

# Seagate Crystal Reports™ 6.0 User's Guide

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# Welcome to Seagate Crystal Reports

## What you will find in this chapter...

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*Two kinds of Hands-On tutorials, Page 2*

*Command, button, key, and control conventions, Page 3*

*Using Seagate Crystal Reports documentation, Page 5*

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*If you need more help..., Page 10*

# Welcome

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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 a 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 totally redesigned to fit the way users tell Seagate Software that 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...* (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 tutorials
2. Procedural tutorials

## 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 and supplementary toolbars and format bar are displayed in small caps. For example: **NEW** command, **PRINT** button, etc.

### Dialog box controls

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

## Other conventions

- 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).

- 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.

- Text that you should pay special attention to within normal body text is underlined.
- **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 and Windows 95 and C:\WINNT35\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 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 your finished report.
  - Some menus have been shortened by removing some of the commands that are unrelated to the current discussion.
  - The data in some lists has been abbreviated to focus attention on the specific items of interest.
  - In some cases, an individual screenshot illustrates both a before and after state 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

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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, Seagate Crystal Reports documentation provides a clear and easy path to productivity. For a complete description of learning tools and suggested learning paths, see *Learning Seagate Crystal Reports*, Page 35.



### PROFESSIONAL EDITION FEATURES

This User's Guide is distributed with both the Standard and Professional Editions of Seagate Crystal Reports. The following list identifies those features and capabilities that are discussed in the User's Guide but that are 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 Dictionary Designer
- Crystal Query Designer
- Reading SQL databases
- Reading Microsoft Exchange data files
- Exporting to ODBC data sources

## Seagate Crystal Reports online Help features

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

- **Seagate Crystal Reports online Help (CRW.HLP)**  
This help file 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.
- **Developer's online Help (DEVELOPR.HLP)**  
Description of all functions and structures, conceptual information, and sample code for the following:
  - ActiveX
  - Crystal Report Engine Automation Server
  - Active Data Driver
  - NewEra
  - PEPlus
  - Report Engine API
  - Visual Basic API
  - VBX
  - VCL

- **Dictionary online Help (DICTNRY.HLP)**  
Dictionary online Help includes all the information you need to create, modify, and work with dictionaries.
- **Query Designer online Help (QUERY.HLP)**  
Query Designer online Help includes all the information you need to create and edit queries for use in creating reports
- **Readme online Help (README.HLP)**  
ReadMe Help including topics such as the following:
  - Obsolete API calls
  - Installation Topics
  - Configuration and SetUp Topics
  - Quick Start
  - International Partners Directory
  - BackOffice Reports
  - Using DBGrid with the Query Module
- **Runtime File Requirements online Help (RUNTIME.HLP)**  
Runtime Help including all the DLLs and UFLs distributed with Seagate Crystal Reports including:
  - the exact name,
  - location, and
  - description.
- **Pro Sample Reports online Help (SAMPLE.HLP)**  
Sample Reports Help for Professional edition of Seagate Crystal Reports including:
  - the reports listed by type,
  - name of the sample report,
  - description of each,
  - list of financial functions used in each report with a link to a complete description of the function,
  - Back Office sample reports.



- **Standard Sample Reports online Help (SAMPLE.HLP)**  
Sample Reports Help for the Standard edition of Seagate Crystal Reports including:

- the reports listed by type,
- name of the sample report, and
- description of each.

- **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.

Here is just a sampling of things 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 know which files to include when you include the Crystal Report Engine with your application. See Runtime File Requirements 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 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 our sample reports. Search for *Functions* or *Operators*



or for the 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. Using the Copy (Ctrl-C) and Paste (Ctrl-V) commands built into Windows Help, you can 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 your reporting more productive and enjoyable. A comprehensive indexing system and hundreds of search terms provide you a variety of avenues for finding the help you need, right from your computer. Once you see what's in the help system, you will most definitely return to it often.

## If you need more help...

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### WEB SITE

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

### INTERNET

- **Report Creation and Design**  
tsrcad@img.seagatesoftware.com
- **Delphi/VCL**  
tsvcl@img.seagatesoftware.com
- **dBase and Paradox**  
tsxbse@img.seagatesoftware.com
- **Report Engine API**  
tsrpe@img.seagatesoftware.com
- **Crystal Info Product Support**  
tscinfo@img.seagatesoftware.com
- **Report Engine NewEra Class Library Issues**  
tsnewera@img.seagatesoftware.com
- **Report Engine C++ Class Library Issues**  
tsmfc@img.seagatesoftware.com
- **Miscellaneous Issues**  
tsmisc@img.seagatesoftware.com
- **Operating System Specific Issues**  
tsosplat@img.seagatesoftware.com
- **Visual Basic, VBX, OCX Support**  
tsvbocx@img.seagatesoftware.com
- **PC database connectivity Support**  
tspcdata@img.seagatesoftware.com
- **SQL/ODBC connectivity Support**  
tssql@img.seagatesoftware.com
- **OLE Automation Tools**  
tsole@img.seagatesoftware.com

- **Web Developer Tools**  
**Web Viewers**  
**ActiveX Viewers**  
tsweb@img.seagatesoftware.com
- **Holos, Essbase, and other OLAP Products**  
tsolap@img.seagatesoftware.com

#### **COMPUSERVE**

#### **GO REPORTS**

#### **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 635.*



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# 1

## Installation and Quick Start

### What you will find in this chapter...

*Installation Requirements, Page 14*

*16-bit version, Page 14*

*32-bit version, Page 14*

*Installing Seagate Crystal Reports, Page 15*

*Windows 3.1 or NT 3.51, Page 15*

*Windows 95 or NT 4.0, Page 15*

*Installing on a network workstation, Page 16*

*Windows 3.1 or NT, Page 16*

*Windows 95 or NT 4.0, Page 17*

*Upgrading from a previous version, Page 17*

*Quick Start, Page 18*

# Installation Requirements

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## 16-bit version

The 16-bit version of Seagate Crystal Reports has the following installation requirements:

- Microsoft Windows 3.1 or higher
- Minimum RAM: 8 MB (16 MB for Windows NT 3.51 or higher)
- Recommended RAM: 16 MB (32 MB for Windows NT 3.51 or higher)
- Minimum hard drive space required: 18 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 Seagate Crystal Reports has the following installation requirements:

- Microsoft Windows 95 or Microsoft Windows NT 3.51 or higher
- Minimum RAM: 8 MB (16 MB for Windows NT)
- Recommended RAM: 20 MB (32 MB for Windows NT)
- Minimum hard drive space required: 21 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.

# Installing Seagate Crystal Reports

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Insert the CD or diskette in 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 your 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 an Automatic or Custom installation.

- If you select *Automatic*, all of the program files are installed to your hard drive.
- If you select *Custom*, you will be given the opportunity to select which program files are installed to your hard drive.

## Windows 95 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 your 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 an Automatic or Custom installation.

- If you select *Automatic*, all of the program files are installed to your hard drive.
- If you select *Custom*, you will be given the opportunity to select which program files are installed to your hard drive.

## Installing on a network workstation

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If you are operating a network workstation that runs Windows locally and Seagate Crystal Reports is already installed on your network server, you do not need to install the program on your workstation. Instead, you can run the workstation setup application that was installed with Seagate Crystal Reports.

During installation, you can choose a Full Network Install or a Partial Network Install.

- A Full Network Install installs all application modules on the network server and allows users to run the program from the shared drive. This method is recommended for diskless workstations.
- A Partial Network Install installs only the main application modules on the network server. This type of installation requires each user to run a workstation setup to install several modules on the client machine. With this installation method, the program will run faster and will take up less local disk space than a Local Install.

Workstation setup (SETUP.EXE) is installed in the \CRW\WKCSSETUP (16-bit) or \CRW\WKCSTP32 (32-bit) directory on the network drive on which Seagate Crystal Reports was installed.

### Windows 3.1 or NT

- 1 From the Program Manager, choose RUN from the File menu. The Run dialog box appears.
- 2 In the Run dialog box, highlight the network drive and directory in which Workstation Setup resides and run the SETUP.EXE application.



## Windows 95 or NT 4.0

- 3 Follow the directions on the screen to set up your workstation.
- 1 Choose RUN from the Start menu. The Run dialog box appears.
- 2 In the Run dialog box, highlight the network drive and directory in which 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 (4.5, 5.0, Crystal Reports for Visual Basic, etc.), the installation routine ensures that there will be no conflict between different versions of the program running on the same machine. When it finds a previous version of Seagate Crystal Reports on your system, the setup application:

- installs the program to the directory you specify,
- installs the new CRPE.DLL into the \WINDOWS\SYSTEM directory,
- renames DLLs in the WINDOWS\CRYSTAL directory, installed by your previous version of Seagate Crystal Reports, 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.

This upgrade procedure makes it unnecessary to change your AUTOEXEC.BAT file.

## Quick Start

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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 35.*



- 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 and NT 4.x, click Start and then select the program from the Seagate Crystal Reports program folder.
- 2 Click the NEW button on the standard toolbar. The Report Gallery appears.
- 3 Select one of the eight Experts to build a report with the help of an Expert, click the *Another Report* button to use a template for building your report, or click the *Custom* button 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 your 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 your report.
  - *SQL/ODBC*, the Log On Server dialog box appears. Highlight the data source you want and then highlight the first table you want to use from the Choose SQL Table dialog box when it appears.
  - *Dictionary*, the File Open dialog box appears. Highlight the dictionary you want to use for your report.

The Design Tab appears with Report Header, Page Header, Details, Page Footer, and Report Footer areas. You create your report by inserting and formatting items in each of these areas.



**NOTE:** If you want to use additional database tables for your report and match them up on a record-by-record basis, click the **LINK EXPERT** button on the supplementary toolbar and then select the table(s) and 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. If you want to add additional sections, click the **SECTION EXPERT** button on the standard toolbar and add the sections you want using the Section Expert.

Once you have added sections to an area, you can move, merge, and delete them in the Section Expert. See *How to add, delete, move, and merge sections*, Page 89.

- 6 If you want to toggle the grid on and off, choose the **OPTIONS** command on the File menu and make your changes in the File Options dialog box when it appears. See *How to turn the grid on/off*, Page 86.
- 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.
  - Move a field to a guideline until it snaps to the guideline.
  - Move 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 82, and *How to move and position objects using guidelines*, Page 83.



- 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. This dialog box displays a list of all of the fields in the active database table(s). To speed the entry of multiple fields, the box remains on screen until you click the *Close* button. You can move the dialog box to a new location or resize it if you wish. See *How to insert database fields*, Page 118.
- 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 If you place multiple fields, they will appear next to each other in the order 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: You can see the actual field names and field types by toggling the Show Field Names check box on in the File Options dialog box (Layout Tab). Search for Configuring Seagate Crystal Reports in Seagate Crystal Reports online Help.***

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

***NOTE: If you add additional Details sections to your 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 you have objects in place, you may want to adjust the report sections somewhat. You do this using the shortcut menu that appears when you right-click the shaded area to the left of the section ruler.
  - If you want to expand the section to accommodate an additional line, choose the INSERT LINE command.
  - If you want the program to automatically align the objects in the section horizontally, choose the ARRANGE LINES command.
  - If you want to reduce the size of the 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 241.

- 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*. 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 will contain the text that you typed in the *Title* text box of the Document Properties dialog box. See *How to add a title page to your report, Page 131*.



- 13 To see how your results will print, click the PRINT PREVIEW button on the standard toolbar.

If you want to speed processing time while building your report, you can preview your 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 72*.

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

- 14 If you want to:

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

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

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



**NOTE:** If you want the formatting to apply only under certain conditions, click the **Conditional Formula** button next to the formatting property in the **Format Editor**, and create a formula that defines those conditions. See *Conditional formatting*, Page 235.

**NOTE:** Many of the font and formatting options are available on the format bar. See *Format bar*, Page 59, for more information on the options available.



15 If you want to create a formula to make 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.

- Click the **New** button. The **Formula Name** dialog box appears. Enter a name for your formula and click **OK**. The **Formula Editor** appears.
- Enter the formula in the **Formula Editor**. Enter fields, operators, and functions by selecting them from their respective scroll lists or type them in. You can check your formula syntax via the **Check** button. When finished editing, click the **Accept** button to return to the **Insert Fields** dialog box. Click the **Insert** button to place the formula just like you would a database field. See *Formulas 101*, Page 321, and *Advanced Formulas*, Page 345, or search for *Functions and Operators and Variables* in Seagate Crystal Reports online Help.



16 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 434.

- If you want the records in your subreport to match up with the records in your 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 436.



17 To insert a cross-tab object in your 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 445.



18 To create a parameter field (a field that prompts you for a value whenever you retrieve data for your 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 the New button to set up a parameter field. Once created, you can insert the parameter field in your report like a database field or select it from the *Fields* list in the Formula Editor.

- You can use parameter fields in your report (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 391.



19 To add a graph or chart, click the INSERT CHART button on the standard toolbar. See *Graphing*, Page 405.

20 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 415, and *How to insert a graphic/picture as an OLE object*, Page 426.



21 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 281.



22 If you want to limit your report to specific records (for example, the records of California customers that have year-to-date sales greater than \$10,000), click the first field on which you want your selection to be based and click the SELECT RECORDS button on the standard toolbar. When the Select Expert appears, set up your record selection criteria. See *Record and Group Selection*, Page 249.



23 To print your 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 165.





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# 2

## What's New

### What you will find in this chapter...

*Sensational new interface gives you power and control, Page 26*

*Multiple section reports offer new reporting alternatives, Page 27*

*Subreports expand report usefulness, Page 27*

*Query Designer adds ad-hoc querying capabilities, Page 28*

*Conditional formatting adds new intelligence to reporting, Page 28*

*Parameter fields mean multi-purpose reports, Page 29*

*Text objects give you text with intelligence, Page 29*

*Preprinted-form reports easier than ever, Page 30*

*Enhanced cross-tab capabilities help identify trends, Page 30*

*More powerful formulas extend your capabilities, Page 31*

*In-place editing makes it easy to edit OLE objects, Page 31*

*Dragging objects between reports cuts creation time, Page 32*

*Web solution serves up variety of online reports, Page 32*

*HTML exporting simplifies Web activities, Page 33*

*New database support improves data access, Page 33*

*Running totals made easy, Page 34*

*Arbor Essbase support extends reporting capabilities to OLAP data sources, Page 34*

*Smart Navigation, Page 34*

## Sensational new interface gives you power and control

---

The report design environment offers greater flexibility than ever before.

- The Design and Preview Tabs are broken into areas and each area can contain multiple sections, each with different data and/or properties. See *Identifying and working with areas and sections*, Page 71.
- The Preview Tab now provides Smart Navigation technology in the new Group Tree view. Using the Group Tree, you can quickly drill down on group data to review the details of each group. See *Preview Tab*, Page 72.
- The Preview Tab now lets you expand and collapse report sections so you can review data with different levels of detail. See *How to drill down on summarized data*, Page 88.
- The new Section Expert enables you to insert, delete, move, merge, and format sections from one place. See *Getting to Know Seagate Crystal Reports*, Page 51.
- Vertical and horizontal guidelines make it easy to place and align objects with precision. See *How to add, delete, and move guidelines*, Page 82, and *How to move and position objects using guidelines*, Page 83.
- Multiple levels of undo and redo make it easy and safe to experiment, and they provide a fail-safe mechanism against inadvertent errors. See *How to undo/redo activities*, Page 87.
- The standard and supplementary toolbars and format bar can be moved, resized, and enlarged, enabling you to customize your environment for maximum efficiency. See *How to move and resize toolbars and the format bar*, Page 80.



These are just a few of the new features in the design environment.

## Multiple section reports offer new reporting alternatives

---

Now you can include multiple sections in any area of your report and you can format each section independently of the others. Using this capability you can:

- create custom form letters that deliver different messages to different readers (See *How to create a form letter using a text object*, Page 218.),
- format numbers and dates differently depending on the audience (See *How to format objects conditionally*, Page 224.),
- create unusual printing effects (See *How to alternate background colors for rows*, Page 226.),
- force objects to print in the order you specify, and more.

See *Multiple Section Reports*, Page 213.

## Subreports expand report usefulness

---

Seagate Crystal Reports enables you to create subreports and place them in your report. You can create freestanding reports based on tables that are not related to those in the primary report, or you can bind the subreports to primary report data.

With subreports, you can create one report that provides all the information you need instead of having to create multiple reports. You will find it easier to create reports and analyze report data with the new subreport feature.

Subreports can be inserted into most sections of the main report and the main report can contain numerous subreports.

Existing report files (.RPT) can be used as subreports. Subreports can have any report format; they can be cross-tabs or contain graphs. Thus, you can present columnar data from one report right next to a graph from another report.

Subreports let you present different types and views of data all on one report for convenient viewing of information and efficient analysis. See *Subreports*, Page 429.

## Query Designer adds ad-hoc querying capabilities

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Seagate Crystal Reports now includes a powerful Query Designer that allows processing of all aggregate functions on the database server. A complete SQL Editor is included to fine tune your queries. And, as you would expect, you can create reports from query result sets. Ad-hoc queries, reports, or both? Seagate Crystal Reports has it all. See *Queries, Page 467*.

## Conditional formatting adds new intelligence to reporting

---

Seagate Crystal Reports has always been known for its flexibility in formatting report data. This version takes a giant step beyond earlier versions by allowing you to format data conditionally based on whatever criteria you want to use.

- Do you want sales figures to print in red if more than 10% under quota, in green if more than 10% over quota, and in black in all other cases?
- When your data contains domestic and international data, do you want to print dates and currency values in the expected format for every country?
- Do you want a section to print only if it contains a record from a Canadian company?
- Do you need to customize your report colors to meet corporate standards or design requirements?

You can do these and countless other things using conditional formatting.

Virtually all field, object, and section formatting (color, font, border, alignment, visibility, and more) can be controlled by creating simple, straightforward formulas. See *Conditional formatting, Page 235, Formulas 101, Page 321, and Advanced Formulas, Page 345*.

## Parameter fields mean multi-purpose reports

---

Now you can create parameter fields. Parameter fields prompt you for a value when the report is run for the first time or the data is refreshed. With parameter fields, you can:

- change report titles or labels,
- modify record selection criteria,
- specify sort fields, and
- set threshold levels for flagging purposes,

all by responding to simple prompts when you run the report. Using parameter fields you can create a single report that satisfies a number of needs. It makes your work easier and more efficient. See *Parameter Fields*, Page 391.

## Text objects give you text with intelligence

---

Text objects give you flexibility and control when you insert text in your report.

- Text objects replace text fields. A text object can contain a character, word, paragraph, or even an entire document, making them perfect for creating customized form letters.
- Each text object contains its own mini word processor, making it easy to insert and edit text.
- Text objects and elements within text objects can be independently formatted with fonts, colors, line breaks, tabs, and more.
- Database fields can be inserted into a text object in-line with automatic trimming to fit properly within text. Text objects can also contain formula fields.
- Text objects can be inserted and edited in-place on the report, making report design easier. Now you can readily see how a text object looks on the page in relation to other objects.

- Presentation quality is improved with total control and flexibility over text object formatting. See *How to insert text objects*, Page 120.

## Preprinted-form reports easier than ever

---

The ability to design reports that print on forms is greatly enhanced now that you can place objects anywhere in the new freeform, drawing program-type environment. New rulers and guidelines facilitate the precise placement of objects on the form, and the built-in tab and ruler capabilities in text objects gives you more flexibility and control. There's even a new Forms Expert that speeds the design process. For fast, efficient reporting on preprinted forms, you can not beat Seagate Crystal Reports. See *How to make an object underlay a following section(s)*, Page 124.

## Enhanced cross-tab capabilities help identify trends

---

Cross-tabs are now objects that you can insert into your report.

- You can insert as many cross-tabs as you need, and you can even insert cross-tabs in subreports. See *How to create a cross-tab object*, Page 452.
- You can use formulas that are defined elsewhere on the report in cross-tabs.
- You can include multiple summary fields or calculations in your cross-tabs. For example, for a single item you can summarize both quantity and price information. See *How to create a cross-tab with multiple summary fields*, Page 459.
- You can independently format rows and columns with background colors, borders, and fonts for better looking and easier-to-understand cross-tabs. See *How to format a cross-tab*, Page 463.
- You can print cross-tabs that extend beyond the width of a page. You can also create cross-tabs that are longer than a single page and the program will automatically repeat the column headings at the top of each page. See *How to print cross-tabs that span multiple pages*, Page 466.

- You can design and edit cross-tabs easily with the ability to call up the Cross-Tab Expert from both the Design and Preview Tabs. See *Cross-Tab Objects*, Page 445.

Using these capabilities, you can create sophisticated cross-tabs like this with ease:

		Craze Adult Helmet			
		small/medium			
		white	green	red	Totals
Western Region	CA	3628 \$122,893.28	2713 \$91,576.70	2835 \$93,586.50	8376 \$263,946.48
	WA	1436 \$48,686.40	834 \$21,692.88	1123 \$38,669.70	3403 \$116,412.78
	Totals	5064 \$171,609.68	3547 \$123,633.38	3158 \$107,956.29	11869 \$402,359.35

## More powerful formulas extend your capabilities

---

Seagate Crystal Reports includes new functionality that lets you create even more powerful formulas than ever before. With Date, Time, and DateTime data types, you can now create date formulas, time formulas, and date/time formulas. With the ability to place arrays in variables, all new running total functions, as well as specialized financial functions, your complex reporting needs are easier than ever before. See *Advanced Formulas*, Page 345.

## In-place editing makes it easy to edit OLE objects

---

Seagate Crystal Reports draws upon OLE technology to add solid new functionality to your reporting environment.

- All pictures are converted to static OLE objects. Double-click an object and the program displays the tools to edit that object, all while staying in Seagate Crystal Reports.

- While working in the Design Tab, you can convert OLE objects to a format that is supported by your editing tools. For example, if you have a .TIF picture and no .TIF editor, you can convert the picture to a Paintbrush format that can be edited in the paint program that ships with Windows. See *OLE, Page 415*.

## Dragging objects between reports cuts creation time

---

Now you can open multiple reports and drag many kinds of objects between them. Now there is no need to “reinvent the wheel”. If you have an object in one report and you need to use it in a different report, just drag it where it is needed.

You can also drag objects into Seagate Crystal Reports, from any application that is an OLE server application. Microsoft Word and Excel are examples of this kind of application. Just highlight the object (such as text or worksheet cells) and drag it into the report. The object becomes part of your report. Double-click it and you can edit it in place using the application you created it with. See *OLE, Page 415*.

## Web solution serves up variety of online reports

---

The Web Server’s Java and ActiveX viewers enable you to publish Active Server reports that can be viewed with a browser. These reports can be created on-the-fly using either archived or newly-refreshed data. Web reports created with Seagate Crystal Reports aren’t static “snapshots.” Users can point and click (drill down) to see the details behind summarized data, change selection formulas, parameter fields and even SQL stored procedures. Reporting was never easier across the internet or within an enterprise via an intranet. See the Technical Reference for further information.



## HTML exporting simplifies Web activities

---

With Seagate Crystal Reports, you can now export your reports directly to HTML format. With this capability, you can publish your reports on the World Wide Web and on organizational intranets. Combining this capability with other Seagate Crystal Reports features, you can add dynamic reporting to your web applications. Some benefits of exporting to HTML include:

- HTML report can be viewed by any web browser.
- Specific Microsoft, Netscape, and Oracle web extensions are available when exporting to HTML.
- Reports are automatically converted to HTML, saving you time and tedious effort when preparing database information for the web.

As the Internet and intranets become more and more important to many businesses, Seagate Crystal Reports is providing the tools you need to take advantage of the new opportunities. See *How to export reports, Page 148*, and search for *HTML* in Seagate Crystal Reports online Help.

## New database support improves data access

---

Seagate Crystal Reports now supports more databases than ever, and it provides new ways to access previously supported data for enhanced performance. The program now ships with drivers for INFORMIX, Microsoft Exchange, ASCII, DB2/2, Access, Excel, SQL Server, Oracle, Sybase, Lotus Notes 3.0 (16-bit, Pro only), scalable SQL (16-bit), and more 32-bit drivers, including FoxPro and Btrieve, than ever before. It has native drivers for INFORMIX<sup>®</sup> ACT! 3.0, Arbor Essbase, IBM DB2 (DB2, DB2/2, DB2/400, DB2/6000), Centura (16-bit), Microsoft Exchange, IIS, SMS, SQL Server, NT Event Logs, Pervasive Scalable SQL (16-bit), Sybase X 2 (16-bit), Paradox, Web Activity Logs, Oracle X 2 (16-bit), Access via Jet, and more. Connecting to your data has never been easier. See *Working With Databases, Page 513*, and *Data Sources, Page 583*.

## Running totals made easy

---

Seagate Crystal Reports has always been the industry leader when it comes to sorting, grouping, and totalling data. With the inclusion of specialized running total functions, it extends its lead even further. Now you can create running totals in a list, running totals group-by-group, and other advanced totalling activities using fewer and less-complex formulas than ever before. See *Advanced Totalling, Page 377*.

## Arbor Essbase support extends reporting capabilities to OLAP data sources

---

Seagate Crystal Reports has always been known for its ability to report on a wide range of PC and SQL data sources. It now reports on Arbor Essbase OLAP data as well. Whether your databases are relational or multi-dimensional, you can use Seagate Crystal Reports to produce professional reports quickly and easily. See *Reporting on OLAP data, Page 191*.

