, but may be a different number at other times) is a variable value. For example, in the formula for converting pounds to ounces ($\text{Ounces} = \text{Pounds} * 16$), 16 is a constant while <i>Ounces</i> and <i>Pounds</i> are variables. In the formula (Today - January 1, 1900), <i>January 1, 1900</i>, is a constant, while <i>Today</i> is a variable that changes whenever the current date changes. In Seagate Crystal Reports, constants can be numbers, text strings, dates, dollar amounts, time, date/time, or the result of a formula that itself contains no variables (i.e., 14-9).</p>

Container document	A file that contains an embedded or linked OLE object.
Conversion interface file	A conversion interface file (.cif extension) is the file in which the program saves the formatting and highlighting from the Document Import Tool. When you highlight something in the Document Import Tool and set properties for database fields, these settings are saved in the .cif file. This file can be used to quickly format the same report later, without highlighting.
Cross-tab	A cross-tab is a report that summarizes and presents data in a compact row and column format that makes it easy to compare data and identify trends.
Database	A database is a bank of related data. Each unit (record) of the database is typically organized in a fixed format to make it easier to retrieve selected portions of the data on demand. Each record is made up of one or more data fields, and each data field can hold one piece of data (known as a value).
Data field	A data field (or field) is the basic building block of a record. Each record is made up of one or more data fields, and each data field can hold one piece of data (known as a value). A customer record in a typical customer mailing list database might contain data fields similar to these: Name, Address, City, State, Zip, Phone, Fax. A data field can be empty or contain a value. Data field data is generally displayed or printed in columns in the Details section of a report.
Data source	A data source is a database, table, query, dictionary, or stored procedure result set that provides the data for a report.
Data types	A data type is a classification of the data that appears in a field or formula. Each piece of data used in a report or formula has one of the following data types: string, currency, number, date, date/time, time, or Boolean (TRUE/FALSE). It is important to understand data types because each function and operator works with only a limited number of data types (often as few as one). For some operators (+ and - for example), the program uses a different set of calculation rules for one type of data than it uses for another.
Debug	Eliminating errors that occur when you run a formula.
Default	A default is a pre-loaded response to a software request for data. It is the response the computer accepts automatically if you do not enter different data.

Details area	A collection of one or more Details sections (i.e., Details A, Details B, etc.).
Details section	The Details section of a report is the core section of the report. You structure the report in this section by inserting data fields, formulas, and other report elements.
Dictionary	A one-stop, ready-to-use source of data that is usually created for end users by computer professionals within the organization. The dictionary takes away the need for the end user to search multiple databases, struggle with links, build formulas, and decode cryptic field names. The user just selects the data he or she needs from the dictionary and builds the report.
Divide by zero protection	PCs will not allow you to divide a number by zero. If you attempt such a division, you will get a system error message. To prevent a system error, the program refuses to print a report which contains a formula that divides a value by zero.
Document Import Tool	The Seagate Document Import Tool is a conversion utility that converts ASCII text reports to Seagate Crystal reports by means of a simple highlighting procedure. By highlighting the appropriate sections of the text report, you can identify the Report Header and Footer, the Page Header and Footer, the Group Headers and Footers, the Details section, the database fields, etc. The Tool can then use this information to generate a Seagate Crystal report.
Drag	<p>Drag can mean different things, depending on the context in which the word is used:</p> <ul style="list-style-type: none"> • When referring to moving a field, drag means to click the field frame and, while keeping the mouse button pressed, move the frame to a new position. You release the mouse button when the field is in the desired position. • When referring to resizing a field, drag means to click one of the field frame handles and, while keeping the mouse button pressed, make the field bigger or smaller. You release the button when the field is the desired size. • When referring to formatting text, drag means to highlight text by moving the I-beam cursor across it while the mouse button is pressed. You release the button when you have finished highlighting.
Dynamic Link Library (DLL)	A Dynamic Link Library (DLL) is a special kind of file that contains Windows functions. DLLs are used by developers to extend the capabilities of Windows applications. The library is activated whenever

an application or another DLL calls a function in the library. DLLs link on the fly, at runtime, whenever an included function is called. DLL functions are available on an as-needed basis to any program that can call DLLs; they do not need to be linked to the program via the compiler. The Crystal Report Engine can be called as a DLL by developers for use with applications they are developing.

Element

The word element is used in the documentation to describe individual report components such as database fields, formulas, and group fields. The Design Tab uses rectangular frames to represent fields.

Embed, Embedded object

An embedded object contains a presentation of the object, all of the data pertaining to the object, and information about the application used to create it. When you modify the original object in the server document, nothing happens to the embedded object unless you specifically update that object.

Empty date

An empty date [designated as Date (0, 0, 0)] is a date that contains neither month, day, or year, and thus does not print. Use an empty date in If-Then-Else formulas that either return a date or not. For example, the formula:

```
If PageNumber = 1 Then
    PrintDate
Else
    Date(0,0,0)
```

«Prints the print date on the first page and prints nothing on every other page.»

Since the Then part of the formula is a date (PrintDate), the Else part of the formula must be a date as well, but a non-printing date. To create a non-printing (empty) date use the Date function and the arguments (0, 0, 0).

Empty number

An empty number [designated as zero (0)] is a field value that is typically printed when a value does not meet a specific condition in a numeric If-Then-Else formula. Use an empty number to specify that 0 be printed. For example, in the formula:

```
If {file.FIELD} = 3.5 Then
    {file.FIELD}
Else
    0
```

you are specifying that the numeric Gradepoint be printed (Then) if the grade point is 3.5 or higher. You are using the empty number 0 to indicate

that 0 is to be printed (Else) if the grade point is below 3.5. Often a user will format the field that contains this formula to be suppressed if 0. In this event, nothing gets printed in the case of a zero value.

Empty string

An empty string (designated as "") is a string that contains no characters. Use an empty string to specify that nothing be printed. For example, in the formula:

```
If {file.FIELD} = 3.5, Then
    "Cum Laude"
Else
    ""
```

you are specifying that the words Cum Laude be printed (Then) if the grade point is 3.5 or higher. You are using the empty string "" to indicate that nothing is to be printed (Else) if the grade point is below 3.5.

Evaluation time

Evaluation time refers to the stage in the reporting process when a formula gets evaluated. The three evaluation time functions are:

1. BeforeReadingRecords
2. WhileReadingRecords
3. WhilePrintingRecords

For a complete discussion of the Evaluation Times, see *Advanced Formulas, Page 315*.

Expert

Seagate Crystal Reports offers you several Experts. Experts are tools designed to take you step-by-step through various aspects of report creation. In most cases Experts have a series of numbered tabs. Simply begin at step one and proceed through the steps. When you have completed the final step, the Expert will do the rest of the work.

NOTE: The term "Expert" in Seagate Crystal Reports is equivalent to the term "wizard" in Microsoft Access.

Export

To export is to distribute your report to a disk file or through e-mail. Seagate Crystal Reports allows you to export your reports in many popular spreadsheet, database, word processor, HTML, and data interchange formats.

Field

A field is the basic building block of a record. Each record is made up of one or more fields, and each field can hold one piece of data (known as a value). A customer record in a typical customer mailing list database might contain fields similar to these: Name, Address, City, State, Zip, Phone, Fax. A field can be empty, or it can contain a value. Field data is typically displayed/printed in columns in the Details section of a report.

Field value	See <i>Value</i> definition.
Field width	Field width is the size of the field in the originating database. A field width is generally fixed, and values in the field may take up all or only a part of the allotted width. The program includes <i>Trim</i> functions for removing excess white space from field values that do not fill their respective fields.
File	A file is a collection of related data stored under one name. In Seagate Crystal Reports, each report is stored as a single file.
Fixed properties	Properties that will always be performed on the object.
Flag	A flag is a character or group of characters used to highlight or identify items of interest to call them to the user's attention. For example, in an accounts receivable report, the words "past due" might be printed as a flag beside every past due account.
Flat formula	A formula that does not reference any database field. For example: 1+1.
Footer	The footer is the text that appears at the bottom of a report page. Footer text frequently includes page numbers, and may include other information that describes or identifies the report. Seagate Crystal Reports gives you the option of printing the footer on all pages or on only selected pages of your report.
Formatting Toolbar	This toolbar displays buttons that you can click to perform many common formatting tasks.
Form letter	In Seagate Crystal Reports, a form letter is a letter that can be reproduced, personalized, and customized using the program's powerful text object capabilities. Form letters generally include both text and field values. You create the letter, and the program runs it each time inserting values from a different record in the database.
Formula	<p>A formula is a symbolic statement of the modifications you want performed on certain data before it is printed on your report.</p> <p>For example, if your report is to contain a {file.SALES} field and a {file.COST} field, you may want to create a GrossProfit field and designate its value as {file.SALES} - {file.COST}. This is a simple formula that tells the program to subtract the value of the {file.COST} field from the value of the {file.SALES} field and then to print the result.</p> <p>You can use formulas to calculate numeric values, compare one value to another and select alternative actions based on the comparison, join</p>

multiple text strings into a single string, and to perform a multitude of other operations. Creating a formula in Seagate Crystal Reports is much like creating a formula in your favorite spreadsheet.