## Smart Navigation

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Seagate Crystal Reports enables you to use Smart Navigation to jump immediately to the report information you want to see. The program displays a high level outline of the report, showing the hierarchy of groups and subgroups in a familiar tree format. When you click on 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. You don't have to page through long reports trying to find specific pieces of information; with Smart Navigation, one mouse click and you're there.

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# 3

## Learning Seagate Crystal Reports

### What you will find in this chapter...

*Learning Seagate Crystal Reports, Page 36*

*User's Guide, Page 36*

*Online Help, Page 43*

*Books Online, Page 43*

*Sample Reports, Page 44*

*Glossary, Page 44*

*Sample Data - CRAZE.MDB, Page 45*

*Suggested learning paths, Page 47*

# Learning Seagate Crystal Reports

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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

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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 to make locating information later more efficient.

### WELCOME TO SEAGATE CRYSTAL REPORTS

*Welcome to Seagate Crystal Reports, Page 1*, is an introduction to Seagate Crystal Reports documentation. This chapter provides an overview of all documentation included with Seagate Crystal Reports, special conventions used, as well as a handy directory of important phone, fax, and e-mail addresses for contacting Seagate Software, Information Management Group.

### CHAPTER I, INSTALLATION AND QUICK START

*Installation and Quick Start, Page 13*, includes everything you need to getting 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 of 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 25*, identifies and describes the main new features, and points you to 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 35*, 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 51*, introduces you to Seagate Crystal Reports. In this chapter you will learn about the tools, the pointers, and the tabs you will use to design, preview, and analyze your reports. This chapter explains what to do and then shows you how to do it. All levels of users will benefit from reading this chapter.

## CHAPTER 5, REPORTING 101

*Reporting 101, Page 95*, concentrates on the basic concepts of report design, and then explains, in easy terms, the things you should understand and consider in order to:

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

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

## CHAPTER 6, PRINTING, VIEWING, AND EXPORTING

*Printing, Viewing, and Exporting, Page 135*, details the ways you can print, view, and export your finished reports. It introduces you to a number of printing considerations, shows you how to use the report viewers (including the Active X and Java viewers that work in web browsers), and it explains how you can export your 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 165*, is the primary tutorial for Seagate Crystal Reports. It is a product introduction that leads you step-by-step through the creation of a report, introducing you to many of the key features of the program in the process. This tutorial has been written for the new user. No prior knowledge of reporting is expected. By the time you finish the 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 191*, shows you how to create reports with OLAP data from Arbor Essbase. While 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 213*, introduces the various kinds of sophisticated reporting available when using the multi-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 reporting, 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 231*, leads you through the steps that are necessary to format your report. Formatting refers to those things that you can do to change the layout and design of your 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 do a variety of other things to give your report a professional appearance.

## CHAPTER 11, RECORD AND GROUP SELECTION

*Record and Group Selection, Page 249*, shows you how to filter which records and groups of records you want to be included in your report. Using the record and group selection tools included in Seagate Crystal Reports, you can do such things as including records only for a specific group of customers, a specific range of account numbers, or that fall within a particular date range.

## CHAPTER 12, SORTING, GROUPING, AND TOTALLING

No other program has the sorting, grouping, and totalling capabilities of Seagate Crystal Reports. *Sorting, Grouping, and Totalling, Page 271*, provides a tour of the kinds of sorting, grouping, and totalling you can do within a report, and then it shows you how. This chapter is an excellent overview for both beginners who may not understand sorting, grouping, and totalling, as well as advanced users, who want to know more about the program's sorting, grouping, and totalling capabilities.

## CHAPTER 13, FORMULAS 101

Seagate Crystal Reports is equipped with a powerful formula language. Once you become comfortable working with formulas, your reporting capabilities are virtually endless. *Formulas 101, Page 321*, 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 new to formulas and shows you 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 345*, 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 you how to use Seagate Crystal Reports to create customized formulas for all your reporting needs.

## CHAPTER 15, ADVANCED TOTALLING

*Advanced Totalling, Page 377*, introduces you to a number of advanced totalling techniques. Seagate Crystal Reports, always a leader in sorting, grouping, and totalling, includes special functions that enable you to perform sophisticated running total activities with ease. The tutorials included in this chapter demonstrate techniques using these functions to produce running totals in a list, running totals within record groups, as well as other advanced totals.

## CHAPTER 16, PARAMETER FIELDS

*Parameter Fields, Page 391*, shows you 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 you refresh the data in your 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 one report that you can modify quickly as your needs change.

## CHAPTER 17, GRAPHING

Seagate Crystal Reports enables you to present summarized data in colorful, easy-to-read charts and graphs. *Graphing, Page 405*, shows you how to create graphs and how to use them in your 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, OLE

Often when you insert a graphic, spreadsheet, or some other object into a report, you may later find it necessary to change that object. Normally to make the 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 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. *OLE, Page 415*, shows you what is possible in Seagate Crystal Reports with OLE and how to implement it.

## CHAPTER 19, SUBREPORTS

A subreport is a report within a report. Using subreports you can combine unrelated reports 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 429*, shows you what you can do in Seagate Crystal Reports using subreports and how to create them.

## CHAPTER 20, 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 make 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 more data in a more compact easier-to-understand form than other reporting methods. *Cross-Tab Objects, Page 445*, introduces you to the cross-tab reporting tools, and it shows you how to create cross-tab reports quickly and easily.

## CHAPTER 21, QUERIES

*Queries, Page 467*, shows you how to create queries that you can use for ad-hoc analysis or result sets for creating reports. Using the Crystal Query Designer you can create, modify, and optimize complex SQL queries with ease.

## CHAPTER 22, DICTIONARIES

Dictionaries are structured and simplified views of data that you can create for some or all of the individuals in your organization. Using 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 491*, shows you how to set up and use dictionaries to improve organizational efficiency and security.

## CHAPTER 23, 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 513*, 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 your reporting for maximum efficiency. This chapter contains information both for the beginner and the advanced user.

## CHAPTER 24, DATA SOURCES

Seagate Crystal Reports works with all kinds of data, from simple text files to advanced client-server SQL databases. *Data Sources, Page 583*, shows you how the program connects to various data sources and what files have to be in place to make the connection. This is an in-depth chapter for advanced users who need to know how Seagate Crystal Reports works 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 629*, is written for the advanced user.

## APPENDIX B, PRODUCT SUPPORT

*Product Support, Page 635*, introduces you to the various ways you can obtain product support.

## Online Help

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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 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 you an explanation of what the command does, then 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.

You can navigate through online Help using the Contents Tab, you can use the Search facility to look up topics by key words, or you can use the full-text Find facility 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

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Books Online contains the full text of this manual, as well as a complete Technical Reference in electronic format. Both online books are included with the CD version; only the Technical Reference is included with the diskette version of Seagate Crystal Reports. These manuals have been created with Adobe Acrobat; Acrobat Reader has been included on the CD and setup disks to allow you to view or print these documents.

Books Online are hypertext documents with hundreds of jumps to take you to topics of interest, related topics, and technical information. Additionally, Acrobat Reader has a full text search capability so you can 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 gives you the tools to find the information you need in a hurry.

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

## Sample Reports

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Seagate Crystal Reports comes with many professionally designed sample reports in two categories:



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.
- By studying the formatting of the reports, you can see how key information is emphasized and what was done to make the reports visually pleasing. See Sample Reports online Help, [SAMPLE.HLP](#).

## Glossary

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Seagate Crystal Reports 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 from Seagate Crystal Reports.

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

## Sample Data - CRAZE.MDB

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Seagate Crystal Reports comes with CRAZE.MDB, a sample database you can use when learning the program. CRAZE.MDB is a Microsoft Access 2.0 database and all of the necessary drivers are included with the program. You should be able to open the database directly and begin designing reports. Virtually all of the examples in this manual are based on CRAZE.MDB data.

CRAZE.MDB is a database that contains data for Craze Mountain Bikes, a fictitious manufacturer of mountain bikes and accessories.

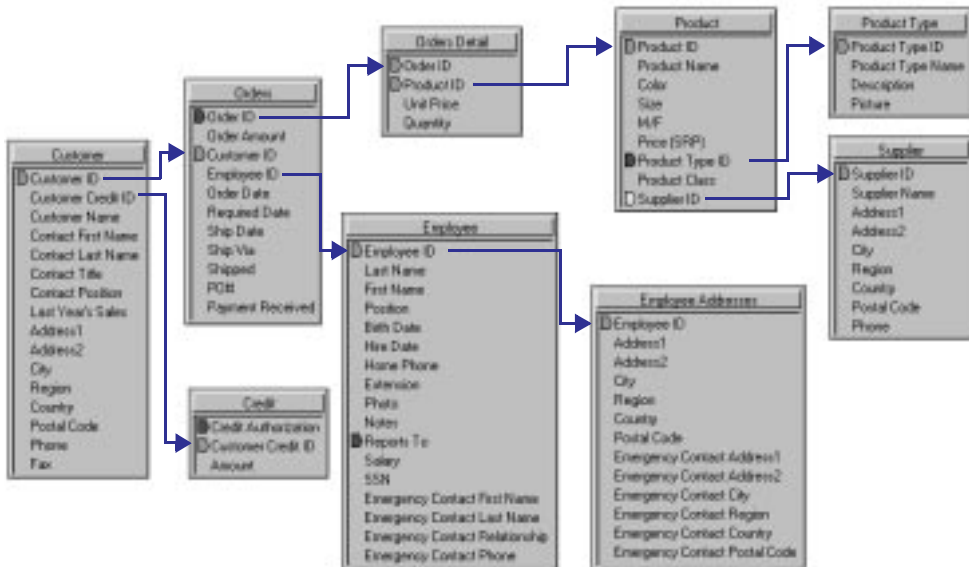
The database includes the following tables:

- **Craze Info**  
Company data for the Craze Mountain Bike company including the company logo in both color and black and white.
- **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 Craze Mountain Bikes.
- **Employee Addresses**  
Personal data for Craze Mountain Bikes employees.
- **Orders**  
Identifying and tracking data for orders.
- **Orders Detail**  
Line item data for orders.
- **Product**  
Descriptive data for Craze Mountain Bike products.
- **Product Type**  
Category data for Craze Mountain Bike products, including product pictures.

- **Supplier**

Data for the suppliers who serve Craze Mountain Bikes.

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



CRAZE.MDB also includes:

- a query (Top Customers), and
- a parameter query (Credit\_Limits) that you can use to learn how to report on those kinds of data sets, as well as,
- the Craze Info table which is not linked to any other table. This table contains company information for Craze 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

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There is no correct learning path for everyone; you have your own needs, and will learn in your own way and 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 a suggested order, yet one that has been carefully structured to speed the learning process. Locate the category that best describes your reporting experience and follow the path from start to finish to get the best results.

### **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 643*, a quick read.
- Read *Getting to Know Seagate Crystal Reports, Page 51*.
- Read *Reporting 101, Page 95*.
- Read *Printing, Viewing, and Exporting, Page 135*.
- Work through *Tutorial - Customer List, Page 165*.
- Read *Record and Group Selection, Page 249*.
- Scan *Sorting, Grouping, and Totalling, Page 271*.
- Read *Formulas 101, Page 321*.
- Review *Sample Reports, Page 44*.
- Refer to online Help and the Hands-On skills 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 643*, for new terms.
- Read *Installation and Quick Start, Page 13*.
- Read *What's New, Page 25*.

- Read *Getting to Know Seagate Crystal Reports*, Page 51.
- Scan *Reporting 101*, Page 95.
- Scan *Printing, Viewing, and Exporting*, Page 135.
- Scan *Multiple Section Reports*, Page 213.
- Scan *Record and Group Selection*, Page 249.
- If you have limited formula experience, read *Formulas 101*, Page 321.
- If you have a working knowledge of formulas, read *Advanced Formulas*, Page 345.
- Scan *Subreports*, Page 429.
- Review *Sample Reports*, Page 44.
- Refer to Hands-On skills 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 *Quick Start*, Page 18.
- Read *What's New*, Page 25.
- Read *Getting to Know Seagate Crystal Reports*, Page 51.
- Scan *Reporting 101*, Page 95.
- Scan *Printing, Viewing, and Exporting*, Page 135.
- Read *Multiple Section Reports*, Page 213.
- Scan *Record and Group Selection*, Page 249.
- Scan *Sorting, Grouping, and Totalling*, Page 271.
- Scan *Formulas 101*, Page 321.
- Read *Advanced Formulas*, Page 345.
- Read *Advanced Totalling*, Page 377.
- Read *Parameter Fields*, Page 391.
- Read *Subreports*, Page 429.
- Read *Performance considerations for all reports*, Page 528.



- Read *Report Processing Model*, Page 629.
- Review *Specialized Formulas* in online Help.
- Refer to the *Glossary*, Page 643, and Hands-On skills 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 Seagate Crystal Reports.

- Read *What's New*, Page 25.
- Read *Getting to Know Seagate Crystal Reports*, Page 51.
- Read *Advanced Formulas*, Page 345.
- Read *Performance considerations for all reports*, Page 528.
- Read *Report Processing Model*, Page 629.
- Review *Power Formulas* in online Help.
- Refer to the *Glossary*, Page 643, and Hands-On skills tutorials as needed.

## **New MIS user**

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

- Read *Quick Start*, Page 18.
- Read *What's New*, Page 25.
- Read *Getting to Know Seagate Crystal Reports*, Page 51.
- Read *Multiple Section Reports*, Page 213.
- Read *Advanced Formulas*, Page 345.
- Read *Advanced Totalling*, Page 377.
- Read *Parameter Fields*, Page 391.
- Scan *Subreports*, Page 429.
- Read *Performance considerations for all reports*, Page 528.
- Read *Report Processing Model*, Page 629.
- Review *Power Formulas* in online Help.
- Refer to the *Glossary*, Page 643, and Hands-On skills

tutorials as needed.

## **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 25.
- Read *Getting to Know Seagate Crystal Reports*, Page 51.
- Read *Multiple Section Reports*, Page 213.
- Scan *Sorting, Grouping, and Totalling*, Page 271.
- Read *Advanced Formulas*, Page 345.
- Read *Advanced Totalling*, Page 377.
- Read *Parameter Fields*, Page 391.
- Read *Subreports*, Page 429.
- Read *Dictionaries*, Page 491.
- Read *Performance considerations for all reports*, Page 528.
- Read *Data Sources*, Page 583.
- Read *Report Processing Model*, Page 629.

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# 4

## Getting to Know Seagate Crystal Reports

### What you will find in this chapter...

*The application window, Page 52*

*Menu bar, Page 52*

*Standard toolbar, Page 55*

*Supplementary toolbar, Page 57*

*Format bar, Page 59*

*Status bar, Page 60*

*Shortcut menus, Page 62*

*Cursors, Page 64*

*Design Tab, Page 66*

*Preview Tab, Page 72*

*Other fundamentals, Page 76*

*HANDS-ON (Report Design Environment), Page 80*

*HANDS-ON (Sections and Areas), Page 89*

## The application window

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The application window is clear and easy to understand.



- The title bar identifies the current report and it contains the standard Windows buttons.
- The menu bar appears just below the title bar.
- The standard toolbar appears just below the menu bar.
- The format bar appears just below the standard toolbar.
- The supplementary toolbar appears just above the status bar.
- The status bar appears at the bottom of the window.

## Menu bar

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The menu bar is the command center of Seagate Crystal Reports. Each option on the menu bar activates a drop-down menu of commands that you can use to create, modify, print, and save your reports.

The menu bar contains the following menus:

- File menu
- Edit menu
- View menu
- Insert menu
- Format menu
- Database menu
- Report menu
- Window menu
- Help menu

## File menu

The File menu includes commands you can use to open, close, and save files, to save files under a different file name, and create new reports, mailing labels, and cross-tabs, as well as several other kinds of reports. It also includes a command you can use to exit the program. Additionally it contains commands that enable you to preview your report before printing, to export your report to a disk file in a variety of formats, to send your report to a printer, to change page margins, and to select a printer if you want the report to print on something other than the default printer. You can also add summary information to help you identify your report as well as change the default settings so 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 you can use to modify aspects of your report. It includes commands to undo and redo actions, to 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 Edit menu commands to show, hide, move, merge, or delete report sections, delete groups, and to convert static OLE objects to editable bitmaps. Search for *Edit menu commands* in online Help.

## View menu

The View menu includes commands you can use to modify the user interface of the program. View menu commands enable you to show or hide the standard and supplementary toolbars, format bar, and status bar, to zoom in and out on your report to view it at different magnifications, and to turn guidelines, the grid, and the rulers on and off. You can also toggle the Group Tree view on and off from the View menu. Search for *View menu commands* in online Help.

## Insert menu

The Insert menu includes commands you can use to insert database fields, text objects, formula fields, parameter fields, cross-tab objects, subtotals, grand totals, summaries (counts, averages, etc.), groups, sections, and several special fields such as print date and page number. The Insert menu also includes commands that enable you to insert group name fields, subreports, graphics, lines, boxes, graphs, and OLE objects into your report. Search for *Insert menu commands* in online Help.

## Format menu

The Format menu includes commands you can use to change the look of the elements in your 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 graphs as well as formatting and pivoting cross-tabs. Finally, using Format menu commands, you can have the program automatically arrange report objects, apply professionally designed styles to the entire report, and move objects in a stack of objects forward and backward. Search for *Format menu commands* in online Help.

## Database menu

The Database menu includes commands you can use to add and delete tables for use with your 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 your report, to remove tables from a report and to adapt your 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 you can use to select the records or groups to be included in your 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 your report. It has commands for updating the data used in a report and for gathering all the files you need for distributing your reports. You can also use one of the Report menu commands to create an executable version of your report that you can share with others that do not have Seagate Crystal Reports. Search for *Report menu commands* in online Help.

## Window menu

The Window menu includes commands you can use to rearrange icons and windows. It also lists the report windows that are open and includes a command that lets you close all report windows at once, if desired. Search for *Window menu commands* in online Help.

## Help menu

The Help menu includes commands you can use to access Seagate Crystal Reports online Help index and 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 final command, gives you information about the version of the program you are using. Search for *Help menu commands* in online Help.

## Standard toolbar

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Seagate Crystal Reports groups several commonly used commands on the standard toolbar that 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 in the window or set it up as a floating palette. See How to move and resize toolbars and the format bar, Page 80.*

If you are not sure what a button on the standard toolbar does, place the pointer over the button and hold it there. A Tool Tip will appear, giving you a quick description of the button.

The buttons on the standard toolbar perform the following functions:



Create a new report.



Open an existing report.



Save your report.



Send your report to a printer.



Preview your report in the Preview Tab.



Export your report to a file or e-mail.



Refresh report data.



Cut selected object/data to the Clipboard.



Copy the selected object/data to the Clipboard.



Paste object/data from Clipboard to the report.



Undo an action.





Redo an action.



Insert database, formula, parameter, and group name fields.



Insert a text object.



Insert a summary.



Activate the Report Expert.



Format any section of your report.



Set record/group selection criteria.



Set record sort order.



Insert a graph/chart.



Search for a specific record.



Sets the magnification factor for viewing your report.



Context-sensitive Help.

## Supplementary toolbar

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The supplementary toolbar gives you 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 of the format bar.



Insert a line.



Insert a box.



Insert a picture.



Arrange report elements automatically to best fit page.



Activate Style Expert to apply a professionally-designed style to your report.



Insert a group.



Insert a subreport.



Insert a cross-tab object.



Find Top/Bottom N records or sort on summary information.



Activate the Format Editor to modify object properties.



Compile your report.



Activate the Report Distribution Expert.



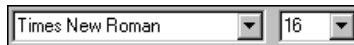
Define links between tables.

## Format bar

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

Two drop-down boxes appear at the left side of the format bar.



Use these drop-down boxes for selecting new fonts and font sizes if you want to use something other than the default.

The buttons on the format bar perform the following functions:



Increase the font size of the selected data one point each time you click the button.



Decrease the font size of the selected data one point each time you click the button.



Change the selected data to boldface.



Change the selected data to italic face.



Change the selected data to be underlined.



Align the selected data flush left.



Center the selected data.



Align the selected data flush right.



When a number field is selected, places a currency symbol with the number.<sup>1</sup>



When a number field is selected, places a thousands separator in the number.<sup>1</sup>



When a number field is selected, places a percentage sign with the number.<sup>1</sup>



When a number field is selected, adds one decimal place to the number.<sup>1</sup>



When a number field is selected, subtracts one decimal place from the number.<sup>1</sup>



Toggles the Group Tree's Smart Navigation on/off in the Preview Tab. See *Group Tree view*, Page 74.



Toggles the supplementary toolbar on/off. See *Supplementary toolbar*, Page 57.

<sup>1</sup>The program refers to your setting in the International section of the Control Panel (Windows 3.x, and Windows NT 3.51) or the Regional Settings section of the Control Panel (Windows 95 and Win NT 4.0).

## Status bar

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

### TOOLBARS/FORMAT BAR FUNCTIONS

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

### MENU COMMAND DESCRIPTIONS

When you highlight a menu command, 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.

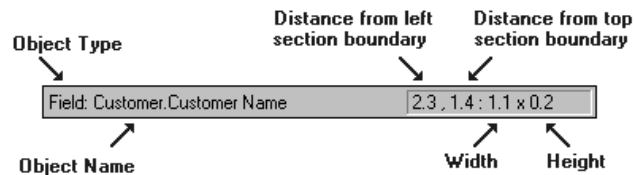
To identify objects, the status bar displays:

- 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, and
- the parameter field name for a parameter 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.

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

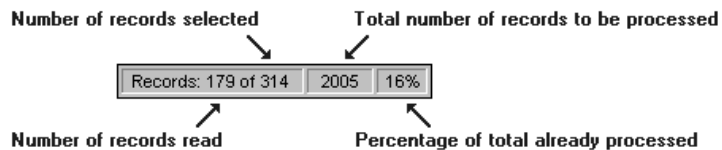


## DATA RETRIEVAL INFORMATION

When you preview your 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 defines the number of records selected out of the number of records read.
2. The second number defines the number of records read.
  - If your report has a selection formula, the records selected figure will typically be smaller than the records read figure.

- If your report 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 your report is based on a single table, the figure that is displayed should remain constant.
    - If your report is based on linked tables, and if any one-to-many situations exist, the figure will typically increase as the program identifies all of 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

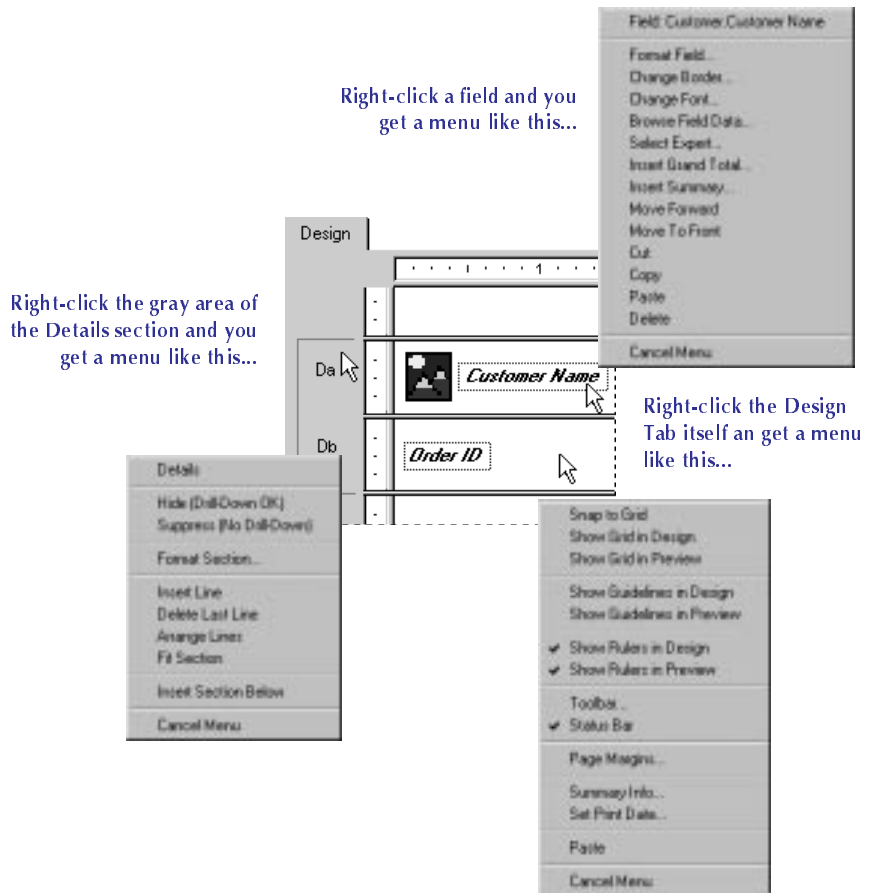
---

When you are working in either the Design or Preview Tab, you can speed up your work considerably 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.

The shortcut menus are valuable 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 make it easier to pick the right one.
- spotlight the things you can do with an element making the program more intuitive to use.



## Cursors

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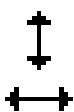
Seagate Crystal Reports uses a number of different cursors at different points in its operation:



The Arrow cursor is the primary cursor. It is 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 is the cursor that appears whenever the program is processing a command. Whenever the hourglass is visible, you can not choose any commands or proceed further with your report.