NOTE: The term “formula” in Seagate Crystal Reports is equivalent to the term “expression” in Microsoft Access.

Formula Editor

The Formula Editor is used to create and edit formulas. It contains tools for inserting fields, functions and operators into the formula, for checking formula syntax and for typing in formula components and arguments. Modified versions of the Formula Editor are used for creating Record and Group Selection formulas.

Formula language

The formula language is a powerful, easy-to-use, programming language designed for creating formulas.

Formula syntax

Formula syntax is the set of grammar rules you are required to follow when creating formulas using the formula language.

Free form

Free form implies that placement of objects is not limited to grids (vertical or horizontal).

Function

A function is a built-in procedure or subroutine used to evaluate, make calculations on, or transform data. When you specify a function, Seagate Crystal Reports performs the set of operations built into the function without needing each operation specified separately. In this way, a function is a kind of shorthand that makes it easier and less time consuming for you to create reports.

Seagate Crystal Reports comes with a wide range of functions, and it also includes tools that allow you to build and save additional functions for yourself.

Grand total

A grand total is the summary of all values in a column, for the entire report.

Grid

In Seagate Crystal Reports, the grid is an underlying network of “lines” that are similar to the lines on graph paper. You can use these lines to help align fields and graphics. If you have the *Snap to Grid* option toggled on in the Options dialog box, Seagate Crystal Reports will automatically align any fields you insert or resize to the nearest grid coordinate.

Group

A group is a set of records that are related to each other in some way. In a customer list, for example, a group might consist of all those customers living in the same Zip Code, or in the same Region. In a sales report, a group might consist of all the orders placed by the same customer, or all

of the orders generated by a particular sales representative. Seagate Crystal Reports offers you a great deal of flexibility in the way you group the data on a report.

Group Footer

A Group Footer is a section created by the program whenever you insert a group, a summary, or a subtotal. The Group Footer section is typically used to display the summary or subtotal.

Group Header

A Group Header is a section created by the program whenever you insert a group, a summary, or a subtotal. The Group Header section is typically used to display the name of the group or some other identifying information.

Guidelines

Guidelines are non-printing lines that you can use to align, move, and resize objects with precision. Guidelines allow you to work in a free form environment (without a grid), while retaining absolute control over the placing of objects in your report.

Header

A header is text that appears at the top of a report page, above the body of the report. While a header can contain virtually any information, it often contains such items as the report title, company name, date, range of dates covered by the report, etc. Seagate Crystal Reports gives you the option of printing the header on all pages or on only selected pages of a report.

Highlighting Expert

The Highlighting Expert is most commonly used for highlighting number or currency field values that are in some way distinguished from the other values in the report. The Highlighting Expert offers a wide range of conditional formatting, including font color, background color, and border style.

You can think of the Highlighting Expert as an advanced formula editor that runs the following equation: If Condition is True, Then Apply These Formatting Specifications.

HTML

The language used by the World Wide Web to publish linked web pages on the Internet.

Index

An index is a small file that identifies the location of each record in a database. Since a tiny index file can be searched or sorted much quicker than a large database, Seagate Crystal Reports uses index files to speed up the report generation process. In a search, for example, Seagate Crystal Reports searches the index for the correct field location. Once found, the program goes directly to the database field. Such a search does away with the need for searching every field of every record in a database. A database may have several indexes, each based on a specific field (or fields).

Indexed fields

Fields in the database that are in a specific order to speed up the retrieval of particular records. Instead of searching through all the data in all the records, the program goes first to the index, and finds a pointer that direct it to the specific record it is looking for. Indexed fields are tagged with arrowheads in the Select Expert and Visual Linking Expert.

In-place editing

The ability to change an OLE object's properties while in Seagate Crystal Reports. The menu items change to provide the editing tools from the server application so that you can make changes easily.

In-place ruler

The ruler that appears when you are editing a text object. This ruler enables you to set tabs, and position objects with precision.

Insertion point

The insertion point is a vertical line that indicates the point at which Seagate Crystal Reports will insert any text that you type in. You set the insertion point by moving the I-beam cursor to the position you want to insert text and click. When typing text for the first time in a Design Tab section, the program sets the insertion point flush left in the section, regardless of where you click the I-beam cursor.

Integer

An integer is a positive or negative whole number or zero. Integers have no decimal places.

Link

A link is a field that is common to two or more databases and that serves as a connecting point between those databases. Seagate Crystal Reports uses the link to match up records from one database with those from the other(s). For example, if the databases each contain a customer number field (even though the fields might have different names), Seagate Crystal Reports can use those fields to electronically connect all records in one database with corresponding records in the other(s). When you create a single report based on multiple databases, the link assures that all the data in each row on that report refers to the same customer (transaction, invoice, etc.).

NOTE: The term "link" in Seagate Crystal Reports is equivalent to the term "relationship" in Microsoft Access.

Linked object

A linked object contains a presentation of the object, and a pointer to a defined part of the server document. When you modify the original object in the server document, the links assure that the object in your report is modified automatically as well. Conversely, if you modify the object in the container document, the original object file is modified as well.

Live header

A live header is a header that changes dynamically with the content of a field. If you group your data by region, for example, a typical live group header would print the name of the region at the beginning of each group.

Map Expert

The Map Expert is a powerful tool for better organizing your data by placing geographic maps on a report. You can drill-down on these maps to see the underlying data.

Microsoft Foundation Class (MFC)

The Microsoft Foundation Class is an object-oriented programming interface that encapsulates many related function calls into one object.

Nesting

In Seagate Crystal Reports, nesting means to use one If-Then-Else expression inside another. For example, If employee's degree is not Ph.D. Then (if employee's sex is male, use the salutation Dear Mr. Else use the salutation Dear Ms.) Else use the salutation Dear Dr. In this example, the nested If-Then-Else statement is surrounded by parentheses. The example says, check the degree field on the employee record to verify that the employee is not a Ph.D. If that condition is true (the employee is not a Ph.D.), then use a letter salutation based on the sex indicated on the employee record. (If the sex is male, Then use a male salutation. Else [if the sex is female] use a female salutation.) Else (that is, if the employee is a Ph.D.), use a Dr. salutation. By using this type of formula construction, you can create a wider set of conditions and a wider set of consequences easier than you could without nesting.

Null

Null means there is no value within a database field for a given record. It does not mean zero because zero is a value.

Null string

A null string is an empty string. It contains no characters. If you were to use the Count function to count the string, it would return a length of zero. "" is used to designate a null string.

Numeric

Numeric data is data on which you can perform arithmetic. The designation numeric refers to the way the data is treated by Seagate Crystal Reports and database programs, not to the way the data looks to you.

For example, a serial number 12345 looks numeric, that is, every character is a number. But a serial number is not the kind of data on which you would want to perform arithmetic, so you would probably store a serial number as text instead of as numeric data.

Numeric is one of several data types. Database programs require you to designate a data type when you create a field for use in a database. The data type you select determines the rules the program follows when dealing with the values stored in that field.

Object

An object is one of several kinds of report elements that generally contain data and have specific properties that define their behavior or appearance. The program uses the following kinds of objects:

- field,
- text,
- cross-tab,
- graph,
- subreport,
- picture, and
- OLE.

Each of these objects can be individually formatted, moved, resized, duplicated, and so on.

Object frame

An object frame is a rectangular cursor that appears as an aid to placing database fields and formulas on your report. Once you have selected a field or created a formula, the object frame appears. When you move the frame to the place in the report you want the field or formula to appear and click the button, the program inserts the item at the point specified.

ODBC

ODBC stands for Open Database Connectivity. It is an interface that gives applications the ability to retrieve data in data management systems using SQL for accessing the data. Such an interface allows a developer to develop, compile, and ship applications without targeting specific database management systems. Also called interoperability.

OLE

OLE is an acronym for Object Linking and Embedding. It refers to the ability to create compound reports, that is, reports that contain elements from other applications and that can be edited using the original application.

OLE container application

An OLE container application is an application that can contain and process OLE objects created elsewhere (like Paint or Paintbrush). Seagate Crystal Reports is a container application.

OLE server application

An OLE server application is an application that can create OLE objects that can then be placed in documents created by container applications. Seagate Crystal Reports is a container application, whereas Microsoft Word and Excel are examples of server applications.

One-to-many

One-to-many refers to a situation occurring in linked databases in which one record in one database can be matched with many records in another database. An example of a one-to-many link would occur when linking a customer table to an orders table. In such a case, for every one customer in the primary database, there would typically be many orders in the second (lookup) database.