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



The Move cursor is available whenever you are moving a single object to another location in your report.



The single-unit Drag and Drop cursor is available whenever you are dragging a single item over an area where it can be dropped.



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



The Stop cursor. It appears whenever the item you are dragging is over an area in which it can not be dropped. For example, the cursor appears when you drag a cross-tab object into a section where it can not be placed.



The Copy cursor is available whenever you are copying a single item.





The Section Sizing cursor. The Arrow cursor changes to the section sizing cursor whenever it is positioned over the boundary of any of the report sections. Using this cursor you can drag a section boundary line to expand or reduce the size of a section.



The Section Splitting cursor. It appears when you position the pointer over the left boundary of a report section. When you click, a horizontal line appears at your position where you want to split the section.



The Link cursor. It appears when you are manually creating links 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 graph in the Preview Tab. When you double-click a summary value or graph element with the Drill Down cursor, the program displays the details behind the summary.



The Pencil cursor is a drawing cursor. It appears whenever you insert boxes and lines. 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 is available by clicking the Help button on the Standard Toolbar. Use the Help cursor to access the online Help system. Simply click the report element, dialog box, etc., with the cursor 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 cursor. It appears as an Intellimouse feature for scrolling through your report in any direction in the Preview Tab.



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

-  The Pan cursor. It appears as an Intellimouse feature for panning right/left in your report in the Preview Tab.
-  The North panning cursor. It appears as an Intellimouse feature for panning North (up) in your document.
-  The South panning cursor. It appears as an Intellimouse feature for panning South (down) in your document.
-  The East panning cursor. It appears as an Intellimouse feature for panning East (to the right) in your document.
-  The West panning cursor. It appears as an Intellimouse feature for panning West (to the left) in your document.
-  The Northeast panning cursor. It appears as an Intellimouse feature for panning Northeast (up and to the right) in your document.
-  The Northwest panning cursor. It appears as an Intellimouse feature for panning Northwest (up and to the left) in your document.
-  The Southeast panning cursor. It appears as an Intellimouse feature for panning Southeast (down and to the right) in your document.
-  The Southwest panning cursor. It appears as an Intellimouse feature for panning Southwest (down and to the left) in your document.

## Design Tab

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



The Design Tab is the place you do most of your initial work when creating a report. It designates and labels the various sections of your report. You can place objects in these sections where you want them to appear, specify your sorting, grouping, and totalling needs, do your initial formatting, and so forth. See *Area printing characteristics*, Page 69.

The Design Tab provides the most efficient environment for designing your report because you work in the tab with data representations, not data itself. When you place a field 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 it takes to gather the data.

The report you create in the Design Tab is a kind of virtual report; it has the structure and the 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.

- **Report Header**

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

- **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. You can also use this section to display field titles above the fields on your report.

- **Details**

This section is used for the body of the report. The bulk of your report data will generally appear in this section. This section will be printed once per record.

- **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 graphs and cross-tabs that include data for the entire report.

- **Page Footer**

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

If you add a group, a summary, or a subtotal to your report, the program creates two additional sections:

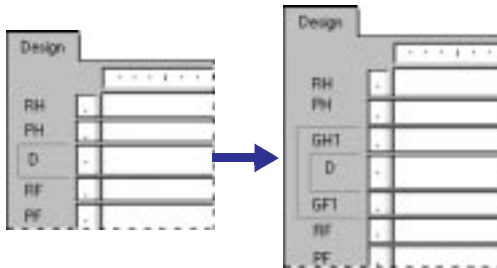
- **Group Header**

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

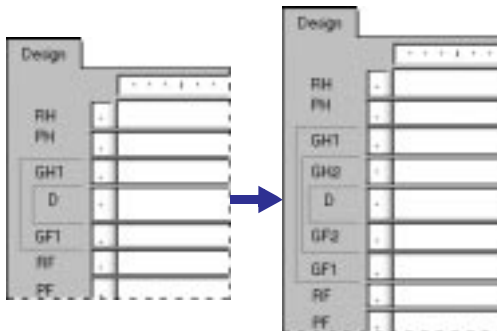
- **Group Footer**

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

When you add a group, a summary, or a subtotal, 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

Your 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 graphs, 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.
  - Graphs 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.
  - You can not place graphs or cross-tabs 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.
  - Graphs 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.
  - You can not place graphs or cross-tabs 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.
  - Graphs 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.
  - Graphs 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.
  - You can not place graphs or cross-tabs in this area.
  - Formulas placed in this area are evaluated once per page, at the beginning of each new page.

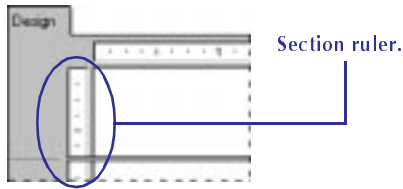
## Identifying and working with areas and sections

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 File Options dialog box. Search for File 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 82.



Whenever you add a new section, the program creates a ruler for that section. See *How to add, delete, move, and merge sections*, Page 89.

## Other Design Tab capabilities

There are several other capabilities built into the Design Tab.

- You can resize a section by dragging its boundary. See *How to split and resize sections*, Page 92.
- You can split a section (create two sections from one) by clicking its left boundary. See *How to split and resize sections*, Page 92.
- You can add horizontal and vertical guidelines by clicking the rulers. See *How to add, delete, and move guidelines*, Page 82.
- You can zoom in and out on your report at any magnification from 25% to 400% of the original size. See *How to zoom your report in and out*, Page 86.

## Preview Tab

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When you want to preview your report before printing, 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:

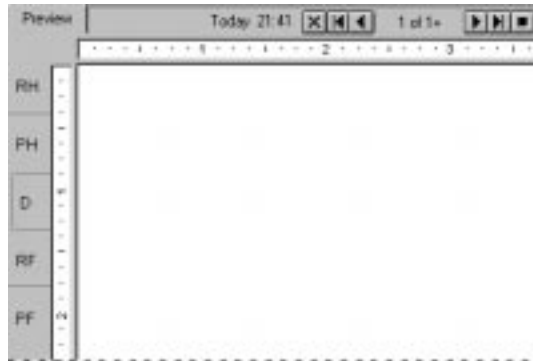


- The first time the Preview Tab is used, it retrieves data from your underlying data source(s) and saves it with the report (unless you have set up the program not to save data).
- From that point on, the program uses the saved data whenever you preview the report unless you specifically refresh it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

Seagate Crystal Reports provides two views for previewing your 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 backwards and forward through the report a 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



You can toggle the Group Tree view on/off using the TOGGLE GROUP TREE button on the format bar.

The Group Tree view presents a split screen.

- The right pane of the screen 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 format bar remain active, giving you essentially the same functionality you have when working with a report in the Design Tab. However, when you are making many changes, it is quicker to make the changes in the Design Tab.

- The Design Tab and Preview Tab are tied together internally. Any changes you make in one are reflected in the other.

- The Preview Tab has a single vertical ruler at the left of the tab instead of the individual section rulers like 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 appeared 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 61*), the Data Age indicator (see *THE DATA AGE INDICATOR, Page 73*), and the Page Forward/ Page Back controls (see *Preview Tab, Page 72*), 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 than 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 from the field.
- Likewise, when you select a summary value, you are actually selecting all of 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 obvious appearance differences, 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.

## Other fundamentals

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The Seagate Crystal Reports reporting environment is extremely flexible.

- You can turn on grid snap, set the grid to a maximum of up to 1", 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 86).
- You can also work without a grid, placing your objects wherever you want them in your report (see *Free form*, Page 77 and *Free form with guidelines*, Page 77).
- Finally, you can use guidelines if you wish to align and resize objects with precision (see *How to move and position objects using guidelines*, Page 83).

Set up your 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 on the Layout Tab in the File Options dialog box. By default, the grid is not active. See *How to turn the grid on/off*, Page 86.

## Free form

Unlike earlier versions of Seagate Crystal Reports, in this version you can work 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 graph and cross-tab objects in the Page Header, Page Footer, or Details sections. See *Area printing characteristics*, Page 69.

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

## Free form with guidelines

You may want to work in a free form environment yet still have 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 to or attaches itself to the guideline.

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

Using guidelines in a free form environment gives you flexibility with control. See *How to add, delete, and move guidelines*, Page 82, and *How to move and position objects using guidelines*, Page 83.

## Sections and objects

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

- **Field objects**  
Fields from database tables and from the result sets returned by formulas, parameter, group name, queries, and stored procedures. See *How to insert database fields*, Page 118.
- **Text objects**  
Characters, words, even entire documents. See *How to insert text objects*, Page 120.

- **Picture objects**  
Bitmaps - \*.bmp, \*.pcx, \*.tif, \*.tga, \*.jpeg. See *How to insert a picture*, Page 121.
- **Graph/chart objects**  
Graphs that display summarized data. See *Graphing*, Page 405.
- **Subreport objects**  
Reports within reports, freestanding or bound to the data in the primary report. See *How to insert a subreport*, Page 434.
- **Cross-tab objects**  
Spreadsheet-like reports that help identify trends. See *Cross-Tab Objects*, Page 445.
- **OLE objects**  
Pictures, spreadsheets, text, and other objects created in OLE server applications. See *OLE Objects Overview*, Page 416.

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 your report.

You can set attribute properties for objects, conditional properties, or a combination of the two.

- You set fixed properties using dialog box options.
- You set conditional properties using special formulas.

See *Conditional formatting*, Page 235, and *Absolute formatting*, Page 233.

You can insert most objects in most report sections. But the program restricts you from placing 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 69, for a summary of section/object restrictions.

**NOTE:** See *How to make an object underlay a following section(s)*, Page 124, 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. For those objects that the program allows in a section, just because you can put it in that section it does not necessarily mean that it makes sense to put it there. That is a different situation that requires some judgement on your part. For example, if you put a picture object:

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

Based on what you are trying to accomplish in the report, it clearly makes sense to put 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.

You can also set fixed and conditional properties for sections just as you can for objects. See *Conditional formatting*, Page 235.

## Underlaying objects

By default, when you place an object into 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 you place an object in a section that you have set to underlay the following sections:

- the object still prints when the section it is placed in 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 it appears one time in the Details section beside a number of details (for example, a graph that compares sales figures by region along side 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. See *How to make an object underlay a following section(s)*, Page 124.

## HANDS-ON (Report Design Environment)

### How to move and resize toolbars and the format bar

---

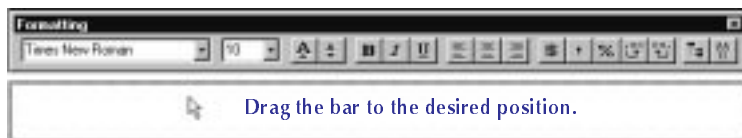


The 32-bit version of Seagate Crystal Reports includes movable, resizeable standard and supplementary toolbars and format bar.

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

#### Moving

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

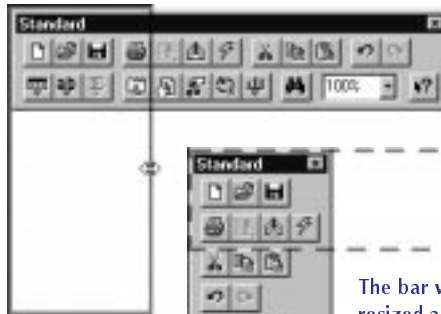


#### Resizing

To resize the bars, position the pointer over an edge or 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...*



The bar will be resized as specified.

You can toggle the standard toolbar, supplementary toolbar, and format bar on and off using the Toolbars dialog box.



A check mark indicates that the bar is visible.

### ***Related Topics***

*Standard toolbar, Page 55*

*Format bar, Page 59*

## 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. You can toggle the visibility of the guidelines on and off in two ways:

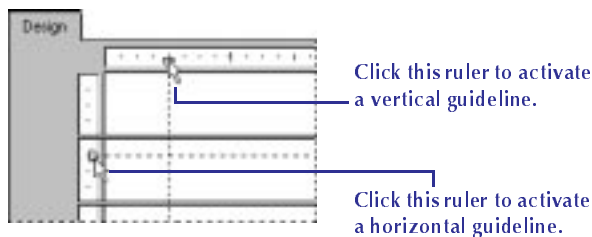
1. Using the two commands on the View menu, **GUIDELINES IN DESIGN** and **GUIDELINES IN PREVIEW**. Search for *Guidelines in Design command* and *Guidelines in Preview command* in Seagate Crystal Reports online Help.
2. Using the two options, *Show Guidelines in Design* and *Show Guidelines in Preview*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

Seagate Crystal Reports inserts guidelines automatically in some situations:

- Whenever you insert a field or formula field in your report, the program automatically creates a guideline at the left edge of the field frame and snaps the field and field title to it.
- If you summarize a field, 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 the **ARRANGE LINES** command, the program automatically creates one or more horizontal guidelines in the section and snaps the fields to them.

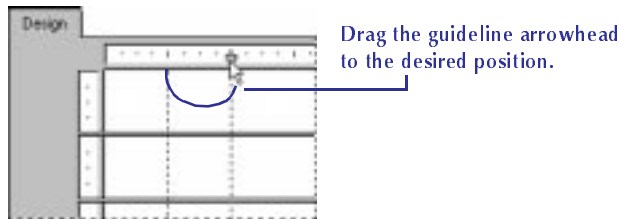
### Adding guidelines

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



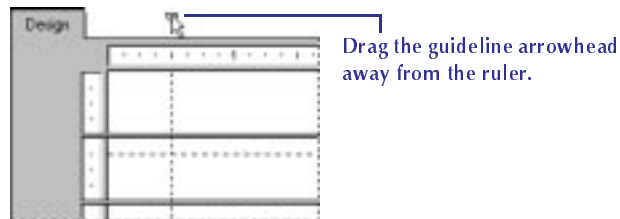
## Moving guidelines

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 *File Options* dialog box. Search for *File Options* dialog box in *Seagate Crystal Reports online Help*.

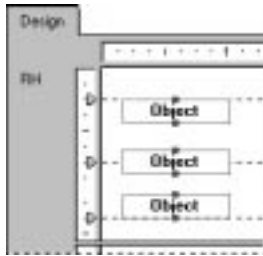
## How to move and position objects using guidelines

---

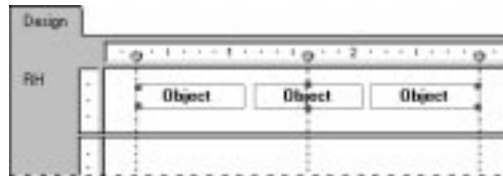
### Positioning objects with guidelines

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

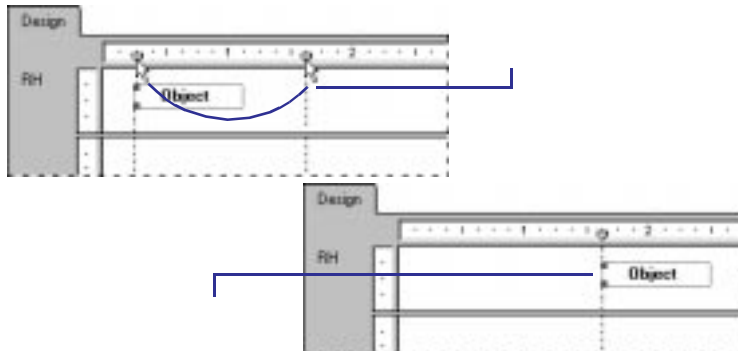
An object can snap to a horizontal guideline on its top, bottom, or horizontal midline (the line that bisects the object horizontally).



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



When a guideline has its snap property toggled on and you move the guideline, you move all objects that are snapped to the guideline.



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

## Resizing objects using guidelines

When you snap one or more objects to guidelines on two sides (top and bottom, or right and left), you can resize the object(s) 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.

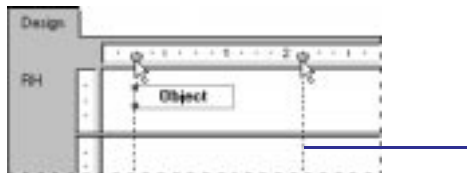
This is a two step process.

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).

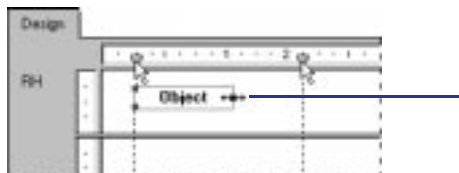
## Snapping objects with two guidelines

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 size you want them, drag either 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 File Options dialog box.

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



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

## How to zoom your report in and out

---

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



To zoom your report in or out, set the zoom level you want using the **MAGNIFICATION FACTOR** drop-down box found on the standard toolbar.



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 you click the button, it reverses the most recent change you made to your report. Each additional time you click the button 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 you have made a change that can't 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

---

You can drill down on your data using the drill down cursor (to show the data behind individual groups). See *Sorting, Grouping, and Totalling*, Page 271.

### Drill down cursor



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 73 and *Group Tree view*, Page 74). When you position the cursor over any summary value that you can drill down on, the program displays a drill down cursor.

If you 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 64.

- 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.



# HANDS-ON (Sections and Areas)

## How to add, delete, move, and merge sections

---

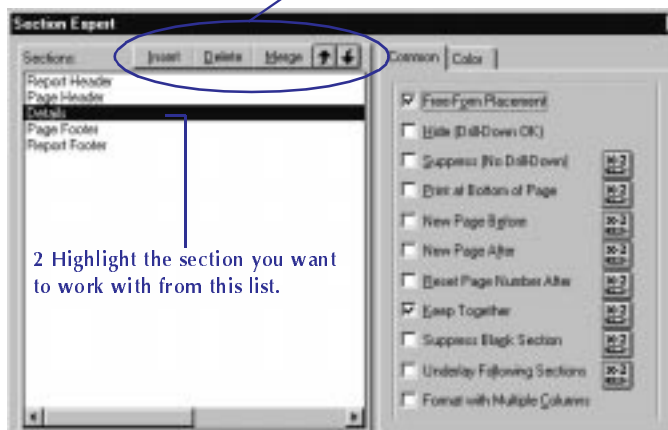
The Design Tab opens originally with a standard set of report sections, each in a standard size (see *Design Tab Areas, Page 67*). You can not delete any of these original sections but you can add to them. Once you have added sections, you can delete them, move them in relation to other similar sections, or merge related sections together.

While there are different ways to do this, an easy way is using 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.

	Click Insert to insert a new section.		Click Merge to merge two sections.
	Click Delete to delete an existing section.		Click the arrow buttons to move a section up or down in an area.

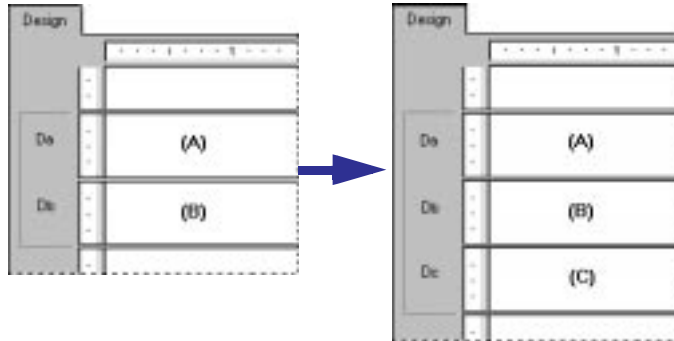


- 2 Highlight the section you want to work with from this list.

I

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

#### INSERT SECTION BELOW

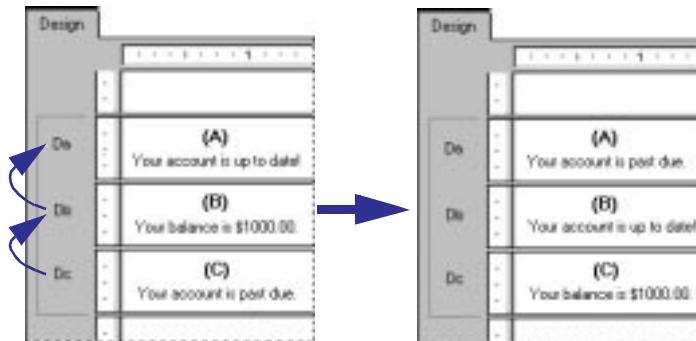


D

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

M

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



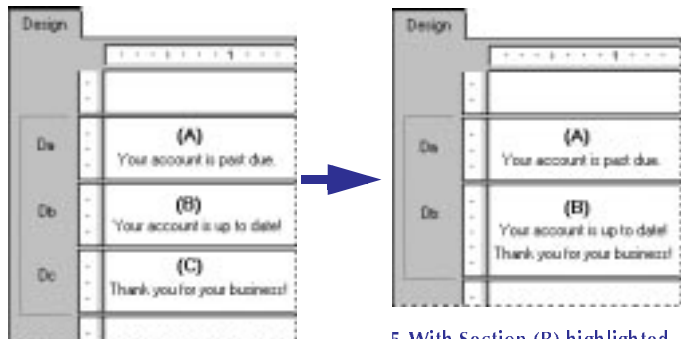
3 With Section (C) highlighted, click the up arrow twice.

The data originally in Section (C) is moved to Section (A). The data in the other sections is moved down.

## M

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 Click the *Merge* button. The program combines both sections into a single section.
- 4 Rearrange the objects as needed.



5 With Section (B) highlighted, click the Merge button and Section (C) will be merged with Section (B) to form one section.

## How to split and resize sections

---

You can split a section into two or more sections or resize sections easily in the Design Tab.

- S**
- 1 Move the pointer over the left boundary of the section you want to split.
  - 2 When the pointer becomes the section splitting cursor, click the boundary. See *Cursors*, Page 64.
  - 3 When a horizontal line appears, drag it up or down to split the section the way you want it.

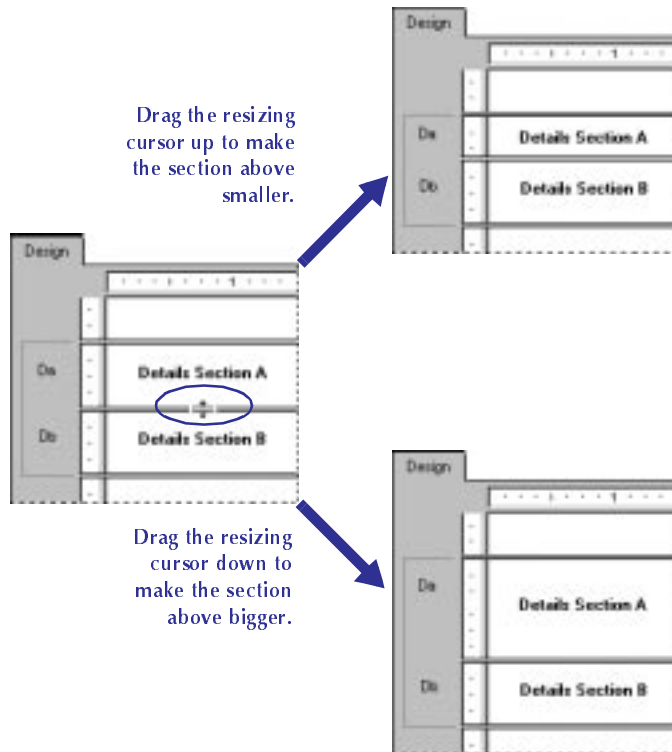


4 When the section splitting cursor appears, drag the horizontal line to the desired position.

The section will split at the line.

- R**
- 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 the FIT SECTION command from the shortcut menu that appears. 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:

- when you place an object and the object is bigger (vertically) than the section you put it in, and
- 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

## Reporting 101

### What you will find in this chapter...

*Basic report design, Page 96*

*How to design a prototype, Page 104*

*Concepts in reporting, Page 105*

*Beyond basic reports, Page 113*

*HANDS-ON (Report Creation and Design), Page 113*

*HANDS-ON (Finishing Your Report), Page 130*

## Basic report design

---

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

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

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

### Deciding on the content of your report

Before you do anything else, you should outline the information you want your 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 types 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 that information come from?



- If the information exists in a database table, what types of fields is the data stored in: number, text, etc.?
- What specific data do you want to appear in the body of the report?
  - Where will that data come from?
  - Does that data exist in data fields or does it need to be calculated from data field values?
  - What types of fields is the data stored in: number, text, etc.?
  - Do you want your data sorted?
    - How?
  - Do you want the data broken into groups?
    - What kind of groups?
  - Do you want your 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?
- What other information do you want 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 so they can make effective decisions. For a report to be effective, it has to present the right 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 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 your 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, 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 his/her individual sales performance and to compare that performance to that of other representatives in the region.
- The regional sales manager will use the report to evaluate the representatives in his/her region and to compare the region's performance to that of other regions.
- The national sales manager will use the report to evaluate the performance of his/her regional managers and to 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 of the users 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 your report. You may decide to change it later, but at least you will have a title to use when creating your prototype report.

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

Do you know the type of database you are reporting from? Whether you will 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 your data and to set you up with access to that database if necessary. See *Data Sources*, Page 583.

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

Your MIS professional, database administrator, or co-workers will have to help you become familiar with your 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 that 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")? See *How to insert a page n of N field*, Page 119.

## Footer data sources

Where will the information come from?

As with Report Header data, the information for your 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 information exists in a database table, what types of fields is the data stored in: number, text, etc.?

## Report body data

What specific data do you want to appear in the body of the report?

When you think of a report, it is probably the body of the report that you think of. The body should contain all the data that you need 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 that 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 to create your reports, so you have a great deal of flexibility in your work.

- Much of the data in a typical report will be taken directly from data fields. Which data fields will you be using 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 (sales commission, for example, 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 *Formulas 101, Page 321*.

## 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 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 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 specified 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. Using Seagate Crystal Reports you can select records based on simple date ranges or comparisons, or you can create complex formulas to identify the records to be included. Take a few minutes to determine the records needed for your report and list the criteria to be used for selecting those records. See *Record and Group Selection*, Page 249.

## Groups

Do you want your data organized into groups? How? By customer? By date? Or by other criteria? Seagate Crystal Reports provides several options for grouping data in your report. See *How to group data*, Page 285.

## 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 289, and *How to subtotal grouped data*, Page 291.

## Group value positions

Where do you want the group values to 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 gives you 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 your report?

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

## Flags

What information, if any, do you want flagged on the report?

You may want to call attention to some data by flagging it on your 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 defined period. So, if you want any information flagged, identify the information and the conditions that will trigger the flagging. See *How to flag values that meet certain conditions*, Page 246.

## 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 so that it really stands out?

Seagate Crystal Reports gives you the opportunity to underline report elements, or to 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 your 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 231.

## Sorting

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

Seagate Crystal Reports gives you both alternatives. See *Sorting, Grouping, and Totalling*, Page 271.

## Developing a prototype on paper

Graphic designers generally begin their work 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 your reports. See *How to design a prototype*, Page 104.

While a paper prototype is useful regardless of your 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 instead of trying to design and learn at the same time.

## How to design a prototype

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- Get paper of the size you will be using for your finished report.
- Position your title and other descriptive header information, using boxes or lines to represent report elements.
- Position your footer information.
- Review the page for balance.
- Look at the information you intend to include in the body of your report.
  - Count the number of fields you will be using and estimate the appropriate spacing between fields.
  - Use rectangles to pencil in the fields using your 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.
- Use small boxes to indicate group values and totals.
- Place some random flags in the column where you want the flags to appear.



- Darken any elements you want highlighted so they stand out from the rest of your prototype.
- Review your finished product for look and balance, and make changes as needed.

## Concepts in reporting

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The purpose of this section is to give you a conceptual understanding of the tasks necessary to create a fairly standard report such as the one created in *Tutorial - Customer List, Page 165*. Each topic is discussed in relation to the Tutorial; please refer to *Tutorial - Customer List, Page 165*, throughout for an illustration of these concepts.

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

### **Report Expert, Another Report, or Custom Report?**

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

1. using a Report Expert,
2. using Another Report as a template, or
3. creating a Custom Report from scratch.

You will probably use all options at some point in time.

### **REPORT EXPERT**

The Report Experts help you 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 your reports step-by-step.

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

## ANOTHER REPORT

If you want to build a new report based upon one that already exists, you can use another report as a template to base your report on. The program will make a duplicate of the original report, which you can modify however you please to create your new report. Use this option whenever you think templates can save you time. Templates are useful:

- when you need to create a new report with a different grouping or different record selection than that of an existing report,
- when you need to create a series of reports, each a little different than the last,
- when you need to reconstruct a report based on an earlier time period using the same report structure used today, or
- when you need to 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.

## CUSTOM REPORT

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

The *Custom* option was chosen for the *Tutorial - Customer List, Page 165*, because creating a report from scratch most fully illustrates the basics of reporting.

## Selecting your data

The next step when creating your reports, is to select the data you want to use in your 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 113*.

Seagate Crystal Reports provides four different data types:

- data file,
- SQL/ODBC,
- dictionaries, and
- queries.

## DATA FILE

Choose the *Data File* option if you want to use any of the standard (not client-server) PC databases to report on. 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 583*.

The *Data File* option was chosen for the *Tutorial - Customer List, Page 165*, because the sample data, CRAZE.MDB, is a Microsoft Access database.

## SQL/ODBC

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

- SQL (Structured Query Language) databases are perhaps the most popular and most powerful database formats. They usually work over a client/server network architecture and they 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 545*.

- ODBC (Open Database Connectivity) 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.

See *ODBC data sources*, Page 606.

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),
- 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 you create a report using a dictionary, the only data you can use in the report is the data you access 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: You can include a subreport based on a different data source in a primary report based on a dictionary.*

*NOTE: Dictionaries are an optional metalayer. You can use Seagate Crystal Reports without ever using dictionaries.*

See *Dictionaries*, Page 491.

## QUERIES

A query is simply 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), 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 using SQL can take quite a while. Since the Query Designer eliminates the need to understand SQL, it can get you building effective queries right away.

The Query 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 Query Designer helps you 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 Query 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 Query Designer can be a powerful tool for many of your information gathering needs.

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

## Linking

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

The majority of your 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 116*, and search for *Visual Linking Topics Index* in Seagate Crystal Reports online Help.

**NOTE:** *You will never find it necessary to link tables in reports from a query because any links required by the data have already been processed.*

## Placing data on your report

Placing data on your report is a very important task. You have to know what type of data you want to place on your report and also where on your report you want to place them.

### DATABASE FIELDS

Much of the data you place on your report will be database fields, displaying data as it is stored in the database. For example, in *Tutorial - Customer List, Page 165*, the Customer Name, City and Country fields are placed on the report. Normally, you will place database fields into the Detail section, but in certain circumstances you will place them in other sections of your report. See *How to insert database fields, Page 118*.

## TEXT OBJECTS

Text objects will be used in your reports for a multitude of purposes. They are a powerful way of inserting titles; labelling summaries and other data on your report; and for easily combining database fields. For example, in the *Tutorial - Customer List, Page 165*, 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. See *How to insert text objects, Page 120*.

## 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 118*, and search for *Special Field commands* in Seagate Crystal Reports online Help.

## FORMULA FIELDS

If you want to display data that is a calculated value, you will need to create a formula field and place that formula field on your report. For example, if your database only stores the order and ship dates for orders but you need to display the number of days it takes to ship the order, you will need to create a formula field that will calculate the number of days between ordering and shipping. This is just one simple example of the use of formula fields. See *Formulas 101, Page 321*, for an introduction to formulas.

## 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 165*, you format the title, add a text object to identify the Contact Name information, and insert the company logo. See *Formatting, Page 231*.

## Record selection

Record selection, the task of paring down the data in your reports 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

## Grouping, sorting, and summarizing your data

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 165*, has information from both United States and International customers. Record selection is used to create a report that lists only those customers in the United States. See *Record and Group Selection, Page 249*.

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

### GROUPING RECORDS

To organize your data, you may want to group related data together. For example, in the *Tutorial - Customer List, Page 165*, after grouping the Customer List by region, you divide the list into region groups. That way, a sales manager for the California region could quickly locate the California group and see the customers within their region only. See *How to group data, Page 285*.

### 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 165*, 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 281*, and *How to sort records within groups, Page 287*.

### SUMMARIES, SUBTOTALS, AND GRAND TOTALS

Many of your reports will use some sort of totalling. 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).

See *How to summarize grouped data*, Page 289, and *How to subtotal grouped data*, Page 291.

## Beyond basic reports

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

- graphs (see *Graphing*, Page 405),
- OLE objects (see *OLE*, Page 415),
- form letters (see *How to create a form letter using a text object*, Page 218),
- subreports (see *Subreports*, Page 429),
- cross-tabs (see *Cross-Tab Objects*, Page 445),
- multi-section reports (see *Multiple Section Reports*, Page 213),
- and much, much more.

## HANDS-ON (Report Creation and Design)

### How to select data and begin creating a report

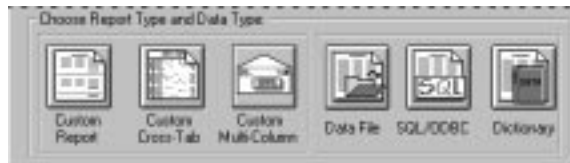
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You can use Experts to help you create reports as quickly as possible. When you click the NEW REPORT button on the standard toolbar, the Report Gallery appears. In the Report Gallery you will find a series of buttons representing the different types 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.
- If you want 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 your new report. The program will make a duplicate of that original report, which you can modify however you please.
- If you want to build a report from scratch, click the *Custom* button. Several Report Type and Data Type icons will appear at the bottom of the Report Gallery. Click the buttons appropriate to your needs.



The program will open a dialog box that enables 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. For information on creating reports from another report, see *ANOTHER REPORT, Page 106*, and search for *Report Templates* in Seagate Crystal Reports online Help and *Sample Reports* in Sample Reports online Help.

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

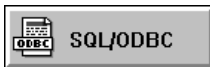


1 Using the File Name and Directories list boxes, select the desired file.



2 Click OK to add the file to your report.

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



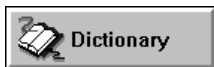
1 First, choose the Server Type.

2 Then, using the SQL Tables and SQL Databases list boxes, select the desired table and click OK.



3 Click done once you have added all you want.

If you choose  
Dictionary as your  
data source...



1 Using the File Name and Directories  
list boxes, select the desired file.



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

## Related Topics

*Data Sources, Page 583*

*How to select a dictionary for a report, Page 510*

## How to add and link multiple tables

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After you have selected a database table to begin working on your report, you may need to select a second table and then link the tables so the records in each table match up. For example, if you are using a Customers table and an Orders table for your 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.

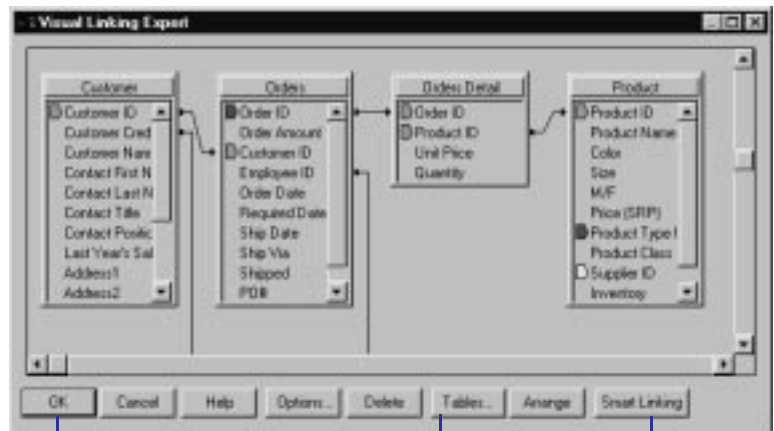
- 1 Choose the ADD DATABASE TO REPORT command from the Database menu. The Choose Database File dialog box appears.
- 2 Using the *Directories*, *Drives*, and *File Name* boxes, select the new database that you want to use in the report and click *OK* when finished. The Visual Linking Expert appears and 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 File Options dialog box, you will not have to

*manually create links between the tables. See [Linking tables](#), Page 520, and search for [File Options dialog box](#) in [Seagate Crystal Reports online Help](#).*

**NOTE:** *If your 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.



Click OK when finished.

To specify the tables, click the Tables button.

To link databases automatically, click the Smart Linking button.

**NOTE:** *When manually creating links, the field you are linking “to” field must be an indexed field. For more information on indexed fields and tables, see [Indexed tables](#), Page 518.*

The Visual Linking Expert closes, and you are returned to your report. The linked databases are now available to use. 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 513*

*[SQL join types \(ODBC data sources\)](#), Page 537*

## How to insert database fields

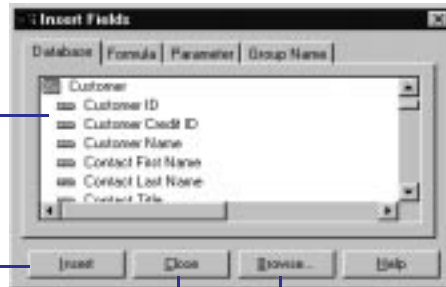
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1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears with the Database Field Tab active listing all of the fields in the chosen database(s).

2 Click the field you want to appear in your report.

3 Click the Insert button to place it in your report.



To speed the report building process, this dialog box remains on screen until you click the Close button. You can move the dialog box wherever you wish.

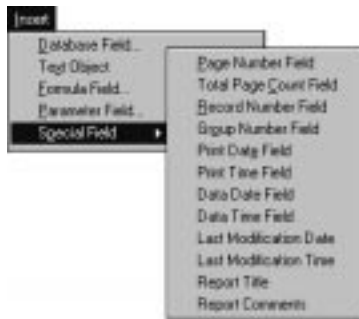
4 Click the Browse button to review the values in the selected field.

## How to insert special fields

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

To insert special fields, choose the SPECIAL FIELD command from the Insert menu. A submenu appears with the special fields available for use in your report. Search for *Special Field commands* in Seagate Crystal Reports online Help.



Choose a command to insert the desired special field.

Each special field is inserted into your report as an object. An object frame appears that you can place into the desired position on your report.



**NOTE:** If you want to change the formatting of any of the inserted objects, right-click the object and click the OBJECT PROPERTIES button on the supplementary toolbar. The Format Editor appears where you can make the desired changes. See *Formatting*, Page 231.

## How to insert a page n of N field

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You can use special fields and text objects to create a Page n of N field where *n* is the current page number and *N* is the total number of pages in the report.

- 1 Insert a text object where you want the field to appear in the Page Header or Page Footer section of your report. See *How to insert text objects*, Page 120.
- 2 Type in the word “Page” followed by a space.

**NOTE:** The text object must be in edit mode for you to be able to enter text. See *How to work with text objects*, Page 216, for more information on the text object edit mode.

- 3 Insert a Page Number field in the text object using the PAGE NUMBER command on the Insert | Special Field menu. (Search for *Page Number command* in Seagate Crystal Reports online Help.)
- 4 Type in a space, the word “of” and another space.

- 5 Insert a Total Page Count field using the TOTAL PAGE COUNT command on the Insert | Special Field menu. (Search for *Total Page Count command* in Seagate Crystal Reports online Help.)

Now, when you print the report the program will print “Page n of N” for each page of your report.

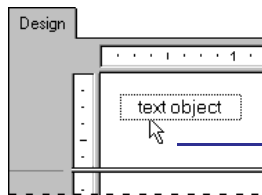
## How to insert text objects

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Click the INSERT TEXT OBJECT button on the standard toolbar.

An empty object frame appears.



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 dimension 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.

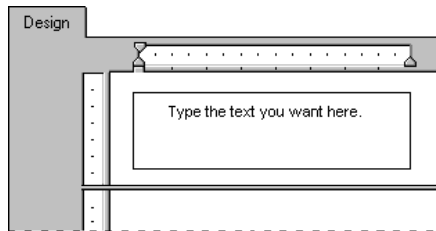


## How to use a database field in a text object

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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.

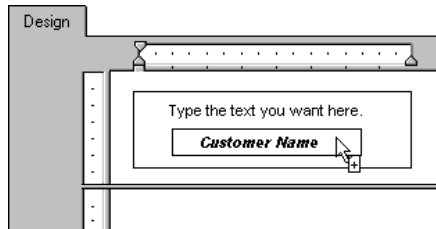
- 1 Insert a text object in your report.



- 2 Type in the text and spaces that 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 you want to insert 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 64.



- 5 Drag the object so the insertion point is located where you want the database field to appear and drop the field.

## How to insert a picture

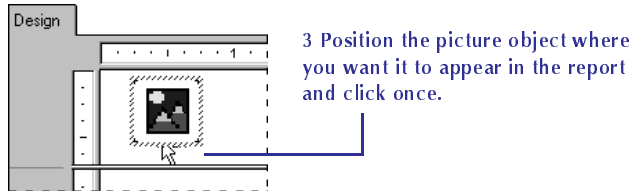
---

Often when you are developing reports you would like to include a picture. For example, you may wish to put a company logo into the header of a report.



- 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 your report. An object frame appears with your picture inside it ready to be positioned.

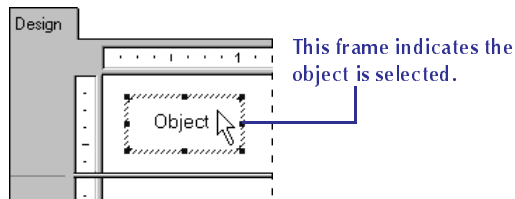


## How to select, move, and resize objects

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### Selecting objects

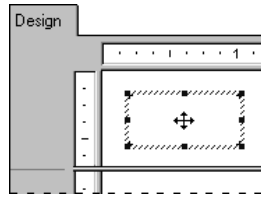
Select an object by clicking it once. An object must be selected to be able to change the font, move the object, etc. When you select an object, sizing handles appear around it.



### Moving and resizing objects

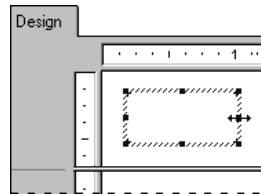
Once an object is selected, you then tell the program what you want to do with it. For example, you can move or resize an object as follows:

*To move an object...*



Press and hold the mouse button to activate the move cursor and drag the objects to the desired position.

*To resize an object...*

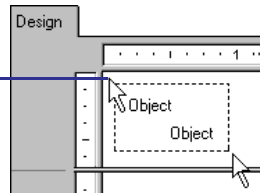


Drag the handles of the frame to change the size of the objects.

## Selecting multiple objects

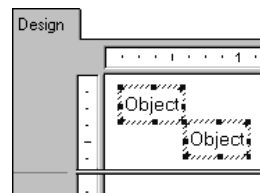
Seagate Crystal Reports allows you to select multiple objects using the marquee selection technique.

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.

3 When you release the mouse button, the rectangle disappears and object frames appear around the selected objects.



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

**NOTE:** *You can move objects over (across) other objects without affecting the placement of the objects beneath.*

You can move fields 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 232*

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

---

In this example you will make the CRAZE logo (CRAZEC.BMP) underlay multiple sections. This is a procedure similar to what you will follow when you want to insert a company watermark to serve as a background for your reports.

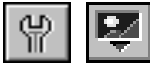
To make an object underlay a following section, you place it in the section above the section you want it to underlay. Then you toggle the *Underlay Following Sections* option on in the Section Expert for the section that you placed it in.

### **CREATING A SIMPLE REPORT**


- 1 To get started, you need to create a simple report using the Customer table in CRAZE.MDB (located in the \CRW directory 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 your report. To eliminate unnecessary objects in this example, delete the field titles that the program places in the Page Header section for each of these fields.
- 3 Break your data into region groups. To do this, choose the GROUP command from the Insert menu and choose {customer.REGION} as the sort and group by field.

Design	
RH	
PH	
GH1	Group #1 Name
D	Customer Name
GF1	Last Year's
RF	

## INSERTING A PICTURE



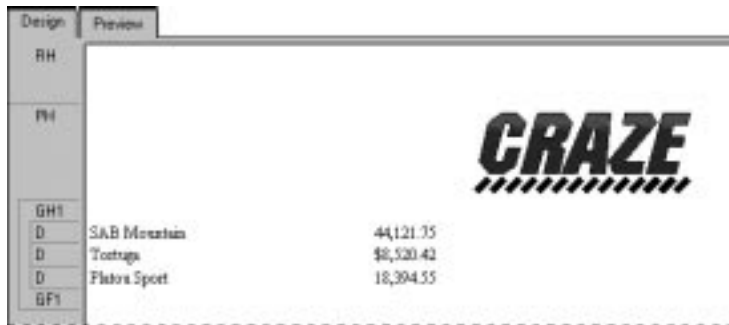
- 1 Click the PICTURE button on the supplementary toolbar.
- 2 Choose the picture file CRAZEC.BMP (located in the \CRW directory or the directory in which the program resides) and place it in the Page Header section, to the right of the body of your report.

Design	
RH	
PH	
GH1	Group #1 Name
D	Customer Name
GF1	Last Year's
RF	

**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.



- 3 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.



### UNDERLAYING THE FOLLOWING SECTION(S)



- 1 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.
- 2 Highlight the Page Header section and toggle the *Underlay Following Sections* option on. See *Types of formatting properties*, Page 233.

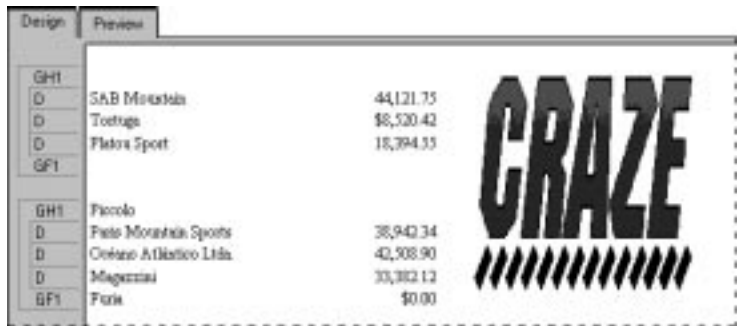


- 3 Preview your work again. Note that now the picture prints in the Group Header and Details sections, next to (instead of above) the text in the body of the report.



**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 graph or an employee picture to print beside the details that pertain to the graph or to the employee.*

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



The area the picture underlays is determined by:

- its size,
- the section you place it in originally, and
- the position in the section in which you place it.

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

## Pre-printed forms

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

- 1 Scan a form.
- 2 Place it in your report as a bitmap.
- 3 Line up the bitmap and the report using the underlay capability and the ability to move objects anywhere you want them.
- 4 Print your report and the form as a single unit, thus eliminating the need to print the forms separately.

## How to hide parts of the report

There are a number of properties you can set to keep particular parts of your 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 the section whenever you run the report. You can use the *Hide* property, for example, in a summary report where you want to display only the summaries but not the details behind the summaries. When you apply the *Hide* property to a section, the section can become visible if you drill down to see the section contents. You can only apply this property absolutely; you can not apply it conditionally with a formula.

### 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. You can apply this property absolutely, and you can apply it conditionally, as well, using a formula. A Form Letter is a great example of the *Suppress* option. You create two details sections - one to suppress if sales are over \$X and one to suppress if 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 in the section, it remains visible.

## Hiding objects

Seagate Crystal Reports has three formatting options in the Format Editor that you can use to hide individual objects.

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

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

Duplicated values are suppressed and do not print.




## 2. Suppress If Zero (Number Tab)

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
5	10.00 146.00
7	153.00 186.00


The zero values are suppressed and do not print.

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

## 3. Suppress (Common Tab)

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 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 won't 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 235.



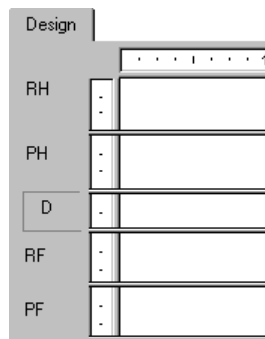
To set these properties, highlight the object, click the OBJECT PROPERTIES button on the supplementary toolbar and set the property in the Format Editor when it appears.

## HANDS-ON (Finishing Your Report)

### How to insert page headers and footers

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You can insert 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).

You can use text, fields, or formulas in these sections just as you can in the Details section.

## Related Topics

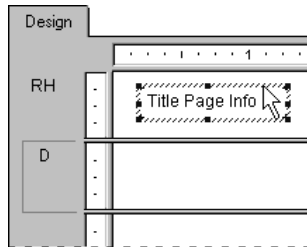
*How to create a footer that appears on all pages but the first, Page 244*

## How to add a title page to your report

---

Seagate Crystal Reports provides a quick, easy way to add a title page to your report using the REPORT TITLE command on the Insert | Special Fields menu. In order to use this command you must have a title entered in the Summary Tab of the Document Properties dialog box. See *How to add summary information to your report, Page 132*.

- 1 Choose the REPORT TITLE command from the Insert | Special Field menu. A placement frame appears when you move the cursor over your report.

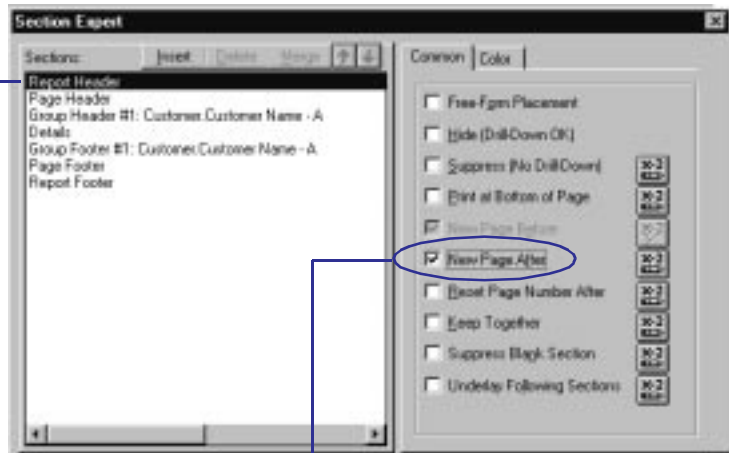


- 2 Move the placement frame to the Report Header section and click one to place the frame.



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

With the Report Header section highlighted...



... toggle the New Page After option on.

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

## How to add summary information to your report

---

There may be times when you want to include non-printing comments with your 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.

The screenshot shows a 'Document Properties' dialog box with a 'Summary' tab selected. The 'Application' is 'Crystal Reports'. The 'Author' field contains 'Report Author'. The 'Keywords' field contains 'Sales, 1995'. The 'Comments' field contains 'This report shows sales figures for 1995, includes a breakdown according to department and employee sales.' The 'Title' field contains '1995 Sales Report'. The 'Subject' field contains 'Yearly sales figures for 1995'. The 'Template' field is empty. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

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

## ***Related Topics***

*How to add a title page to your report, Page 131*

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.