Operators	<p>Operators are special symbols that describe an operation or an action to take place between two or more values.</p> <p>The symbol / for example, is an operator that means divide. A/B means Divide A by B. Seagate Crystal Reports reads the operators in a formula and performs the actions specified. Seagate Crystal Reports contains arithmetic, string, comparison, Boolean, conversion, date, and range operators, among others.</p>
Order of precedence	<p>The order of precedence is a set of rules that determines the order in which arithmetic operations take place in a formula that involves multiple arithmetic operations. Multiplication (*) and division (/) are performed first (first tier operations), followed by addition (+) and subtraction (-) (second tier operations). When there are multiple operations involving the same tier, the order of precedence dictates that the operations are performed from left to right. You can use parentheses, if you wish, to alter the normal order.</p>
Out of place subreport	<p>A subreport that remains hidden, or "out of place," when the report is viewed. An object frame appears in its place. You can drill-down on the frame to view the subreport data.</p>
Page Footer	<p>A section that prints at the bottom of each page. Page footers are typically used for page numbers, chapter names, and other identifying information.</p>
Page Header	<p>A section that prints at the top of each page. Page headers are typically used for titles and other identifying information.</p>
Parameter field	<p>A special kind of field that prompts the user for a value. You can use parameter fields for report titles, record selection, sorting, and a variety of other uses. Using parameter fields enables you to create a single report that you can modify quickly to fit a variety of needs.</p> <p>NOTE: The term "parameter field" in Seagate Crystal Reports is equivalent to the term "parameter queries" in Microsoft Access.</p>
Paste	<p>Paste means to retrieve and place data from the Clipboard into a report or formula. The data may have been cut from the same report or formula or from a different one.</p>
Perspective Editor	<p>The third party tool to change charts that are plotted off the summaries in a report (also called PG Editor.)</p>
Population	<p>A population is the entire set of values that might be tested statistically, as opposed to a sample which is a subset of the population. A population</p>

does not necessarily refer to a group of people; it can refer to the number of automobiles produced on an assembly line or the number of construction companies bidding on a project.

For example, a real estate agent might sell 20 houses in one year. The population of houses sold by that agent in that year is 20.

Population standard deviation

Population standard deviation is a statistical test of how the values in an entire population (all values) deviate from the mean or average value for that population. Population standard deviation is most often used when all values are being evaluated as opposed to just a sample of those values (StdDev).

NOTE: This comparison simply suggests typical usage. In practice, some users prefer a calculation based on N values (PopulationStdDev) while others prefer a calculation based on N-1 values (StdDev). Both forms of standard deviation are provided by the program.

Population variance

Population variance is the square of the population standard deviation. It is a measure of the amount by which the values in an entire population vary from the mean (average) value for that population.

Population variance is typically used when all values are being evaluated as opposed to just a sample of those values (Variance).

NOTE: This comparison simply suggests typical usage. In practice, some users prefer a calculation based on N values (Population-Variance) while others prefer a calculation based on N-1 values (Variance). Both forms of variance are provided by the program.

Properties

Properties are qualities that define the appearance or action of an object or a section. There are two kinds of properties in Seagate Crystal Reports:

1. **On/Off**
A property that can only be toggled on or off.
2. **Attribute**
A property for which you have to supply a value.

Range

A range is a set of values that fall between and include a defined upper and lower limit. For example, the range 10 to 20 includes 10, 20, and all the numbers that fall between. Also, the range January 1, 1991 to January 30, 1991, includes January 1, January 30, and all the dates that fall between. In Seagate Crystal Reports, a range can consist of numbers, dollar amounts, or dates.

Record

In a database, a record is a complete unit of related information, an electronic file folder that holds all of the data on a given entity. Each

record contains one or more fields that contain the specific pieces of data of interest. In a customer database, for example, a record would store all of the data on a single customer. In an inventory database, a record would store all of the data on a single inventory item. Data from an individual record is displayed or printed as a row of data on a columnar report.

Report

A report is simply an organized presentation of data. As a management tool, a report is used to provide management with the insight it needs to run an organization effectively. Seagate Crystal Reports allows you to create comprehensive, customized, attractive management reports quickly and easily. But report in Seagate Crystal Reports also refers to invoices, form letters, mailing labels, and other related items that require the organization and output of data.

Report Footer

The Report Footer section is the last section of a report in the Design Tab. You can place a summary in this section that you want to appear only on the last page of a report.

Report Gallery

The Report Gallery is a special dialog box that appears when you click the NEW button on the standard toolbar or choose the NEW command from the File Menu. The Report Gallery serves as a gateway to all the report creation experts and to the graphical interface for selecting the report and data type for creating custom reports.

Report Header

The Report Header section is the first section of your report in the Design Tab. You can place a title in this section, or any data you want to appear only on the first page of your report.

Request

A request is a set of criteria that specifies the subset of data that you want to use for your report. For example, if you want your report to contain only California data, you can create a record selection request that retrieves only California records for your report. You create record and group selection requests using the Select Expert.

Returns

The word “returns” refers to the result of a function, an operation, or a formula. For example:

- When using a function, it performs a calculation or manipulation that results in a data change of some kind. The data that results is what the function returns. For example, Average(1, 2, 3, 4, 5) returns the average of the array 1, 2, 3, 4, 5. Truncate(1.2345) returns the integer (whole number) portion of the number 1.2345.

- When using an operator, the result of the operation using that operator is what the operation returns. For example, 5*6 equals 30. You can say that the operation 5*6 returns 30. Also, the operation 100<200 compares the two values and returns True; 200<100 compares the two values and returns False.
- When using a formula that contains functions or operators, each function or operation within the formula returns a result, but the formula taken as a whole returns a result too. When talking about a formula, it is the result of the formula that is of interest, not the result of individual functions or operations. For example, in the following formula:

```
If {file.QTY} < {file.REORDERAMOUNT} Then
    "Reorder "
Else
    ""
```

an internal operation compares the value of the {file.QTY} field with the value of the {file.REORDERAMOUNT} field. If {file.QTY} is less than {file.REORDERAMOUNT}, that individual operation returns the value True, but that is not what the formula taken as a whole returns. The formula, taken as a whole, returns the flag "Reorder" when the operation internally returns the value True.

Row

A row is the display of data from a single record. Rows run horizontally across the page. The words row and record are sometimes used interchangeably in this manual. Contrast with column.

Ruler

The ruler provides a visual reference for positioning and resizing fields, graphs, lines, boxes, and bitmaps. The increments on the ruler are based on your measurement settings in the International section of the Windows control panel. The ruler also enables you to change page margins while immediately seeing the results of your changes on the report itself.

The Ruler is visible in both the Design Tab and Preview Tab when their respective check boxes are toggled on in the Options dialog box.

Running totals

Running totals are totals that are displayed generally on a record by record basis. They total all records (in the report, in the group, and so forth) up to and including the current record. For example, if your first three records have values of 2, 4, and 6, the running total for each of the three records would be 2, 6, and 12, respectively.

Sample

A sample, as used in statistics, is a subset of a population used to represent the entire population. Researchers frequently do not have the

	<p>option of testing an entire population before forming conclusions based on their tests. In such cases, they use a sample to represent the whole.</p> <p>For example, political polling before elections is often based on questioning only four or five hundred people. From the answers given by this sample, predictions can be made on how an entire nation will vote.</p>
Scroll bars, scrolling	<p>Sometimes a window can display only a portion of a document. In such a case, the window includes scroll bars that you can use to move other parts of the document into the window for your review.</p> <p>Scroll bars also appear with lists that are longer than the available window. The scroll bars allow you to move back and forth through the list. The process of moving through a list or document using scroll bars is called scrolling. In Seagate Crystal Reports, the screen automatically scrolls whenever you move the cursor outside the window and press and hold down the button.</p>
Section	<p>A section is a part of the report design environment. The program divides the design environment into several sections, each of which has different printing characteristics. You place objects in the various sections to build a report.</p>
Select	<ul style="list-style-type: none"> • With regard to a report element (data field, formula, etc.), select means to point to the element and then click to choose the element as the object of the next menu selection. • With regard to text, select means to highlight the text by dragging the I-beam cursor over it. • With regard to records, select means to identify and choose those records of interest while disregarding all others. • With regard to groups, select means to identify and choose those groups of interest while disregarding all others.
Selection formula	<p>A selection formula is a formula that specifies the records, or groups of records, you want included in your report.</p>
Server document	<p>A server document is a file that stores the original OLE object.</p>
Server-side processing	<p>Server-side processing is a feature that allows you to set up reports that perform the majority of their processing on the server. These reports push only relevant details to your computer, thus saving you time and memory.</p>
Shortcut menu	<p>A dynamic menu available in the Design and Preview Tabs. Access the shortcut menu by highlighting an object and right-clicking.</p>

Smart Processing Cache

The Crystal Web Report Server stores requested reports in the Smart Processing Cache directory. When a user requests a report through a web browser, the report is generated and stored in the cache. If another user requests the same report, the Crystal Web Report Server retrieves the report from the cache rather than generating it all over again.

Cached reports that remain unused for a long period of time are invalidated by the Crystal Web Report Server. Periodic clean up processes delete invalid reports from the cache to make room for more recent or more popular reports. This process of caching frequently used reports and deleting unused reports provides an efficient use of web server and network resources, reducing repetitive report generation and network traffic.