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# 6

## Printing, Viewing, and Exporting

### What you will find in this chapter...

*Printing considerations, Page 136*

*Design solutions for printing/distributing, Page 137*

*Report creation checklist for distributed reports, Page 146*

*Updating printer drivers, Page 147*

*Report distribution, Page 147*

*HANDS-ON (Distributing Your Report), Page 148*

*HANDS-ON (Viewing Reports With a Web Browser), Page 155*

## Printing considerations

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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 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:

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

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

- using 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. Therefore, 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

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**NOTE:** Before reformatting your report using the techniques outlined in this section, please see *Updating printer drivers*, Page 147.

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 137,
- *Placing text-based objects*, Page 139,
- *Placing multi-lined text-based objects*, Page 141,
- *Section characteristics*, Page 142,
- *TrueType fonts*, Page 142,
- *Video resolution*, Page 143,
- *Specific margins*, Page 143,
- *Default printer*, Page 143, and
- *Free form placement*, Page 144.

### Spacing within text-based objects

While it is recommended to have the *Free Form Placement* option toggled on (see *Free form placement*, Page 144), 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
2. guidelines

## USING THE GRID

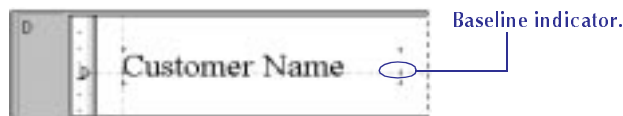
Each section of a report contains a design grid. It can be toggled on/off and set to different sizes as needed (see *How to turn the grid on/off*, Page 86). Once set, the grid remains the same size for all sections. It is measured from the upper left hand corner of each section and continues down and 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 File 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 move to 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 *Positioning objects with guidelines*, Page 83). However, the snap property of guidelines works differently for text-based objects than other objects (i.e., OLE objects). 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.



Thus, if you need to place several text objects of different font sizes on one line and have their baselines line up, you will want to 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 you have Free Form Placement 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 the 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 the average character width as provided by the font and font size selected.

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 the width as you see fit.

- For text objects, the default width is approximately 17 average character widths wide. Text objects are different in that their width will automatically expand as you enter in text and/or database fields. Again, as with all other text-based objects, the width can be resized by the user.

- For different number fields, such as 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.

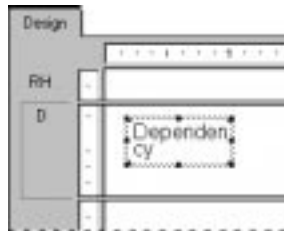
Whether the default widths are accepted or the text-based objects are resized, a problem could arise if the text inside the object prints right to the edge of the object frame. While the report may look fine on the machine it was designed on, when the report is printed using another printer driver that measures the font wider, the length of the text grows but the object frame remain 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. Using the Common Tab of the Format Editor, toggle the *Can Grow* option on. The object is 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 have spaces in them 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.*



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 where the actual text in a database field is far less than the field is formatted to be.

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 offer an effective solution when dealing with a single text-based object in a section, there are still design considerations when placing more than one text-based objects in a section. When sizing one object, you must consider its placement with regard to other objects in the section.

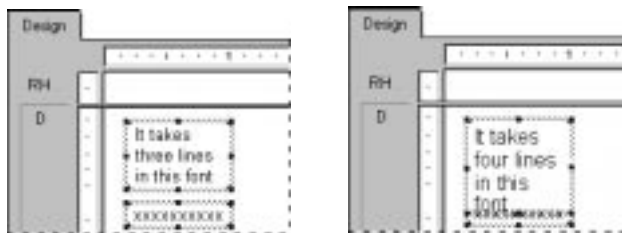
The best rule of thumb is:

- 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-lined 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 an additional characteristic that must be considered. If the printer driver expands or contracts the spacing of the text, word wrapping may differ causing the number of lines necessary to print the object to change to accommodate growth or shrinkage.

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



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

So, where possible, place multi-lined 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 67*).

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 so 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 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 again to accommodate the third object.

Thus, a line's height is determined by the text-based object with 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 makes it 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.
- 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 printing using different printers. The fonts may not be supported by other printers or, while they are supported, they may not be installed on the printers.

When printing, if the 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, 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 240).

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

- When the report is printed in another environment where the printer's default margins are **greater** (thus less printable area), the report objects on the right side of the report will print off the page.
- When the report is printed in another environment where the printer's default margins are **smaller** (thus more printable 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 your 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, how the printer is recognized can still vary according to operating systems. Consider the following example:

An HP Laser III printer is being installed on 3 different operating systems.

- With Windows 95, 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 name of the printer, in this case HP Laser III and the printer driver is HPPCL5MS.DRV.

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

If you need to specify 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 graphs, 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-lined objects rather than the printer driver. In so doing, you can better protect your reports from printing inconsistencies using various 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-lined 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-lined text-based objects*, Page 141).

## 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.

- The absolute x coordinate is only 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; it is the printer driver that determines it instead.

However, the placement of OLE objects such as graphics, boxes, and lines is **not** controlled by the printer driver. So, Seagate Crystal Reports **always** references these object's *absolute coordinates* when placing and printing. With these varied methods of placing text-based and OLE objects, problems can arise when combining the two.

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. If the report is printed using another printer driver that measures inter-line spacing greater than the original printer driver:

- the placement of the box will not change relative to the section it is in (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 based on the printer driver being used.

***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 with sections formatted with *Free Form Placement* toggled off, and you want the objects to be surrounded by a border or formatted with lines, it is better to modify the objects' border properties rather than inserting lines and boxes. This way, the borders will always stay with the objects. Simply right-click the object and then select the **CHANGE BORDER** command from the shortcut menu that appears (see *How to add color, shading, and borders*, Page 238).

Remember, **every** 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 the **same**.

## Report creation checklist for distributed reports

---

1. To accommodate possible growth caused by a 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.
2. Consider where and how you place multi-lined text-based objects. The number of lines necessary to print a text-based object may vary when printed using different printer drivers.
3. Use Windows TrueType fonts where possible because being the most common fonts they are readily available on all versions of Microsoft Windows and can realized on all printers.

4. Use the most common and coarsest video driver settings. It is recommended that you set your video driver resolution to 640 x 480 pixels.
5. Set specific page margins.
6. Do **not** choose a specific printer. Choose the default printer unless your application or compiled report requires a specific printer.
7. After the report is completed and you are happy with the results, format every section to have *Free Form Placement* toggled on.
8. Remove **all** guidelines from the reports.

By adhering to this checklist your report will be the least sensitive to changing printer drivers and ready for distribution.

## 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. Sometimes a problem arises when 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 latest 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 your reports in Seagate Crystal Reports format (.RPT).

- If you want to e-mail your report to someone who does not have Seagate Crystal Reports, you can export the report in MS Word or Excel format directly to an Exchange folder (search for *Exchange Data Access* in Seagate Crystal Reports online Help online Help), as well as many other e-mail systems.
- You can even publish the report on the Internet by exporting your report to HTML. See *How to export reports*, Page 148.

## HANDS-ON (Distributing Your Report)

### How to export reports

---

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

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



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



The dialog box is broken into two sections, a *Format* section and a *Destination* section.

- 2 Using the *Format* drop-down box, select the format in which you want to export the report. For example, if you want to convert the report to Microsoft Excel 4.0 format, choose Excel 4.0 (.XLS) from the list.
- 3 In the *Destination* drop-down box select a destination for your file.
  - If you want to save the report to a disk file, select *Disk file*.
  - If you want to attach the report to an e-mail document, select the appropriate Mail application. Seagate Crystal Reports supports Microsoft Mail (MAPI), Microsoft Exchange Mail (MAPI), and Lotus cc:Mail (VIM).
  - If you want to store the report in a Microsoft Exchange folder, select *Exchange Folder*.
  - If you want to send the report to a Lotus Notes database, select *Lotus Notes Database*.
- 4 Click *OK*, and the export process begins.

When you export a report to a disk file, the Choose Export File dialog box appears. Use the controls in this dialog box to select a path and file name for your file.

***NOTE: While 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 you want to use the data in, 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 *OK*. The program exports the report to a disk file in the format you specify.

## Exporting to e-mail

Since each e-mail system supported by the Export facility operates a little differently, the following instructions are generic in nature.

- 1 When you export to e-mail, the program asks you to log on to your system. Log on in the normal way.

- 2 Select the individual(s) to whom you are going to send the report.
- 3 When the message screen appears, the system displays an icon indicating that a report is attached. The icon will vary, depending on the format used to export the report.
- 4 Type in any message that you want to include with the report.
- 5 Send the message. A dialog box appears allowing you to monitor the progress of your export.
- 6 When the export is finished, the message will appear in the addressee's mailbox. The recipient opens the message in the normal way and double-clicks the icon to call up the report.

**NOTE:** *Both Microsoft Mail and Microsoft Exchange Mail use MAPI. If you intend to attach a report to an Exchange e-mail message, do not select Exchange Folder as the export destination, select MAPI instead.*

**NOTE:** *If you have questions regarding the operation of your e-mail system, please refer to the documentation that came with the system.*

## 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 to export 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 your 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 you want to appear when another user selects your report from the Lotus Notes Desktop.
- 6 Click *OK*, and the report is exported.

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

## Exporting to an Exchange Folder



An Exchange folder can contain standard notes (mail), files, and instances of Exchange forms. 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. For more information, search for *Exchange Data Access* in Seagate Crystal Reports online Help.

- 1 With the report you want to export 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 box.
- 3 Select *Exchange Folder* as the export destination, from the *Destination* drop-down box and click *OK*. The Choose Profile dialog box appears.
- 4 Select the desired profile from the *Profile Name* drop-down box. 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 where you want the report to appear, and click *OK*.
- 7 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 your reports as well.

By exporting your 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 are accessible with many of the most popular web browsers including Netscape and Microsoft Internet Explorer.



- 1 With the report you want to export active, click the EXPORT button on the standard toolbar. The Export dialog box appears.
- 2 From the *Format* drop-down box, select one of the HTML formats listed.
  - If Netscape is your browser, select *HTML 3.0 (Netscape 2.0)* format.
  - If you are using Microsoft Internet Explorer as your browser, select *HTML 3.0 (Explorer 2.0)* format.
  - The third HTML option, *HTML 3.0 (Draft Standard)*, is a new form of HTML that has not been officially released yet, but has been released for comments. If you are working with this new form of HTML, select this HTML format.
- 3 Select a destination from the *Destination* drop-down box such as a disk file, an e-mail address, Microsoft Exchange, or Lotus Notes. 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 make more than one HTML file. For this reason, the program asks you for the name of a directory to export the report to, 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 the 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 for the program to export to a particular ODBC database format. See [Exporting to an ODBC data source](#), Page 152, and [How to set up an ODBC data source](#), Page 562.*

Exporting to an ODBC data source lets you:

- change data from a centralized database 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 to export 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 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 that this report will be added to as a new table, and click *OK*.

- 5 If the ODBC data source you selected requires a log on ID and password, the Login or SQL Server Login dialog box appears. Enter your ID and Password, then click *OK*. The Enter ODBC Table Name dialog box appears.
- 6 Enter the name you want to give the new table in the database, and 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 your fax driver from the *Name* drop-down box.
- 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 fill in the appropriate fax information.

# HANDS-ON (Viewing Reports With a Web Browser)

## How to request reports from a web browser

---

The easiest way to request a report from the Crystal Web Report Server is to simply request the report file in the form of a URL address.

- 1 Open your web browser and make sure you have access to your web server.
- 2 Open a report from your browser by requesting the following URL address:

`http://<domain>/crweb/craze5.rpt`

**NOTE:** *<domain> is the name of the domain for your web server. An example of a domain name would be:*

`www.img.seagatesoftware.com`

The report request is sent to the web server, the report is returned, and it appears inside your browser window.

**NOTE:** *Depending on the web browser you are using, the report may appear inside one of the Crystal Smart Viewers by default. For complete information on using each of the Smart Viewers, see How to view reports with the Crystal Smart Viewer/Java, Page 158, How to view reports with the Crystal Smart Viewer/ActiveX, Page 159, and How to view reports with the Crystal Smart Viewer/HTML, Page 161.*

- 3 Scroll down until you see the data for Competition Bikes. You should see total sales for three different competition bikes: Descent, Endorphin, and Mozzie.

**NOTE:** *You can also use the Group Tree, if available, in the Crystal Smart Viewer if your browser displays a Smart Viewer. The Group Tree lets you easily navigate and drill-down through report data.*

- 4 Click or double-click the Total sales value for the Descent bicycle model.

***NOTE: Different viewers allow you to drill-down on data using either a single click or a double click. If a single click does not work, use a double-click.***

A new page appears showing detail data for the different sizes of Descent bicycles, along with the summary sales values for each size.

If you are a Systems Administrator or IS Manager, you may want to use this drill-down feature to your advantage. Design reports for access by your users that show summary information only, but allow drilling down on detail data. This kind of a report will reduce network traffic by only delivering the data needed by users instead of delivering large reports with long sections of detail data.

### ***Related Topics***

*How to drill down on summarized data, Page 88*

*Sorting, Grouping, and Totalling, Page 271*

## **How to specify parameter field values**

---

If a report contains parameter fields or is based on an SQL stored procedure, you will be prompted to provide a value for the parameter field.

- 1 Use your web browser to request a report that contains a parameter field. The Crystal Web Report Server returns a page requesting a value for the parameter field:



The screenshot shows a standard Windows-style dialog box. The title bar is not visible, but the text inside the box is bolded. The main text is 'Please Provide the Following Information'. Below this, in a smaller font, is 'Prompting Parameter Field'. Then, 'Prompt: Sales Amount' is displayed. A descriptive line follows: 'Enter Last Year's Sales amount for which you want to see regional sales higher than:'. Below this text is a single-line text input field. At the bottom left of the dialog box is an 'OK' button.

- 2 In the text box that appears on the web page, enter a value for the parameter field.
- 3 Click *OK* at the bottom of the page.

***NOTE: If a report contains more than one parameter field, you will be asked to enter a value for each field.***

- 4 The report is generated and appears inside your web browser. The value you specified for the parameter field restricts the values that appear in the report.

***NOTE: Your web server administrator may design web pages that handle parameter fields and stored procedures automatically. The Crystal Web Report Server only prompts for parameter field values when necessary.***

### ***Related Topics***

*Parameter Fields, Page 391*

## **How to log on to a database**

---

If a report is based on a secure database, a database that requires log on information before data is returned, the Crystal Web Report Server will require that you supply a log on name and password before displaying the report.

- 1 Use your web browser to request a report that is based on a secure database such as an SQL server database or a password-protected Microsoft Access database. The Crystal Web Report Server returns a page requesting log on information including user name and password.

***NOTE: If the report is based on an SQL database, you may also need to provide the name of the SQL server and database.***

- 2 In the text boxes that appear on the web page, enter user name and password you normally use to log on to the database.
- 3 Click *OK* at the bottom of the page.

***NOTE: If a report accesses more than one secured database, you may be asked to log on to each database separately.***

- 4 The report is generated and appears inside your web browser.

**NOTE:** *Your web server administrator may design web pages that handle log on information differently. The Crystal Web Report Server only prompts for log on information when necessary.*

## How to view reports with the Crystal Smart Viewer/Java

---

Web browsers that support Java applets can display reports using the Crystal Smart Viewer/Java. Unless you indicate otherwise, the Netscape Navigator web browser, versions 2.x and later, will automatically use the Crystal Smart Viewer/Java by default when you request a report from the Crystal Web Report Server.

- 1 Type in the URL address for the report you want to view. Do not, however, press the Enter key to actually request the report yet. For information on how to request a report using a URL address, see *How to request reports from a web browser*, Page 155.
- 2 Append the Crystal Web Report Server INIT command, preceded by a question mark (?), to the end of the URL address and specify the Crystal Smart Viewer/Java. For example:

```
http://<domain>/crweb/wsale.rpt?init=java
```

A new web page will appear containing the Crystal Smart Viewer/Java, and 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 Smart Viewer itself. If Smart Navigation is available, you can use the Smart Navigation button in the Smart Viewer to turn on and off the Group Tree. This button will be disabled if Smart Navigation is unavailable.*

- 3 To page through the report, use the page controls.
- 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.

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.

- 6 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 that value for you. If you need to find the next instance of that value in the report, simply click the *Search* button again.

***NOTE: You may experience minor problems scrolling through reports in the Crystal Smart Viewer/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/Java. If you experience problems, click repeatedly on the scroll buttons to scroll. Do not hold the scroll buttons down.***

## How to view reports with the Crystal Smart Viewer/ActiveX

---

The Crystal Smart Viewer/ActiveX is a powerful ActiveX control that allows you to view and work with reports in any web browser that supports ActiveX. Unless you specifically request a different Crystal Smart Viewer, versions 3.x and later of Microsoft Internet Explorer will open the Crystal Smart Viewer/ActiveX by default when you request a report from the Crystal Web Report Server.

- 1 Type in the URL address for the report you want to view. Do not, however, press the Enter key to actually request the report yet. For information on how to request a report using a URL, see *How to request reports from a web browser, Page 155*.

- 2 Append the Crystal Web Report Server INIT command, preceded by a question mark (?), to the end of the URL address and specify the Crystal Smart Viewer/ActiveX. For example:

```
http://<domain>/crweb/wsale.rpt?init=actx
```

A new web page will appear containing the Crystal Smart Viewer/ActiveX control, and the first page of the requested report will appear inside the control. In addition, group names will appear in the Group Tree for Smart Navigation.

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

- 3 To page through the report, use the page controls.
- 4 Zoom in and out on the report using the *Zoom* button.
- 5 Use the Smart Navigation features of the Group Tree, if it is available, to navigate through the report by groups.
- 6 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.

- 7 To search for a specific value in the report, type the value into the *Search* text box, and click the *Search* button.

The 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.



- 8 To print the report to a printer available from your machine, click the *Print* button.

**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 Smart Viewer/ActiveX. The Smart Viewer Print button uses printer settings saved with the report file. If you experience problems printing a report, contact your web server administrator.*

## How to view reports with the Crystal Smart Viewer/HTML

---

The Crystal Smart Viewer/HTML uses the features of HTML frames and forms to display reports on any of the most common web browsers. If your web browser does not support Java applets or ActiveX controls but does support the latest standards for HTML, you may want to use the Crystal Smart Viewer/HTML.

- 1 Type in the URL address for the report you want to view. Do not, however, press the Enter key to actually request the report yet. For information on how to request a report using a URL, see *How to request reports from a web browser*, Page 155.
- 2 Append the Crystal Web Report Server INIT command, preceded by a question mark (?), to the end of the URL address and specify the Crystal Smart Viewer/HTML. For example:

```
http://<domain>/crweb/hr.rpt?init=html_frame
```

A new web page will appear containing the Crystal Smart Viewer/HTML, and the first page of the requested report will be displayed. In addition, a Group Tree for Smart Navigation is generated based on group names 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 Smart Viewer itself. If Smart Navigation is available, you can use the Smart Navigation button in the Smart Viewer to turn on and off the Group Tree. This button will be disabled if Smart Navigation is unavailable.*

- 3 To page through the report, use the page controls at the top of the Preview Tab.
- 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.

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.

- 6 To search for a specific value in the report, type the value into the *Search* text box, and click the *Search* button.

The 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.

## How to view plain HTML reports

---

Requesting reports as plain HTML files provides a convenient and easy-to-use method of accessing reports from a web server that is supported by all web browsers. Many common browsers display reports, by default, as plain HTML pages, including Netscape Navigator version 1.x as well as Internet Explorer versions 2.x and earlier.

- 1 Type in the URL address for the report you want to view. Do not, however, press the Enter key to actually request the report yet. For information on how to request a report using a URL, see *How to request reports from a web browser, Page 155*.
- 2 Append the Crystal Web Report Server INIT command, preceded by a question mark (?), to the end of the URL address and specify the plain HTML as the format for viewing. For example:

`http://<domain>/crweb/hr.rpt?init=html_page`

The first page of the report will appear as a standard HTML page inside the web browser.

- 3 To page through the report, use the page controls at the top or bottom of the report page.
- 4 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.

- 5 To search for a specific value in the report, type the value into the *Search* text box, and click the *Search* button.

The 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.



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# 7

## Tutorial - Customer List

### What you will find in this chapter...

*Overview, Page 166*

*Before you begin, Page 166*

*Getting started, Page 167*

*Creating your report, Page 167*

*Selecting a database to use, Page 168*

*Inserting a field, Page 171*

*Adding additional fields, Page 175*

*Reviewing your work, Page 175*

*Saving your report, Page 181*

*Record Selection, Page 182*

*Grouping and sorting, Page 186*

*Completing the report, Page 189*

## Overview

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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 your report, then selecting specific records to be included. You will also learn how to:

- insert and move database fields,
- add and format a title,
- display your report in the Preview Tab so you can fine-tune your work,
- use the Select Expert to ensure your report includes only the data you need,
- move objects,
- group and sort data,
- insert pictures, and
- print your report.

### Before you begin

This tutorial assumes you are familiar with Microsoft Windows and uses conventional names 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 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 the Seagate Crystal Reports environment, please review the following sections before beginning this tutorial:

- *Getting to Know Seagate Crystal Reports, Page 51*, which explains the main application window, the Design and Preview Tabs, the menu bar, standard and supplementary toolbars, format bar, and status bar, as well as many other features of the program.
- *How to add, delete, and move guidelines, Page 82*, and *How to move and position objects using guidelines, Page 83*.
- *Other fundamentals, Page 76*, which describes working with the grid, free form placement of objects using guidelines, as well as a description of 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 your report



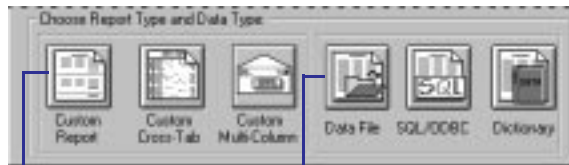
- 1 Click the NEW button on the standard toolbar. The Report Gallery appears.

The Report Gallery contains a number of buttons. These buttons open the Experts that guide you through the creation of specific kinds 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 the Custom button.

The Report Gallery expands to reveal several custom report options.



3 Click the Custom Report button.

4 Click the Data File button.

The Report Gallery disappears, and 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 *Queries*, Page 467, and *Dictionaries*, Page 491, for more information.

## Selecting a database to use

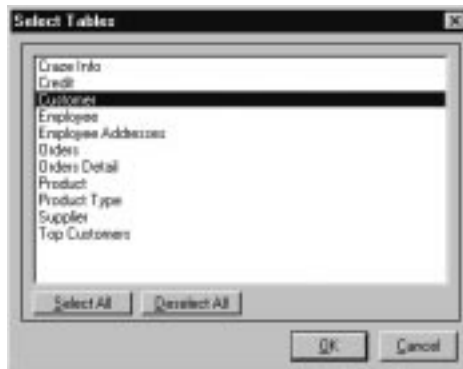
The next step in creating a report is to select a database. Select the CRAZE.MDB sample database for this tutorial.

- 1 In the Choose Database File dialog box, select the file CRAZE.MDB from the *File Name* list box. This file was installed in the \CRW directory (or the directory in which the program resides).





- 2 Click **OK** to open the file. 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. Click **Customer** to highlight it and click **OK**.

The Design Tab appears with the Insert Fields dialog box active.



**NOTE:** If you choose more than one table in the *Select Tables* dialog box, the *Visual Linking Expert* will appear. For more information on linking, see *How to add and link multiple tables*, Page 116, and search for *Visual Linking Topics Index* in *Seagate 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 you are working in, simply look to the shaded area to the left at the report which always displays the section names or the initials that designate the names. See *Design Tab*, Page 66.

- If you have already toggled the *Short Section Names in Design* check box on in the File Options dialog box prior to reading this tutorial, the *Report Header*, *Page Header*, *Details*, *Report Footer* and *Page Footer* section names will appear as *RH*, *PH*, *D*, *RF* and *PF* respectively.
  - If you have not toggled the *Short Section Names in Design* check box on, follow these steps:
- 1 Choose the **OPTIONS** command on the File menu. The File 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 your report.

## Inserting a field

The Insert Fields dialog box appears automatically with the Database Tab active because it is almost certain you will want to insert database fields when you create a new report.



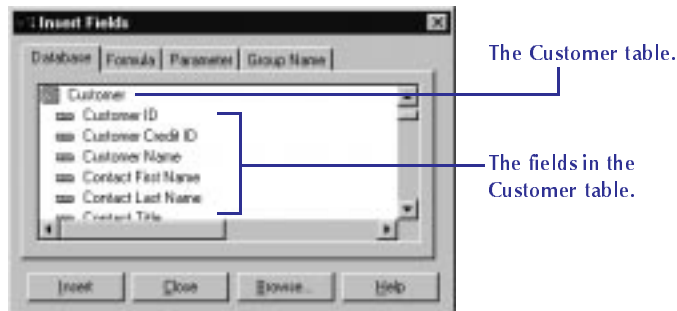
This dialog box is set to remain on screen until you click the *Close* button. All of the tables available for use in your report are listed in this box.

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 resize cursor. See *Cursors*, Page 64.

You will now start placing objects on your 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.



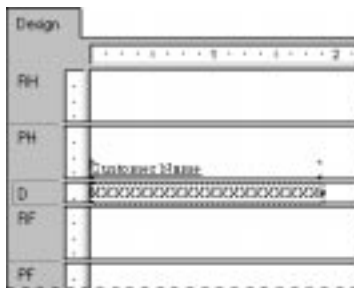
- 2 When you finish reviewing the data, click the *Done* button to return to the Insert Fields dialog box.
- 3 Highlight the Customer Name field and drag it into the Details section of your report.

- 4 An object frame appears with the arrow cursor as you drag the field onto your 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.
- 5 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 will turn into a stop cursor indicating that you can not drag the field that far. See *Cursors*, Page 64. 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 you go any further, take a look at the field you just placed in the Details section.

- First of all, the object frame indicates that when your 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. You will learn how to make changes to these attributes later in the tutorial.
- 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

As you can see, the Customer Name field takes up quite a bit of space on your report. 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. This selects 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 64*.
- 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 your report. This time, however, you will add them at the same time by using the Ctrl-click combination.

- 1 Highlight the City field in the Insert Fields dialog box, press the Ctrl key on your keyboard, and 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 pick a non-continuous range of fields. You can use the Shift-click combination to pick several fields from the list that are continuous.

- 2 Click the *Insert* button to place the fields.
- 3 Move the cursor over your 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 your report in the same order they are listed in the Insert Fields dialog box.

## Reviewing your work



Now let's see how your report looks with three fields placed and positioned.

- 1 Click the PRINT PREVIEW button on the standard toolbar to activate the Preview Tab.

Your screen should look similar to this:

Customer Name	City	Country
City Cyclists	Swelling Heights	USA
Painfinders	D+Kalt	USA
Edo-A-Holics Anonymous	Blacklick	USA
Psycho-Cycle	Hammville	USA
Spending Wheels Inc.	San Diego	USA
Rockabacks for Jocks	Austin	USA
Power Cycles	Eden Prairie	USA
Spoken 'N' Wheels Ltd.	Des Moines	USA

**NOTE:** The first time you preview your 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 simply switch between designing and previewing your report by clicking the corresponding tab.

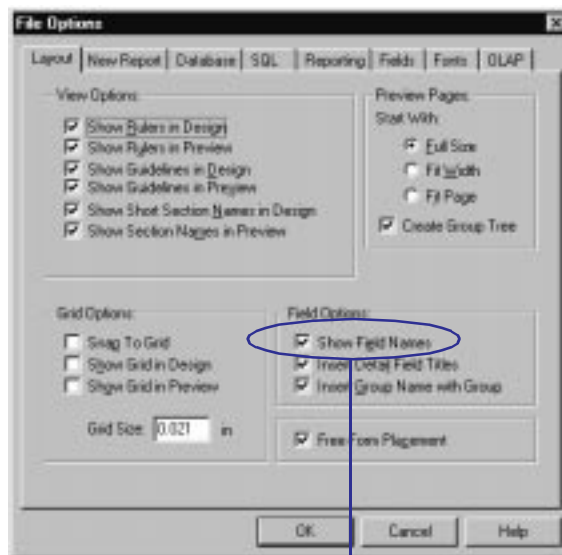
You have the beginnings of a customer list report, but you still have several fields to add.

- 2 When you are finished reviewing your report, return to the **Design Tab** by clicking once on the **Design Tab**.

## Displaying field names

Field pictures have been discussed, but there will be times when you want to see the field names in the **Design Tab**.

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



- 2 Toggle the **Show Field Names** check box on and click **OK** when finished.

Now in the **Design Tab** you will see the actual field names instead of field pictures (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. An object frame appears next to the arrow cursor as you move the cursor over your report.
- 2 Insert the field to the right of the fields in the Details section. The Design Tab automatically scrolls to the right, if necessary, as you drag the field. 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. When 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 in 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 the *Insert* button.
- 8 Move the cursor over the text object until your cursor becomes a drag and drop cursor. See *Cursors, Page 64*.
- 9 Click once to place the field in the text object.
- 10 Your cursor now appears after the Contact Last Name field within the text object. 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 the *Insert* button.
  - 13 Move the cursor over the text object until your 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.
- Your report should now look similar to this:

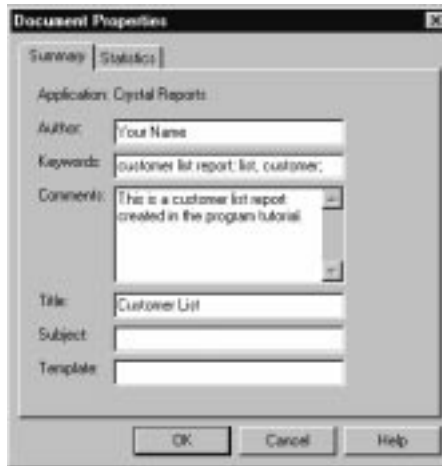


Customer Name	City	Country	Contact
City Cyclists	Sweding Heights	USA	Christie
Parklanders	D-Kalb	USA	Masley
Slide-A-Holics Anonymous	Blacklick	USA	Jamish
Psycho-Cycle	Hannville	USA	Mont, A
Spoking Wheels Inc.	San Diego	USA	Reynold
Rockabacks for Jocks	Amotin	USA	Davis,
Power Cycles	Eden Prairie	USA	Smith,
Spoken 'N' Wheels Ltd.	Des Moines	USA	Chenier

## 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 you have 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. See the Reports at a Glance online Help (RPTGLANC.HLP) located in the \CRW directory (or directory in which the program resides).

- 1 Choose the SUMMARY INFO command on the File menu. The Document Properties dialog box appears with the Summary Tab active.



- 2 Enter information about your report in the text boxes provided as shown above. 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 of 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 your report. An object frame appears.
- 4 Position the object frame in the upper left-hand corner of the Page Header (PH) section of your report and click once to place the object.
- 5 Click the Preview Tab to review your changes.

As you can see, the report title object 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.

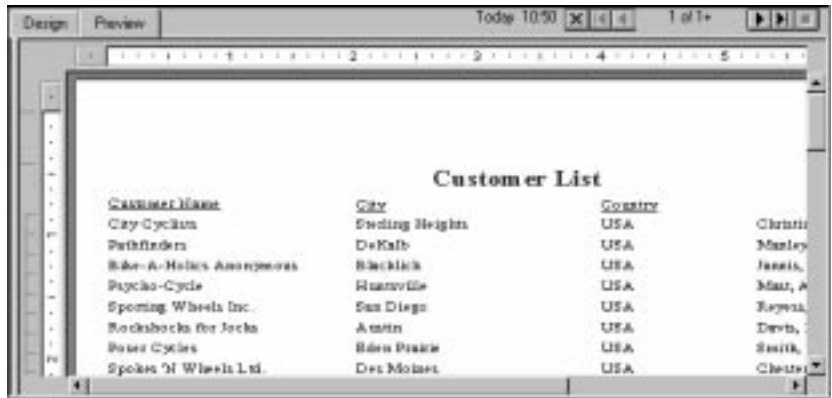
- 1 To center the title, you will first need to expand the title field box so it's about the same width as the data in your report. To do this, click the object to select it.
- 2 Position your cursor on the right edge of the object until the cursor turns into a resizing cursor. Drag the right edge of 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 your report.



- 3 With the report title object still selected, click the **CENTER ALIGNMENT** button on the format bar. The title is centered within the object.
- 4 Right-click the object and choose the **CHANGE FONT** command 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 box and 16 (or a point size suitable to the font you are using) from the *Size* drop-down box.
- 6 Change the color of the text by choosing **Maroon** from the *Color* drop-down box. 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 size of the report title.

The title is now formatted to stand out on your report.



<u>Customer Name</u>	<u>City</u>	<u>Country</u>	Contact Name
City Cyclists	Sweding Heights	USA	Christie
Pathfinders	DeKalb	USA	Manley
Bike-A-Holics Anonymous	Blacklick	USA	Jessie
Psycho-Cycle	Huamville	USA	Maur, A
Sporting Wheels Inc.	San Diego	USA	Elyssa
Rockhocks for Jocks	Austin	USA	Dawn
Racer Cycles	Belen Prairie	USA	Smith
Spokes N' Wheels Ltd.	Des Moines	USA	Cheryl

## 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. An object frame appears next to the arrow cursor as you move the cursor over your report.
- 3 Place the object in the Page Header (PH) section above the contact name object.
- 4 Type "Contact Name" in the text object.
- 5 While the text object is still in edit mode, highlight the field heading.



- 6 Click the UNDERLINE button on the format bar.

The Contact Name field now has a heading that looks just like the other field titles.

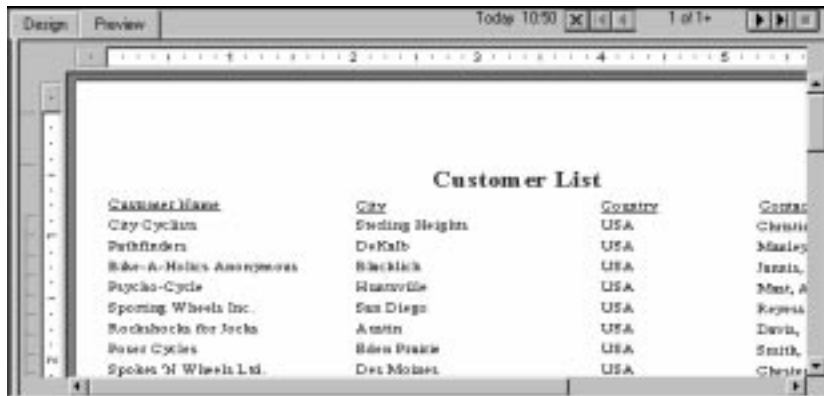
## Saving your report



- 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 where the program resides.

3 Click the Preview Tab to view your report.

Your report should now look similar to the following:



Customer Name	City	Country	Contact
City Cyclists	Swindon Heights	USA	Christie
Pathfinders	DeKalb	USA	Mailey
Bike-A-Holics Anonymous	Blacklick	USA	Jennin
Psycho-Cycle	Huanville	USA	Mart, A
Sporting Wheels Inc.	San Diego	USA	Reyes
Rockhocks for Jocks	Austin	USA	Davis
Power Cycles	Belen Prairie	USA	Smith
Spokes 'N' Wheels Ltd.	Det Molart	USA	Christie

Congratulations! You have just created a basic listing report. You will continue to refine this report during the rest of the 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 your report, and
- save a report including your selection criteria.

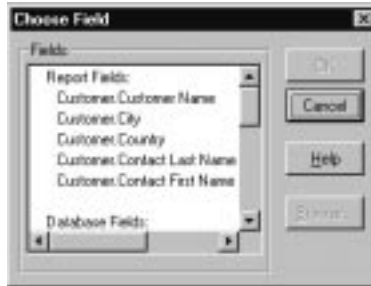
For example, it may be useful to have a customer list that only lists customers from the USA. The sample data contains records from the United States and International customers. The program makes it easy to restrict lists like this using the Select Expert. See *Record and Group Selection, Page 249*.

### Entering your selection criteria

When you scroll through your report, you will see that the report 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 your report to deselect any fields.
- 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.



- 5 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.

- 6 Click the arrow on the right drop-down box to see what other options you have.
- 7 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.

- 8 Click the arrow on the drop-down box. A list of all the country values appears. Select *USA* from the list.

Your sentence now reads:

Select all records where a customer's Country is equal to USA

- 9 Click *OK* to return to the Design Tab.
- 10 Click the Preview Tab to review the results of your work.
- 11 A message box appears asking if you would like to use saved data or refresh data.
  - If you click *Use Saved Data*, the program will only select records from those saved with the report. This method is recommended if you simply add a new record or group selection formula.
  - If you click *Refresh Data*, the program will select records from the entire database. This method is recommended if you change an existing record or group selection formula.
- 12 Because you did not change a record selection formula, click the *Use Saved Data* button.

Now when you scroll through the report, you will see that only customers from the USA appear.

- 13 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 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



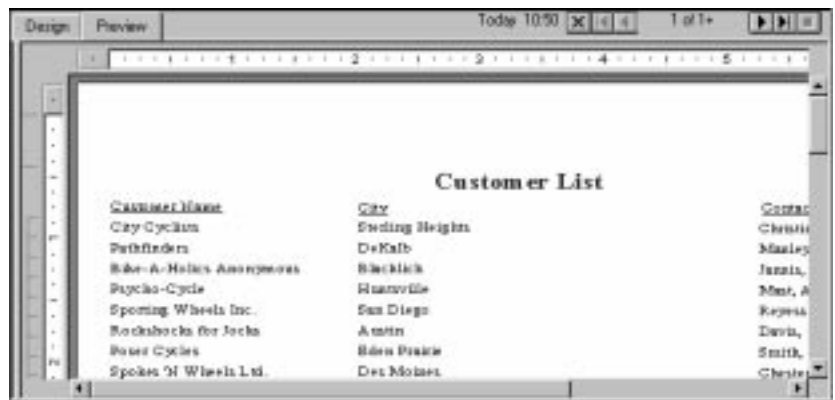
powerful kinds of reports you can prepare. As you can see, it is an easy program to use.

## Deleting a field

Now that your 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 your report.

Your report should look similar to this:

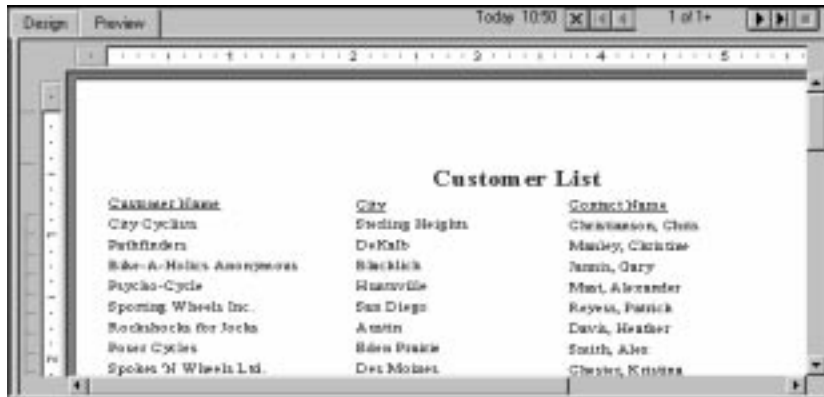


## Balancing field spacing

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 fine 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 your 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.

Your report should look similar to this:



<u>Customer Name</u>	<u>City</u>	<u>Contact Name</u>
City Cyclists	Sweding Heights	Christensen, Chris
Pathfinders	DeKalb	Manley, Christine
Bike-A-Holics Anonymous	Blacklick	Smith, Gary
Psycho-Cycle	Huanville	Mart, Alexander
Sporting Wheels Inc.	San Diego	Reyes, Patrick
Rockhocks for Jacks	Austin	Davis, Heather
Power Cycles	Belen Prairie	Smith, Alex
Spokes 'N' Wheels Ltd.	Des Moines	Cheney, Kristina

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 you with a great deal of flexibility for customizing your reports.

### Grouping your report

In many reports you need to break your data into groups to make it easier to read and 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.



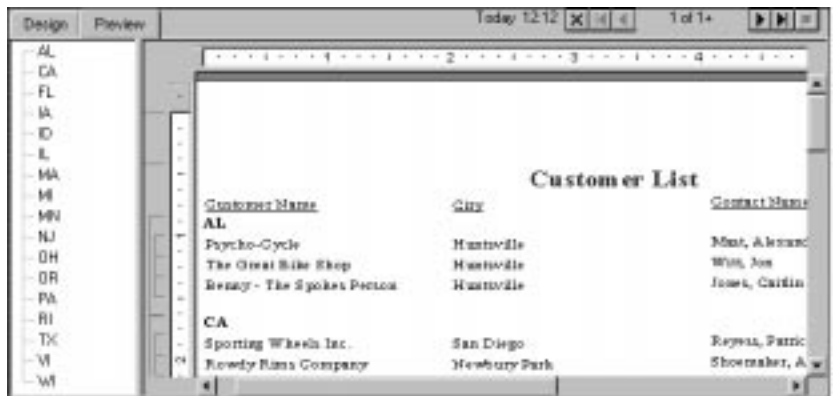
- 1 In the Design Tab, click the INSERT GROUP button on the supplementary toolbar. The Insert Group dialog box appears.



- 2 Select the Region field from the Customer table in the first drop-down box. The program will now take all records with the same value in the region field and place them together in a group on your report.
- 3 Select *in ascending order* from the second drop-down box. The region grouping will be displayed on your 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 your report looks like.





- 6 If the group tree is not visible, click the TOGGLE GROUP TREE button on the format bar 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, if you would like to see the Texas customer group, simply click TX in the Group Tree. The program will jump 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 your report looking for the group. For more information on the group tree, see *Group Tree view, Page 74*.

**NOTE:** *For many of your reports you will want to insert summaries, subtotals and grand totals. For example, if you were 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 Totalling, Page 271*.*

## Understanding “live” group headers

When you insert a group, a group name field is automatically inserted in the Group Header section of your report. The group name field displays the current group’s name. For example, if you group by region, when you preview your 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.

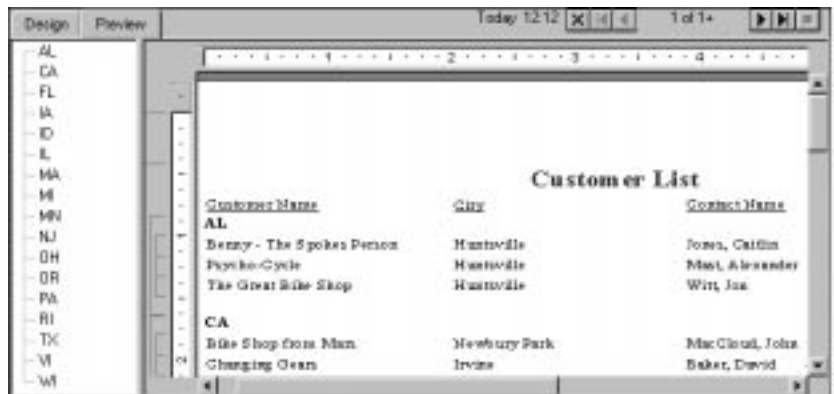


- 1 In the Preview Tab, click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.



- The *Report Fields* box lists all fields currently on your report. You can choose to sort based on any of these fields.
  - The *Sort Fields* box displays the fields that are already sorted in the report. Because the region field is already sorted, the sorting you are about to do will be within each region, 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*.

Your report should now look similar to the following:



Notice that the records within each group are in alphabetic order.

## Completing the report

You have just one step left to complete your report. You are going to add a company logo on 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 your report.

- 1 In the Design Tab, click the INSERT PICTURE button on the supplementary toolbar. The Open dialog box appears.

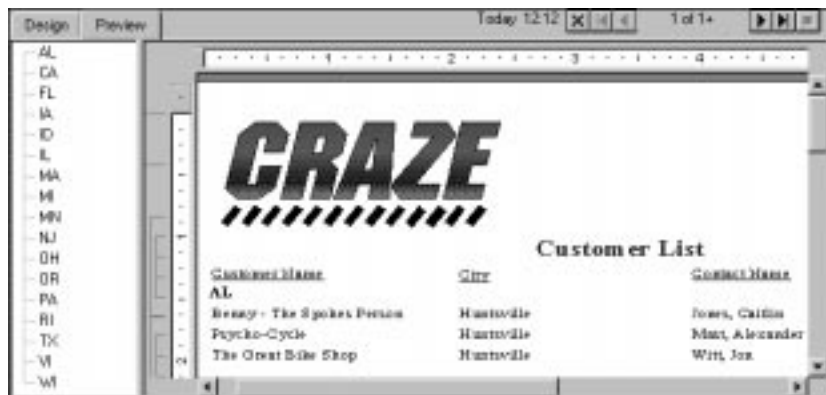
- 2 Choose the CRAZEC.BMP file and click *Open*. An object frame appears as you move the cursor over your report. The object frame represents the logo you will place.
- 3 Position the object frame in the upper left-hand corner of the Report Header (RH) section of your report and click once.

Placing the logo in the Report Header (RH) section ensures that the logo is printed only on the first page of your report. See *Area printing characteristics, Page 69*.

**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 your report.

Your final report should look like this:



- 5 Save your report by clicking on the SAVE button on the standard toolbar.

You have just completed your first report. It is a pretty impressive report, and Seagate Crystal Reports made it easy to do.

### ***Related Topics***

For information about distributing your report (printing, exporting, etc.) see *Printing, Viewing, and Exporting, Page 135*.

---

# 8

## Reporting on OLAP data

### What you will find in this chapter...

*Introduction, Page 192*

*Arbor Essbase client drivers, Page 193*

*Selecting members for dynamic reporting, Page 193*

*Combining data using subreports, Page 195*

*Essbase database security, Page 196*

*The report definition and the Essbase outline, Page 197*

*Storing database outlines, Page 198*

*Saving reports without outlines, Page 198*

*Server independence of reports, Page 199*

*Updating Essbase server and database locations, Page 200*

*Efficient access of Essbase databases, Page 201*

*Optimizing for large Essbase databases, Page 201*

*HANDS-ON (Reporting on OLAP data), Page 202*

# 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 manual 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 Arbor Essbase data

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Arbor Essbase has become one of the most popular OLAP systems available. 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. The section *HANDS-ON (Reporting on OLAP data)*, Page 202, includes a tutorial for building a cross-tab report using Essbase data.

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 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 your 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.

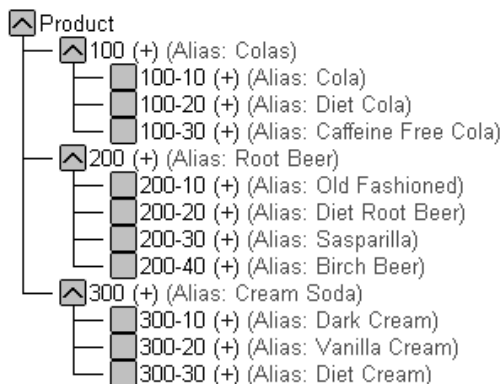
## Arbor Essbase client drivers

To report on Essbase data, your system must have access to several Essbase client drivers. These drivers are installed if you have installed an Essbase client application, such as the Essbase Spreadsheet Client. If you do not have any Essbase client applications installed on your system, run the Seagate Crystal Reports setup program and toggle *Custom installation* on. Toggle the check box for the *Arbor Client Files* under Database access on in the Custom Installation Options dialog box. This does not install any Arbor client applications. It only installs the files necessary for Seagate Crystal Reports to access Essbase data.

## 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, 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 your 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.

## Combining data using subreports

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.

Subreports allow you to put secondary report objects inside a primary report. Subreports allow some extremely powerful reporting capabilities including:

- linking detail reports to primary report records,
- presenting different views of the same data in a single report, and
- combining multiple reports containing unrelated data in the same report.

*NOTE: For complete information on working with subreports, see Subreports, Page 429.*

Using subreports, you can include both relational data and OLAP data in the same report, called a heterogeneous report. Seagate Crystal Reports allows any of the following combinations:

- A primary report based on relational data containing a subreport based on OLAP data.
- A primary report based on OLAP data containing a subreport based on relational data.
- A primary report based on either relational or OLAP data that contains several different subreports, some based on OLAP data and some based on relational data.

In other words, any combination is possible. In addition, data can be linked between a primary report and a subreport. This means the data in a subreport can be directly related to the values displayed in the primary reports. A useful example is a report that displays detail information in a subreport for a specific record in the primary report.

## 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 File 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 your 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 OLAP data is made up of a report definition, report data (optional), and an OLAP 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 OLAP database outline can be saved with the report definition if the report, or a subreport, is based on an OLAP database. Having access to the OLAP database outline can be important when trying to view or edit existing report files. See *Server independence of reports, Page 199*.

By default, Seagate Crystal Reports saves outline information of an OLAP database with any report that accesses it. Only information relevant to the data used by your report is saved, though.

***NOTE: Information about Essbase alias tables is not saved with the report file.***

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.

You can prevent the program from storing database outline information with your report using the OLAP Tab in the File 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.

## Storing database outlines

***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.***

When you store a database outline with a report, the outline information is stored with the report definition file (your standard .RPT file). The database outline includes dimensions, members, consolidation attributes, expense attributes, any aliases defined in the Essbase Default alias table, and more.

***NOTE: Seagate Crystal Reports does not store aliases from alias tables other than the Essbase Default table. To access aliases in other alias tables, you must use the EssbaseAlias function when designing your report and you must be connected to an Essbase server.***

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 199*.

## 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 your report, you can save the Essbase database outline with the report, as described in the previous section, thus eliminating, in many cases, 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 reestablish the server connection before printing or scheduling the report. A server connection can be reestablished using the LOG ON SERVER command on the File menu, if no report is currently open, or 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 (see *The report definition and the Essbase outline*, Page 197),
- 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 (see *The report definition and the Essbase outline*, Page 197).

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, Page 197*), 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 your Essbase server or database changes, you must update the information about the server and database in your 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 \CRW\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 \CRW\SAMPLES\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 command from the Database 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.
- 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 File Options 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 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.*

## HANDS-ON (Reporting on OLAP data)

The following tutorial demonstrates basic techniques for creating a cross-tab report based on the Arbor Essbase Sample Basic database. If you do not have access to this database, contact your Network Administrator. In addition to this tutorial, Seagate Crystal Reports online Help file contains several more tutorials for reporting on Essbase data. Search for *Working with Essbase* in Seagate Crystal Reports online Help.