Snap property

Snap is a “magnetic” property that attracts nearby objects. Seagate Crystal Reports uses two facilities that have the snap property: Guidelines and the Grid. Whenever an object is moved close to a guideline or a grid coordinate, the program snaps it into position for accurate placement and alignment.

Sort-and-group-by field

A sort-and-group-by field is a field that triggers the printing of a subtotal (or a group field value) whenever its own value changes.

For example, you may have a customer report that contains the {customer.CUSTOMER ID} and {orders.ORDER AMOUNT} fields. If you want to subtotal by customer (total the orders for each customer), click the {orders.ORDER AMOUNT} field as the field to subtotal and the {customer.CUSTOMER ID} field as the sort-and-group-by field. Seagate Crystal Reports sorts the data by customer, so that all orders from the same customer are grouped together. Then, whenever the value in the {customer.CUSTOMER ID} field changes (when it changes from one customer to a different customer), Seagate Crystal Reports prints a subtotal of the values in the {orders.ORDER AMOUNT} field (a total of orders for the individual customer). You can also use sort-and-group-by fields to trigger summaries. See *Sorting, Grouping, and Totaling*, Page 245.

Sort direction

Sort direction describes the way records or groups are printed in your report. They are printed either in ascending (A to Z, 0 to 9), or descending (Z to A, 9 to 0) order.

Sort field

A sort field is a data field on which the sort procedure is based. A mailing list, for example, could be sorted, in ascending order, on the {customer.POSTAL CODE} field; that is, the customers would be sorted so that those with the lowest postal codes would appear first and those with the highest postal codes would appear last. The report could also be

sorted in ascending alphabetic order, on the {customer.CONTACT LAST NAME} field; that is, customers with last names beginning with A would appear first and those with last names beginning with Z would appear last.

Sort order

Sort order is an indicator of the direction in which you want your data to be presented once it is sorted. Data is typically printed in one of two sort orders: ascending (lowest to highest, earliest to latest, first to last, A to Z, etc.) or descending (highest to lowest, latest to earliest, last to first, Z to A, etc.).

Sorting

Sorting is a method of organizing the order in which data appears on your report. Seagate Crystal Reports provides you with powerful tools for sorting your report data.

SQL

SQL stands for Structured Query Language; a system for managing, organizing, and retrieving data stored on a computer database. Structured Query Language is a computer language that enables you to interact with a specific type of database called a relational database.

SQL pass-through

The ability to get the SQL Server to process the data retrieval criteria in order to pass the smallest possible result set back to Seagate Crystal Reports for final processing. When processing can be passed-through to the server, it makes the reporting process more efficient and it minimizes network traffic.

Standard deviation

Standard deviation is the square root of the variance. It is a statistical test of how various values in a set of values deviate from the mean or average value for that set. You can use standard deviation, for example, for assessing the relative difficulty of tests given to students, for evaluating and projecting customer purchase patterns, or for comparing the results delivered by two or more products under evaluation (laboratory blood tests, smoke detectors, radar detectors, etc.). The uses are endless.

Standard deviation (as opposed to population standard deviation) is typically used to project the standard deviation for an entire population (all values) based on testing only a small sample of that population. For example, a company producing batteries with a new manufacturing process might want to test the batteries to determine how long they will last before they go dead. If the company tested all of its batteries, it would have no product left to sell. As an alternative, the company might test thirty batteries selected at random and project the mean burn out time and standard deviation for all batteries based on the results from that thirty battery sample.

NOTE: This comparison simply suggests typical usage. In practice, some users prefer a calculation based on N values (PopulationStdDev) while others prefer a calculation based on N-1 values (StdDev). Both forms of standard deviation are provided by the program.

Static OLE object

A static OLE object is a picture of an object that is stored in a document when it is saved. The picture can be displayed or printed by a user who does not have the application in which the original object was created. The object can not be edited in place, however, without first converting it to an editable type of object. Static OLE objects offer better online and print performance than do standard bitmaps.

String

A string is a series of connected characters (letters, numbers, symbols, spaces) stored and used as text. The word "hello" is a text string as is the phrase "Order # 2453" and the customer number "B30-124-777". Strings are sometimes referred to as text strings or character strings.

Subreports

A subreport is a report within a report. It has all of the characteristics of a report with one exception: it can not itself include a subreport. Subreports can be free-standing or they can be linked to the data in the primary report. Seagate Crystal Reports enables you to insert as many subreports as you wish.

Substring

A substring is simply a part of a larger string. "Columbia" is a substring of the string "British Columbia", "1040" is a substring of the customer number "B-1040-0032456", and "B" is a substring of the string "President Bill Clinton".

Subtotal

A subtotal is a partial total, a total of a specific, limited group of data in a field. For example, given the following data:

1, 2, 3, 4, 5, 6, 7

a subtotal after the 3 produces the value 6 ($1 + 2 + 3$). A second subtotal after the 6 produces the value 15 ($4 + 5 + 6$).

A subtotal is the sum of all values from a single field, from all the records in a group. In a sales report, for example, if you subtotal the amount ordered by sales representative, Seagate Crystal Reports gathers all the records that belong to the sales representative and totals the amounts ordered from all the records.

Summary

A summary is the value generated as the result of an evaluation, a tally, or a calculation performed on data from a single group.

In a group average, Seagate Crystal Reports averages the values in a group of records; in a group count, it counts the values in a group of

records, and so forth. Summary values are important tools for creating powerful reports.

Summary field

A summary field is a field that determines the sum of the values, the average value, the maximum value, the minimum value, or count of values in a group of values in a given field. Much like a subtotal, a summary field groups data to your specifications and then performs the requested calculation/determination.

Syntax

Syntax, in Seagate Crystal Reports, is a set of rules that specifies the proper way to use functions and operators in formulas.

Tabs

Tabs are used in many dialog boxes and Experts in Seagate Crystal Reports. Tabs resemble the tabs on common file folders. Tabs always have text on them to indicate what you will find on the Tab.

Template

A template is a copy of a report used as the starting point for creating a new report. When a template is used, your original report remains unchanged.

Text object

A text object is a specialized object that can contain text, database fields, and formula fields. It contains its own mini word processor that can be used for anything from adding a label to creating an entire document.

Text string

A text string is text that is entered directly onto the report itself instead of being entered via a data field or formula.

Toolbar

A bar at the top of a Seagate Crystal Reports application window which contains a number of buttons that you can click to activate the most frequently used commands.

Total

A total is a sum of values. Subtotals and grand totals are different varieties of totals.

Truncate

Truncate means to cut off or eliminate all data that comes after the decimal point. Thus, if you truncate 1.2345, you get the value 1. If you truncate the value 1.9999 you also get the value 1. Truncate does not round data, it simply cuts off unwanted data.

Two pass formula/function

A two pass formula is a formula that requires two passes through the data for completion. The first pass performs some calculation or selection and the second pass performs a calculation or selection that uses the result generated by the first pass.

An example of a two pass formula is one that calculates the sales for each sales representative as a percent of total company sales. The first pass

sums the sales for each representative to arrive at total company sales. The second pass divides the sales per representative by total company sales to calculate the percent of total sales.

Underlay

The ability of an object (a bitmap, a graph, etc.) to print beneath multiple sections which follow the section in which it was placed. For example, you can place a bitmap in one section, format the section to underlay the following sections and then expand the bitmap so it appears as a background for the entire page of your report.

Value

A value is the data found in a field. In a field called {customer.CONTACT FIRST NAME}, for example, John or Mary might be the value. In a field called {orders.ORDER AMOUNT}, 1234.55 or \$200 might be the value.

Variance

Variance is the square of the standard deviation. It is a measure of the amount by which all values in a group vary from the mean (average) value in the group. It is a statistical test that can be used to evaluate the variability in a group of values (for example, the amount bid by each of the bidders on a construction project).

Variance (as opposed to PopulationVariance) is most often used to project the variance for an entire population (all values) based on testing only a small sample of that population. For example, with a limited number of bids in on a construction project, you might want to project the variance for all bids based on the sample already in. Or, based on sales figures for the first three months of the year, you might want to project the variance for orders for the entire year (including the nine months yet to come).

NOTE: These comparisons simply suggest typical usage. In practice, some users prefer a calculation based on N values (PopulationVariance) while others prefer a calculation based on N-1 values (Variance). Both forms of variance are provided by the program. For a more thorough discussion on the use of variance, consult any reliable statistics text.

Verify

In Seagate Crystal Reports terms, verify does not mean to repair and compact the database (MDB file) in Access. It means to let the report understand the changes made to the database structure (fields and tables, NOT records).

Wildcard

A wildcard is a character that represents any character (?) or any group of characters (*) in a search string. For example, if you are searching for Dan*, the search string will return strings like Danny and Daniel.

Word wrap

Word wrap is a word processor-type property of a text object that automatically moves a word to the following line when the word is too long to fit the remaining space on the current line.

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