### How to create a cross-tab with Essbase data

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A cross-tab report illustrates how one set of data relates to another set of data. Often, each set of data comes from a different dimension in the Essbase database, and the report can be viewed as a true dimensional report based on dimensional data.

Cross-tabs are the most natural types of reports to create with OLAP data, and you may find yourself using the Cross-Tab Report Expert for most of your reporting tasks. Because cross-tab data is laid out similar to a spreadsheet, you may already be familiar with many of the concepts illustrated here, and you will start building expert cross-tabs with very little training.

Cross-tab reports can actually be designed using any of three different methods in Seagate Crystal Reports:

1. Using generational data in the Cross-Tab Report Expert,
2. Using dimensional data or a combination of dimensional and generational data in the Cross-Tab Report Expert, or

3. Using dimensional data in a columnar report and manually constructing the cross-tab by moving and formatting data fields in the application window.

Each method has advantages and disadvantages. For a complete description of each method for creating cross-tabs, search for *Cross-Tab Options* in Seagate Crystal Reports online Help.

This tutorial takes you through the steps of creating a cross-tab report using generational data in the Cross-Tab Report Expert.



- 1 Start Seagate Crystal Reports, click the NEW button on the standard toolbar, then click the *Cross-Tab* button in the Report Gallery. The Create Report Expert appears.
- 2 On the Data Tab of the Create Report Expert, scroll down, and click the *Essbase* button. The Essbase Server Login dialog box appears. Log on to Essbase using your standard Essbase user name and password.

**NOTE:** *If you have already logged on to Essbase while creating a previous report, and have not yet exited Crystal Reports, you will not need to log on again.*

- 3 Click *OK* on the Essbase Server Login dialog box, and the Essbase Application & Database dialog box appears.

Select the Basic database from the Sample application, and click *OK*. The Basic database will appear in the database list of the Data Tab.

## Adding data with the Members Tab

In this tutorial, you will design a cross-tab report that displays Profit data over time. You will need to select members from the Measures dimension and the Year dimension in the Sample Basic database.

- 4 Click the Members Tab in the Create Report Expert.

On the left side of the tab is the *Database Fields* list box displaying all available dimensions in the database, and on the right side of the tab is the *OLAP Members* list box.

- 5 First, select members from the Year dimension. This cross-tab will display Profit related data for each quarter, with a final column displaying data for the entire year. Select the Year dimension in the *Database Fields* list box, and click *Add*. Year appears in the *OLAP Members* list box.

- 6 Select Year in the *OLAP Members* list box, and click the *Properties* button below the list box. The Member Properties dialog box appears.
- 7 Select *This member's children*, and click *OK*. Do not select *This member and children*. Although final Year totals for Profit data will appear in the cross-tab, this report will not get that data from the Essbase derived aggregate for Year. Instead, the program will calculate the result using smart aggregation.
- 8 After you click *OK* in the Member Properties dialog box, *(children ONLY)* appears next to the Year member in the *OLAP Members* list box.

You also need to add data from the Measures dimension, the dimension that contains Profit related data.

- 9 Click the node next to the Measures dimension in the *Database Fields* list box. The Profit, Inventory, and Ratios members are displayed.
- 10 Select the Profit member, and click *Add*. Profit is added to the *OLAP Members* list box.
- 11 Select Profit in the *OLAP Members* list box, and click the *Properties* button. The Member Properties dialog box appears.
- 12 This time, select the *This member and descendants* option, and click *OK*.

Profit data is much more complex than the Year dimension, and it will be easiest if the report obtains all aggregates in the Measures dimension directly from Essbase. This time, the program will use smart aggregation to recognize that Profit is an aggregate derived from its descendants and will not calculate a Total for the members of the Measures dimension.

## Using the Cross-Tab Tab

Now that you have selected the data that will appear on your report, you need to design the cross-tab report itself.

- 13 Click the Cross-Tab Tab to begin designing your cross-tab report.

The list box at the lower left corner of the Cross-Tab Tab shows Essbase dimensions. If you selected members from a specific dimension on the Members Tab, that dimension appears here with a separate listing for each generation in that dimension.

However, only generations up to the highest generation you selected appear here.

For example, when you selected the Profit member and its descendants, each generation from the Measures dimension was added to the *OLAP Generation Fields* list. When you selected the children of Year, only generations 1 and 2 from the Year dimension were included in this list because you did not indicate any members from generation 3 of the Year dimension.

When you add a generation from a dimension to the Rows or Columns sections of a cross-tab, a band is created in the cross-tab report for that generation, and only members that you specified on the Members Tab are included in the band. If you add Basic.Measures, Generation 2 to the Rows section, for instance, only the Profit member will appear in the cross-tab. Even though Inventory and Ratios are also generation 2 members of Measures, you only included the Profit member from generation 2 when you selected members on the Members Tab.

Smart aggregates are created for any dimension generations appearing here that you did not specifically select. For example, you selected only the children (generation 2) of Year on the Members Tab, but generation 1 (Year itself) also appears in the *OLAP fields* list. If you include Basic.Year, Generation 1 in your cross-tab, the program will create a Year band and calculate the aggregate based on generation 2 members.

This relationship between members selected on the Members Tab and generations added to the cross-tab on the Cross-Tab Tab is important to understand. Pay close attention to your database, the members you select, and the generations that are added to the cross-tab. Without careful consideration, you may have inaccurate results in your report.

Below the *Report Fields* list is the *Database Fields* list. This section of the list box allows you to select entire dimensions to place in the cross-tab. Like the generation list items, though, only members you actually selected on the Members Tab will appear for each dimension. Unlike the generation list items, members from different generations within the same dimension appear together in the same band of the cross-tab.

For more information on selecting dimensional data for cross-tabs, search for *Cross-Tab Options* and the tutorial *Dimensional Cross-Tabs* in Seagate Crystal Reports online Help.

If you scroll to the bottom of the list box, you will notice that the last item in the list box is DATA. This field represents actual numeric data in your database (rather than members of a dimension).

The largest feature of the Cross-Tab Tab is the cross-tab layout section that fills the upper left corner of the tab. Use this section of the tab to design the actual layout of your report.

A cross-tab report consists of three features: rows, columns, and summary data. The rows and columns indicate how you are examining and comparing the summary data. Summary data is evaluated based on the comparisons between rows and columns. The cross-tab report you create in this tutorial will examine Profit data from the Measures dimension over a period of time represented by the members of the Year dimension.

- 14 Scroll to the bottom of the list box on the Cross-Tab Tab, and select the DATA field. In any cross-tab report you create with OLAP data, the cross-tab must summarize actual numeric values, not OLAP database members. These values can come directly from the DATA field of the OLAP database or can be generated by a formula or summary field.
- 15 Drag the DATA field to the *Summarized Field* list box in the cross-tab layout section. Basic.DATA appears in the *Summarized Field* list box.
- 16 Scroll back up in the list box, and select Basic.Year, Gen 2 from the list. Drag this generation field to the *Columns* list box of the cross-tab layout section.
- 17 Select Basic.Year, Gen 1 from the list box, and drag it to the *Columns* list box.

A message box appears, indicating that you have not selected members from the Year dimension in the correct order.

When you add members to a cross-tab, you will naturally want to group generations in the same order that they are organized in the original database. For example, quarters from the Year

dimension should be grouped under the year. It would not make sense to group the year under individual quarters. The Cross-Tab Tab helps you organize generations correctly by making sure generation 2 data is grouped under generation 1 data, generation 3 data is grouped under generation 2 and generation 1 data, etc.

- 18 Click *Yes* in the message box to have generations correctly organized in the cross-tab. If you click *No*, the program will not allow you to add Generation 1 data beneath Generation 2.

Remember, though, you did not actually select a generation 1 member of the Year dimension on the Members Tab. Since you asked for generation 1 to appear in the columns section of the cross-tab, the program will use smart aggregation to recognize the missing member and calculate an aggregate value.

- 19 Drag the following generations from the list box to the *Rows* list box of the cross-tab layout section in order:

- Basic.Measures, Gen 2
- Basic.Measures, Gen 3
- Basic.Measures, Gen 4

This cross-tab will not display generation 1 of the Measures dimension.

***NOTE: The Cross-Tab Tab also provides the Add Row, Add Column, and Set Summarized Field buttons to move fields to the Rows, Columns, and Summarized Field list boxes of the cross-tab layout section. Use these buttons or the drag and drop technique, whichever is more convenient for you.***

## Previewing the report and smart aggregation

- 20 Click *Preview Report* on the Create Report Expert. The Expert disappears, and, after a few seconds, the program generates and displays your cross-tab data.

***NOTE: You may need to adjust the size of report fields so that member names are displayed correctly. To resize a field, simply select the field and drag the handle at the right side until the field is displayed correctly.***

The first thing to notice in the cross-tab is that generations within the same dimension appear in separate bands of the

cross-tab. For instance, generation 2 members of the Year dimension appear together in a band of columns, while generation 1 of the Year dimension appears in a separate band above generation 2. Now you can clearly see why the program forces you to place generations in the cross-tab layout in a certain order.

Notice also that the program added a Year band and a Total column at the right hand side of the report for generation 1 of the Year dimension. When you see a column or row that is labeled *Total*, the program is calculating the aggregate values. If aggregate values are not labeled *Total*, the values are coming directly from the Essbase database. Since you did not select any generation 1 members for this dimension, these values do not come from the original Essbase database. Instead, this Year *Total* column contains the aggregates calculated by Seagate Crystal Reports. These aggregates were calculated simply by adding together the values for the generation 2 members that did come from the Essbase database.

To better understand smart aggregation and cross-tab aggregation, you will change the OLAP properties selected for the Year dimension.

***NOTE: To avoid accidentally losing your work, you may want to save the report as it currently stands before continuing with the tutorial.***

- 21 Select one of the members from the Year dimension in the cross-tab report. You can select any one of the quarters or select Year itself.
- 22 Choose the CHANGE OLAP MEMBERS command from the Edit menu. The OLAP Members dialog box appears.
- 23 Currently, *Year (children ONLY)* appears in the *Current Members* list box. Select this item, and click *Properties*. The Member Properties dialog box appears.
- 24 Change the properties for the Year member to *This member and children*, and click *OK*. *Year (and children)* now appears in the *Current Members* list box.
- 25 Click *OK* in the OLAP Members dialog box. Seagate Crystal Reports regenerates your cross-tab.



Although the values in the last column of the report did not actually change, they are now being obtained directly from the Essbase database instead of being calculated by Seagate Crystal Reports. Notice that the *Total* label is now missing. As described before, if an aggregate value is calculated by Seagate Crystal Reports, the *Total* label will appear for the respective row or column. If no *Total* label appears, the values are being obtained directly from the Essbase database.

Although the change you just made had no effect on the actual data in your report, understanding the difference is important in situations where not all members from the child generation are present. For instance, if you had only selected the Qtr1 and Qtr2 members of generation 2 of the Year dimension, the results for the Year would appear different based on smart aggregation. If you select the Year member as well, the Year total would come directly from the Essbase database and would represent the entire year. However, if you did not select the Year member, Seagate Crystal Reports would use smart aggregation to obtain a total from available data, Qtr1 and Qtr2 values, in this case. Thus, the Year column would actually only represent the first two quarters of the year.

## Formatting the report



26 Select one of the data values that appears in the cross-tab. For example, select the value that appears at the intersection of the COGS member and the Qtr1 member. Notice that the value is selected and a gray box appears behind every other data value except the aggregate values for Year, Margin, Total Expenses, and Profit. This means that the formatting changes you are about to make will affect all of the selected data values in the cross-tab.

27 Click the CURRENCY button on the format bar.

A currency sign is added next to each selected value in the cross-tab.

28 Add a currency sign to the values that appear in the remaining rows and columns of the cross-tab. You may need to make several selections before all values are formatted correctly.

**NOTE:** *You can use the Shift key to select several fields at the same time.*

## Highlighting bands

- 29 Select the entire cross-tab report by clicking in the upper left hand corner of the cross-tab object, outside of any data fields or members. A selection rectangle appears around the entire cross-tab object.
- 30 Choose the **FORMAT CROSS-TAB** command from the Format menu. The Cross-Tab dialog box appears. This dialog box is similar to the Cross-Tab Tab in the Create Report Expert.
- 31 You will highlight certain rows and columns in the cross-tab report according to the generation within each dimension using the Cross-Tab dialog box. Select **Basic.Year, Gen 1** in the *Columns* list box.
- 32 In the *Background Color* drop-down box, select **Silver**.
- 33 Now select **Basic.Measures, Gen 2** from the *Rows* list box and select **Silver** as its background color.
- 34 Click **OK** in the Cross-Tab dialog box. The program highlights the Year band in the cross-tab columns and the Profit band in the cross-tab rows along with their respective aggregate values. This simple band highlighting capability allows you to easily format cross-tab reports to clarify data.

## Pivoting the cross-tab

After examining the cross-tab data produced in your report, you may decide that you need to make some changes.

- 35 Right-click in the upper left corner of the cross-tab and select the **PIVOT CROSS-TAB** command from the shortcut menu that appears.

The report has been completely pivoted on its axis.

## Breaking the report over groups

- 36 Click the Design Tab again. Notice that the cross-tab is a single object that appears in the Report Header section of the report. In addition, you may have recognized that this cross-tab only represents two dimensions in the Sample Basic database.

The following steps demonstrate how to add a third dimension to your report, group the report based on this third dimension, and split the cross-tab into multiple cross-tabs based on the grouping.

Although it is possible to add a third dimension directly into the cross-tab object, adding the dimension as a group on the primary body of the report can often have better results, depending on the data you are presenting.

- 37 Choose the REPORT EXPERT command from the Report menu. A message box appears stating that the actions you are about to take can not be undone using the UNDO command on the Edit menu. Click Yes in response to the message box, and the Create Report Expert appears again.
- 38 Click the Members Tab to display available and selected database members.
- 39 Click the node next to the Scenario dimension in the *Database Fields* list box to view the children of Scenario.
- 40 Select the Actual member, and click *Add*, then select the Budget member, and click *Add*. These two members are now available to your report, but you will not add them to the actual cross-tab.
- 41 Click the Group Tab. You will create groups in the report based on the Actual and Budget members.
- 42 In the *Report Fields* list box, scroll down and select the Scenario dimension. This is the dimension containing the Actual and Budget members that we want to group on.
- 43 Click *Add*, and Basic.Scenario appears in the *Sort Fields* list box. The report will now contain groups for each of the selected members of this dimension.
- 44 Click *Preview Report* to generate the new groups in your report.

Notice that three separate cross-tabs now appear in the report.

- 45 Click the Design Tab to view the report in Design mode. Two new report sections now appear in your report, a Group Header and a Group Footer. In addition, a second cross-tab object now appears in the Group Header section.

When the program grouped the report based on the selected members of the Scenario dimension, it also copied the cross-tab object to the Group Header section, resulting in a separate cross-tab for each group. Since the first grouping that appears

when you preview the report is for the Actual member, the cross-tab, likewise, contains Actual data. The second cross-tab for the second group, on the other hand, contains Budget data.

Seagate Crystal Reports also left the original cross-tab object in the Report Header section. This cross-tab represents summary information based on data from all groups. It acts as a type of grand total cross-tab. This way, your reports can display cross-tab information specific to each group, along with a final summary cross-tab.

Since the groups you created here are for Actual vs. Budget data, a summary cross-tab does not make sense. You will remove the cross-tab that appears at the top of the report.

- 46 From the Design Tab, select the cross-tab object that appears in the Report Header section by clicking in the upper left hand corner, above the rows and to the left of the columns, and press Delete.

***NOTE: You may want to resize the Report Header section to make it smaller now that it does not contain a Cross-Tab object. To do this, simply drag the boundary at the bottom of the section upward until the section is an appropriate size.***

- 47 Click the Preview Tab to see the results of the changes you made. Two cross-tabs now appear in your report, one for the Actual group containing Actual related data, and one for the Budget group containing Budget related data.
- 48 Choose the SECTION command from the Format menu, and the Section Expert appears.
- 49 Select the Group Footer #1: Basic.Scenario in the *Sections* list box, and toggle the *New Page After* check box on.
- 50 Click *OK* when finished. The report is now split among two pages, one for each group and, therefore, one for each cross-tab. You can finish the report by adding a title, date, and any other formatting appropriate to the data.

As you can see, designing cross-tab reports is exceptionally easy. OLAP data, by its inherent design, naturally fits the cross-tab concept. After designing a few reports using your own Essbase data, you will quickly master this powerful report design.

---

# 9

## Multiple Section Reports

**What you will find in this chapter...**

*Using multiple sections in reports, Page 214*

*HANDS-ON (Multiple Section Reports), Page 215*

## Using multiple sections in reports

---

Seagate Crystal Reports provides five design areas to use when building your report: Report Header, Page Header, Details, Report Footer, and Page Footer.



Each area contains a single section when you first create a 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 215),
- putting conditional messages in form letters (see *How to print conditional messages in form letters*, Page 225),
- formatting objects/sections differently based on field values (see *How to format objects conditionally*, Page 224),
- alternating background colors on a row-by-row basis (see *How to alternate background colors for rows*, Page 226),
- eliminating blank lines when fields are empty (see *How to eliminate blank lines*, Page 227), or
- adding blank lines under specific conditions (see *How to add blank lines conditionally*, Page 228).

When you understand the power of multiple sections, you will discover even more ways that you can use them to produce the report effects you want.

## *Related Topics*

*How to add, delete, move, and merge sections, Page 89*

# HANDS-ON (Multiple Section Reports)

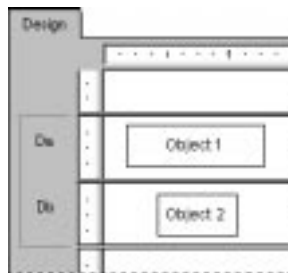
## How to prevent variable length objects from overwriting each other

---

When you place subreports or other variable length objects above other objects in one section of your report and you have the *Can Grow* option for the variable length object toggled on in the Format Editor, that object may overprint objects 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 233*.

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 *TWO UNRELATED REPORTS, Page 440*.

*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 as you create 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 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.

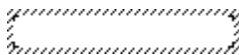


In this mode, you can resize it by dragging any of the resizing handles or move it by placing the cursor inside the object and dragging it to a new location. You can also insert fields in this mode but you can not insert text. You put a text object into the move/resize mode in one of two ways:

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 with an in-place ruler 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 is inactive or in the move/resize mode.

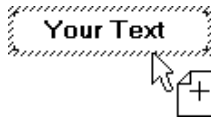
Each text object contains word processor capabilities including the ability to change the fonts for individual characters and fields, and automatic word wrap. In the edit mode you can insert text and such non-text objects as database fields and formulas.

Whenever the object is in edit mode, it contains an insertion point, a flashing vertical line that indicates the position that 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.

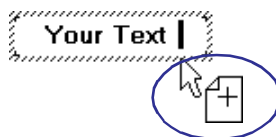
As you work through the tutorials for multiple sections, it is always expected that you will type or place fields at the existing insertion point unless you are told otherwise.

- To select text in a text object (to delete it, to change a font, and so on), 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 64*.
- To select a field in a text object, position the cursor over the field and, when the I-beam cursor appears, right-click.
- To insert text, type in the text you want and it appears at the insertion point.
- To insert a field, you must insert it using a menu command, a button, or a dialog box. You can not simply drag a field into a text object from elsewhere in the report. When the program displays the placement frame, move the frame to the text object. The placement frame changes to a drag and drop cursor when it is in a position where the field can be inserted in the text object. See *Cursors, Page 64*.

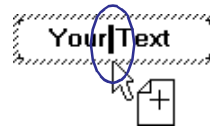


**NOTE:** It is critical that you see the drag and drop cursor before you place the field. If you do not see it, you might place the field so it overlays the text object instead of being inserted in it. It may appear to be inside the text object, but if you move the object the field will not move with 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 120*

## **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 225*, explains how to use multiple form letters or multiple versions of the same form letter for custom mailings. This topic shows you how to create a form letter.

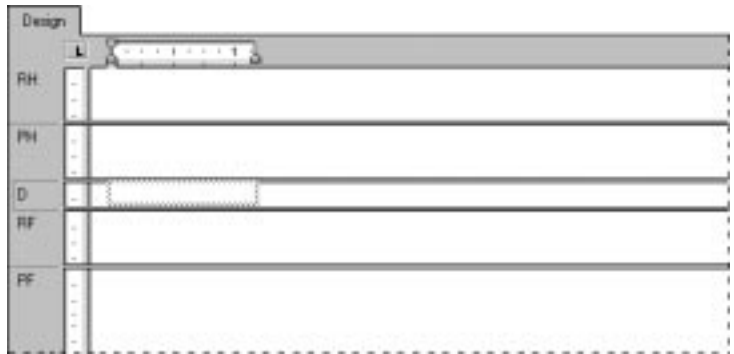
You are going to use a text object to create a form letter. The form letter you create will be tied to a database table so that each letter is customized with company information from a different record.

If you have difficulty performing any of the steps in this tutorial, please see *How to work with text objects*, Page 216.

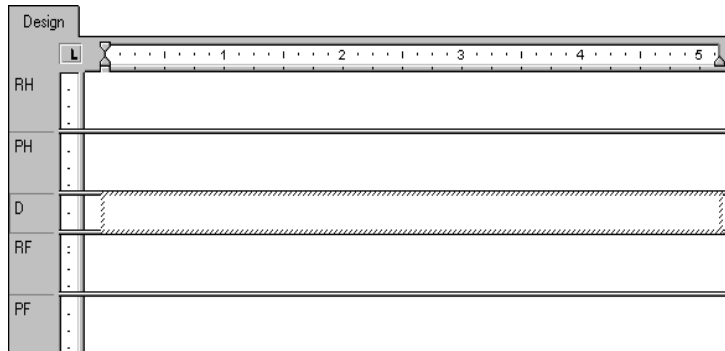
## Creating the form letter

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 CRAZE.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 File Options dialog box.
- 3 Insert a text object in the Details section of your 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.



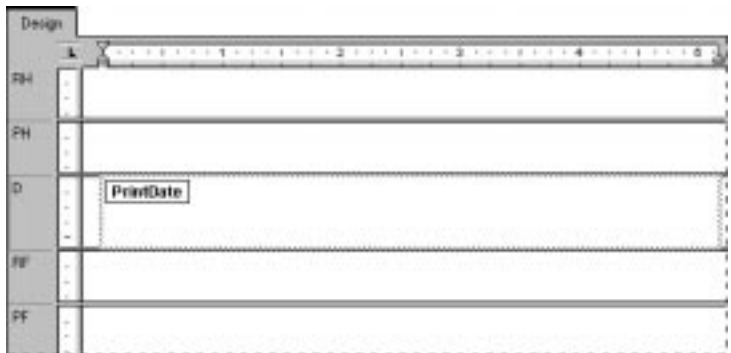
- 6 Double-click inside the text object to place it in edit mode, ready for you to begin your work. When you do this, the insertion point will be positioned at the extreme left, inside the object.

## DATE

- 1 To put a date into the letter, choose the PRINT DATE FIELD command from the Insert | Special Field menu, drag the placement frame into the text object, and place it at the insertion point.

***NOTE: If you want to change the way the date is formatted in the letter, click the border of the text object to put it in move/resize mode, highlight 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 put some white space between the date and the inside address and move the insertion point down within the text object.

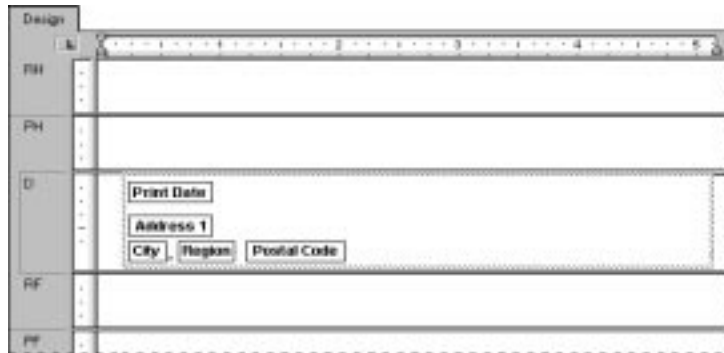


## INSIDE ADDRESS

To create the inside address, drag database fields into the text object from the Customer table in the Insert Fields dialog box.

- 1 Drag in the Address 1 field, place it at the insertion point, and press Enter to place the field. The insertion point will move 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 to place the field. The insertion point will move down to the line below.
- 7 Press Enter one more time to move the insertion point down one more line to the position where you want to start the salutation. This completes the inside address.

**NOTE:** When you place a field into 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 in 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 (do not include the quotation marks) and press Enter to put in a carriage return and move the insertion point to the next line.

The image shows a 'Design' tab in a report builder. On the left is a vertical pane with tabs labeled 'RH', 'PH', 'D', and 'RT'. The 'D' (Design) tab is active, showing a letter template. The template has a header section with a ruler at the top. Below the header is a large text area containing several form fields: 'Print Date', 'Address 1', 'City', 'Region', 'Postal Code', and a salutation line 'Dear [Contact Title] [Contact Last Name]'. The fields are arranged in a structured layout, with 'Print Date' at the top, followed by 'Address 1', then 'City', 'Region', and 'Postal Code' in a row. The salutation line is at the bottom of the visible text area.

## 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 1995 an outstanding year for CRAZE Mountain Bikes. I want to thank you and your staff for your support. I hope 1996 will be a banner year for you.”
- 5 Press Enter twice.
- 6 Type “Sincerely yours” (do not include the quotation marks) followed by a comma, then press Enter four times.
- 7 Finally, to complete the form letter, type your name.

The Design Tab should look similar to this:



- 8 Click the PRINT PREVIEW button on the standard toolbar to preview the form letter.

It should look similar to the following:



## How to format objects conditionally

You may want to create a report that uses different formats based on field values. For example, you may want to print 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 your report. See *Tutorial - Customer List*, Page 165, and *Reporting 101*, Page 95.



- 2 Create one Details section for each country that requires a unique format. See *How to add, delete, move, and merge sections*, Page 89.
- 3 Make certain that each of the Details sections contains the same data. For example, every field that you place in the Details A section, you must also place in the Details B section, Details C section, etc.



- 4 In the Details A section, click the currency field to select it, 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 231.

- 6 Click *OK* to return to your 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)* option on.



- 9 Click the *Conditional Formula* button to the right of the *Suppress* option and 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 specified that the country value is not equal to UK. In other words, suppress the section when the country value is not UK. This would make the section print only when the record contained a UK value.

- 10 Repeat Steps 4 through 9 for each additional section.

Now when you print your report, the date and currency data for each country will appear in the format that is expected for that country. See *Conditional formatting*, Page 235.

## How to print conditional messages in form letters

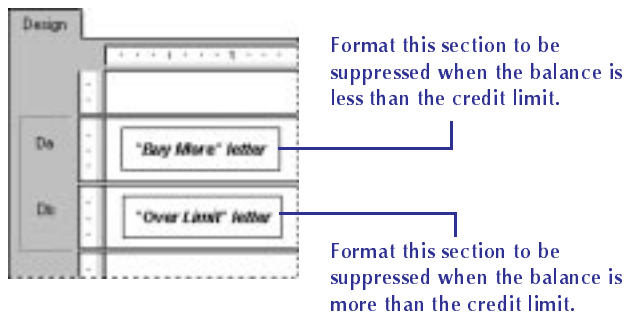
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Many times you may want to print conditional messages in form letters. For example, you may want to encourage customers with available credit to buy more and those who are over their credit

limit to bring their accounts down below the limit once again. You can create both of these letters in a single report.



- 1 Insert a second Details section in your report using the Section Expert. See *How to add, delete, move, and merge sections, Page 89*.
- 2 Create two form letters. Place a letter that encourages customers to buy more in the Details A section of your report; place a letter that encourages customers to bring their balance down in the Details B section of your report. See *How to create a form letter using a text object, Page 218*.
- 3 Using the Section Expert, 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 224*

*Conditional formatting, Page 235*

## **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 to improve readability (a greenbar-paper effect).



- 1 Using the Section Expert, 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 89.
- 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 231.



- 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 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.»

- 4 Now select Details B and set the background color to Green.
- 5 Using the technique from Step 3, 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 your report and make certain that the information and layout of each of the Details sections is identical. In other words, whatever you put in Details A, put it in 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

---

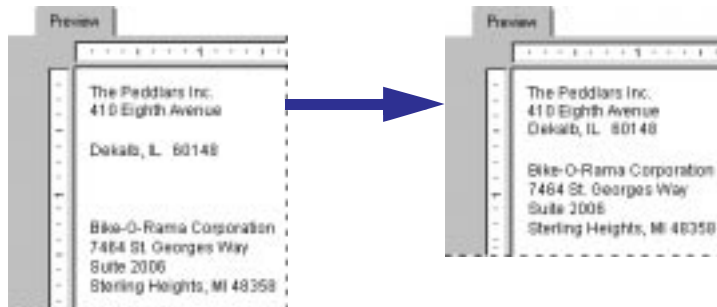
It is very common to have two address lines in a customer table, one (Address 1) for street address and one (Address 2) that can be used for suite number or mail stop. Address 1 usually contains a value but Address 2 is often blank. If you create a customer list

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 Using the Section Expert, create two new Details sections so you have a total of three. See *How to add, delete, move, and merge sections, Page 89*.
- 2 Place the Address 2 field in the middle section and the other data above and below it as you want it to appear in your report.
- 3 Format the middle section to *Suppress Blank Section*. See *How to hide parts of the report, Page 127*.

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 your 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

---

If you want to print a blank line on your report under specific conditions, you can do that using multiple sections. For example, you may want to insert a blank line after every fifth record in your report.

- 1 Create two Details sections. See *How to add, delete, move, and merge sections, Page 89*.

- 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: If you want to insert a blank line under different conditions, you can modify your formula appropriately. See Conditional formatting, Page 235.***



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# 10

## Formatting

### What you will find in this chapter...

*Formatting concepts, Page 232*

*Absolute formatting, Page 233*

*Types of formatting properties, Page 233*

*Conditional formatting, Page 235*

*HANDS-ON (Absolute Formatting), Page 238*

*HANDS-ON (Conditional Formatting), Page 244*

## Formatting concepts

---

In this section, you will learn about formatting your report. Formatting refers to those things that you can do to change the layout and design of your report, as well as the appearance of text, objects, or entire report sections.

You can use formatting to do many things:

- separate sections of your report,
- call attention to certain data,
- change the presentation of dates, numbers, Boolean, currency values, and text (strings),
- hide unwanted sections, or
- give your report a professional appearance.

Seagate Crystal Reports gives you a wide range of formatting commands and properties that you can apply to various elements in your 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, if you want to change page margins, use a dialog box that lets you 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 the properties in one of two ways:
  - 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 your report. See *Absolute formatting, Page 233*, and *Conditional formatting, Page 235*.

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.



## 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 your selection using property settings.

Use the following dialog boxes for formatting your reports:



- Format Editor for formatting field values.
  - Borders Tab of the FORMAT EDITOR for formatting objects, numbers, and text,
  - Box Tab of the FORMAT EDITOR for formatting boxes, and
  - Line Tab of the FORMAT EDITOR for formatting lines.
- Section Expert for formatting entire sections.



Each of these dialog boxes contains a number of different formatting properties and 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:

- On or Off Properties
- Attribute Properties

## ON OR OFF PROPERTIES

An on or off property is a property that is set using a check box.



- When you toggle the check box on, the property is always applied.
- When you toggle the check box 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

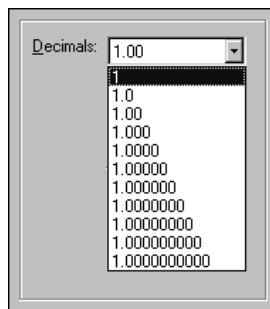
An attribute property is a property that specifies one of many alternative attributes. The *Color* property, for example, gives you the opportunity to specify one of the 16 basic Windows colors or to specify a custom color and then create that color using the tools provided. Clearly such a property can not 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:

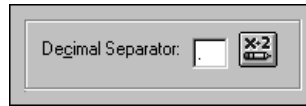
- by clicking an option button,



- by selecting an attribute from a drop-down box,



- or, by typing an attribute in a text box.



## Conditional formatting

---

Conditional formatting is formatting that applies only under certain conditions. For example, 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 for you to apply formatting conditionally in these and hundreds of other situations. See *How to format objects conditionally*, Page 224.

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 those conditions using simple formulas. See *Formulas 101*, Page 321.

**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 you 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 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.

## Conditional attribute properties

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.

A conditional *attribute* property tests to see *which* of two or more conditions are 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, it applies the *red* attribute, if it is not, 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 346.

```
If Condition A Then  
    Red  
Else  
    Black
```

**NOTE:** *When you set up conditional attribute properties, the program loads a selection of attributes into the Functions list in the Formula Editor. You can double-click any of those 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 or three 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, apply the Country A attribute; Country B, apply the Country B attribute; Country C, apply 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 348.

## 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 where values do not fit any of the conditions you 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 box 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. While the topics detail specific reporting needs, they illustrate basic procedures as well.

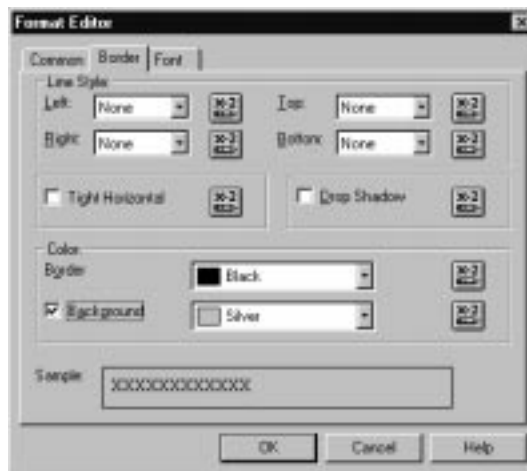
# HANDS-ON (Absolute Formatting)

## How to add color, shading, and borders

---

Seagate Crystal Reports allows you to add color, borders, and shading to fields on your report to emphasize important data and create professional looking reports.

- 1 Right-click the field you want to format and choose the CHANGE BORDER command from the shortcut menu that appears.
- 2 The Format Editor appears. Click the Border Tab to activate it.



- 3 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

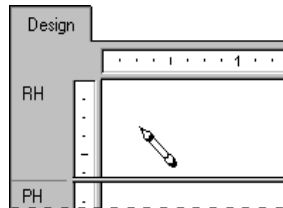
---

Seagate Crystal Reports allows you to add lines and boxes to your report to emphasize important data and create professional looking reports.

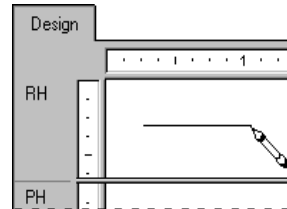
## Adding lines



Click the INSERT LINE button on the supplementary toolbar. A pencil-shaped cursor appears.



Using the pencil cursor, draw the line where desired.



## Editing lines

Right-click the line you want to format and choose the FORMAT LINE command from the shortcut menu that appears. The Format Editor appears with the Format Line Tab active.

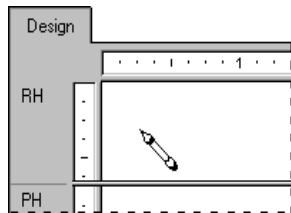


Make the desired changes and click OK when finished to return to your report.

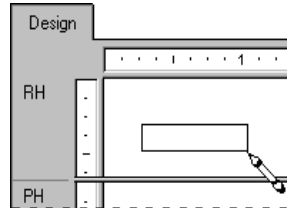
## Adding boxes



Click the INSERT BOX button on the supplementary toolbar. A pencil-shaped cursor appears.



Using the pencil cursor, draw the box where desired.



## Editing boxes

Right-click the box you want to format and choose the **FORMAT BOX** command from the shortcut menu that appears. The Format Editor appears with the Format Box Tab active.



Select the color, width, style, and/or fill color you want and click OK when finished.

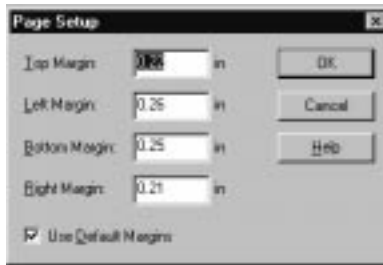
The program formats the selected box to your specifications.

## How to change margins

---

- 1 Choose the **PAGE SETUP** command from the File menu. The Page Setup dialog box appears.





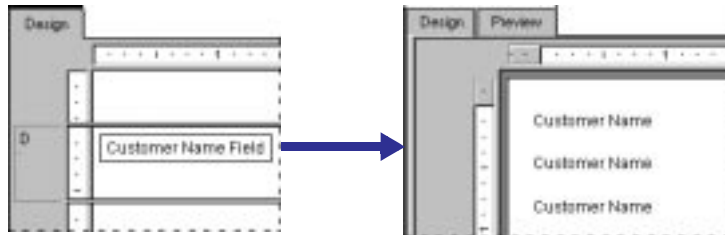
2 Change the default page margins to fit your needs and click OK when finished.

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 in it affects the amount of white space that appears between rows on your report.

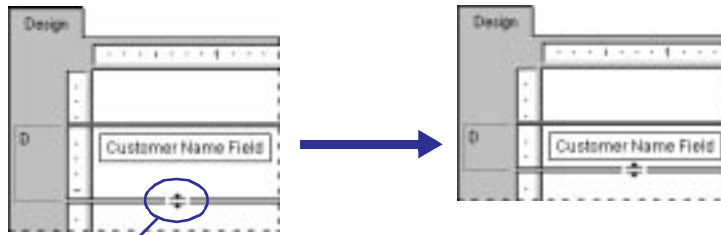


The free form Design Tab allows you to add and delete white space two ways:

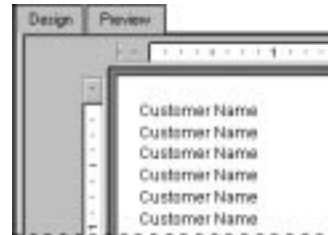
1. by sizing the area in the Design Tab using the resizing cursor, or
2. by changing options using the Section Expert.

### Deleting white space by resizing

To delete unnecessary white space in a section, simply move the mouse pointer over the bottom section boundary line. The pointer will change to a resizing cursor.



When the resizing cursor appears drag the section boundary up to remove extra white space.



*Your report will print like this...*

## Deleting white space using the Section Expert



If an entire section is blank (i.e., if you are not putting anything into the Page Footer section of your report), you can eliminate the unnecessary white space by suppressing the section in the Section Expert.

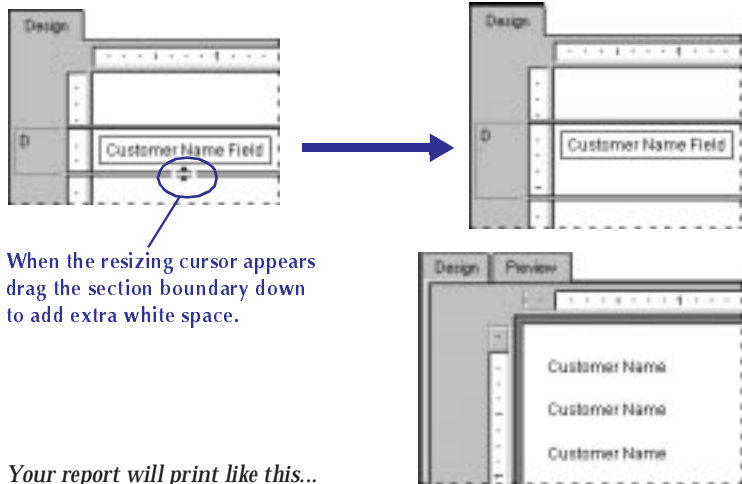
- 1 Click the SECTION EXPERT button on the standard toolbar. The Section Expert appears.
- 2 Highlight the Page Footer section in the *Sections* list box.
- 3 Toggle the *Suppress (No Drill-Down)* option on.

The Page Footer section will no longer print.

**NOTE:** You can also right-click the shaded area to the left of the section and choose the **FIT SECTION** command from the shortcut menu that appears. The program automatically resizes the section so the bottom boundary is even with the baseline of the bottom object in the section. See *How to eliminate blank lines*, Page 227.

## Adding white space by resizing

To add extra white space between rows in your report, simply move the mouse pointer over the bottom section boundary line. The pointer will change to a resizing cursor.



**NOTE:** You can also add white space to a section by right-clicking the shaded area to the left of the section and choosing the **INSERT LINE** command from the shortcut menu that appears. 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, move, and merge sections, Page 89*

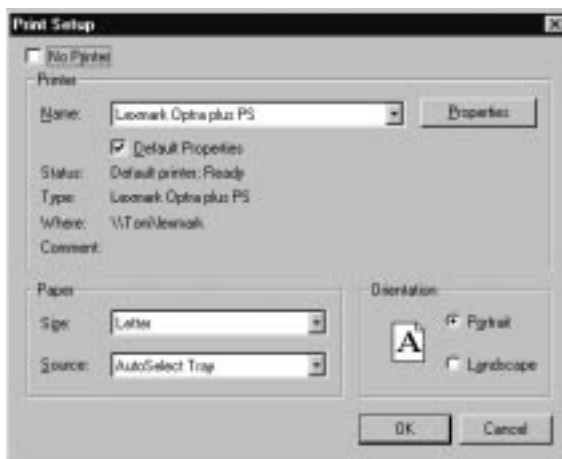
*How to add blank lines conditionally, Page 228*

## **How to set page orientation and paper size**

---

You can print your reports using portrait or landscape orientation in a variety of paper sizes. You 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. Your paper size options are directly related to the printer you have selected.

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 paper size desired and its source from the drop-down boxes in the *Paper* section.
- 5 Click *OK* when finished.

## HANDS-ON (Conditional Formatting)

### How to create a footer that appears on all pages but the first

---

You can print a page footer on all pages except the first page. You do this by formatting the page footer section conditionally using an *on* or *off* property.

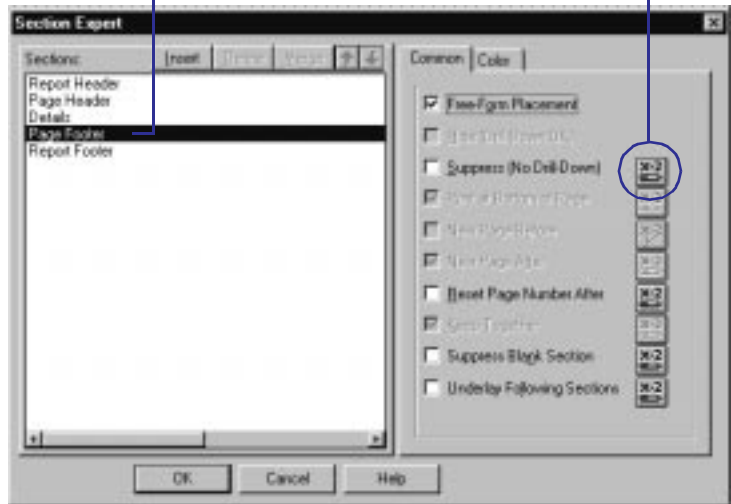
- 1 Place the field you want to display as a page footer in the Page Footer section of your report.



- 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 *Formula text* box:

PageNumber = 1

This formula suppresses the section on the first page but not on any of the other pages.

- 6 Click the *Accept* button.
  - If there is an error in your formula, a Formula Compiler Error will be displayed detailing your error.
  - If there is no error in your formula, you will be returned to the Section Expert. Notice 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 your report ensuring that the page footer appears on all pages but the first.

*NOTE: If you have a multi-line page footer and you have put 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 your 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.*

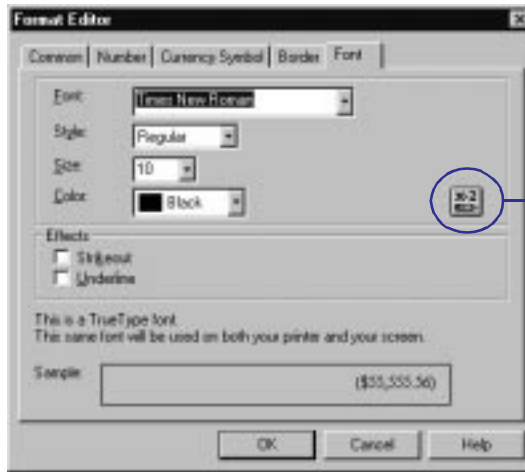
## How to flag values that meet certain conditions

---

You can flag field values that meet certain conditions by formatting the field conditionally using an attribute property.

For the purpose of this example, assume you have a Last Year's Sales field in your report and you want the value to print in Red if sales were less than \$10,000 and to print in Black in all other cases. In this way you are using color to flag values that fall below a certain threshold.

- 1 Right-click the Last Year's Sales field and choose the FORMAT FIELD command from the shortcut menu that appears. The Format Editor appears. Click the Font Tab to activate it.



2 Click the Conditional Formula button to the right of the Color drop-down box to open the Formula Editor.

3 Enter the following formula in the *Formula text box*:

```
If {customer.LAST YEAR'S SALES} < 10000 Then
    Red
Else
    Black
```

See *How to create if-then-else formulas*, Page 346.

4 Click the *Accept* button.

- If there is an error in your formula, a Formula Compiler Error will be displayed detailing your error.
- If there is no error in your formula, you will be returned to the Section Expert. Notice 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.

5 Click *OK* to return to your report.

Now, when you run your report, if the value in the Last Year's Sales field is less than \$10,000, the value will print in red.





---

# 11

## Record and Group Selection

### What you will find in this chapter...

*Record selection, Page 250*

*Group selection, Page 254*

*Record selection formula templates, Page 256*

*HANDS-ON (Record Selection)*

## Record selection

---

### Specifying records/groups to be included

When you select a field to appear on your 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,
- include records for a specific range of account numbers out of the total number of records in the database, or
- include 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 that you can use to specify virtually any kind of record selection that you want. Many times, however, you may not need the flexibility in record selection that the formula language provides. The Select Expert is designed for times like that.



***NOTE: You can use the Select Expert to set up record selection and group selection requests. When you select either a group name or a summary field, 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.***

The Select Expert makes it easy to specify the records you want included in your report. You simply highlight the field that you want to base your selection on 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, the Select Expert provides the tools you need to do it. See *How to set up record selection using the Select Expert, Page 263*, and search for *Select Expert* in Seagate Crystal Reports online Help.

Using the Expert you can set up simple record selection requests:

- customers from Arizona,
- orders in the first quarter, or
- sales over \$10,000.

You can also use it 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: If you want to create 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 kinds 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 using the EDIT SELECTION FORMULA command on the Report menu. Choose either the RECORD or GROUP command from the submenu when it appears.

When you are in the Selection Formula Editor, you can build your selection request using fields, functions, operators, and other formulas. Your 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 *Formulas 101, Page 321*.

For sample record and group selection templates, see *Record selection formula templates, Page 256*, and *How to use record/group selection templates, Page 266*.

Search the *Record/ Group Selection Templates* topic 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 set. You base those conditions on what kind of information you want in your finished report.

Assume, for example, that you want a report that only shows California data. Your challenge is to find the best way to identify those records that come from California.

- If the table that you are using for your report has a State field or a Region field, you can specify in your request that the program use only those records where 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 a way to identify that data in some other way.
  - 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*, ..., *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 on that. Search for Subscript in Seagate Crystal Reports online Help.***

## Interaction of the Select Expert and the Selection Formula Editor

Clearly you are not locked into any one method of record selection. Just because you are not locked into it, however, you should still use care when you set up your selection criteria. For details of some of the things you should consider, see *Selection performance tips*, Page 260.

**NOTE:** *As a general rule, if you can base your record selection on a number of fields (as in this example), select an indexed field instead of a field that is not indexed. See Indexed tables, Page 518.*

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 that you can review and modify using the *Show Formula* button in 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 Set up your selection criteria using the Select Expert.
- 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 want to make changes using the formula language, click the *Formula Editor* button in the expanded Select Expert and make your formula changes using all the tools in the Record Selection Formula Editor.
- 7 Review the results of those changes in the Select Expert. Select each field used in the record selection formula and see 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, the section of the formula code that does that extraction will not be converted to Select Expert selection criteria. This is because there is no facility in the Select Expert to make such an extraction by pointing and clicking.***

## Group selection

---

When you group or summarize data, all the groups in your report are included by default. There may be times, however, when you do not want to include all the groups. For example:

- You may only want to include 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 your report in several different ways.

You can do some kinds of selection 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. When using the group selection method, however, it could conceivably take longer to get the report back.
- Some kinds of selection you can do 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. When using the group selection method, however, it could conceivably take longer to get the report back.

## Select Expert



You can select groups of records using the Select Expert just like you can select individual records.

Instead of basing your selection criteria on standard fields like you do for record selection, however, you base it on group name fields or summary fields when you are setting group selection criteria.

- If you have simply 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 either on the group name field or on the summary field. For example:

```
Sum( {Customer.LAST YEAR'S SALES} ,  
      {Customer.REGION} ) > 10000
```

**NOTE:** *You can use the Select Expert to set up record selection and group selection requests. When you select either a group name or a summary field, 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 select groups using the formula language. To do this you 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 was

the case 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 *Formulas 101, Page 321*.

## Top N

Many 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. Using this Expert, you specify whether you want to display the Top N or Bottom N groups, and then you specify what number *N* is.

For example:

- if you want 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, or
- if you want 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 consideration with 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 set. You need to decide whether to eliminate those records from your report entirely or to lump them all together in a single group with the name you specify. The program enables you to do either. See *How to select the top or bottom N groups, Page 267*.

## Record selection formula templates

---

### Formula templates

The following example formulas can be used as templates to help you create your own selection formulas using the Record Selection Formula Editor. The examples illustrate different kinds of selections that you can do, not necessarily the selection that is best to do from a performance standpoint. To help identify the



best way to set up your record selection, see *Selection performance tips*, Page 260.

**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 that have a value in the {file.FIELD} field greater than 99999.»

```
{file.FIELD} < 99999
```

«Selects those records that have a value in the {file.FIELD} field less than 99999.»

### Range of values

```
{file.FIELD} > 11111 and {file.FIELD} < 99999
```

«Selects those records that have a value in the {file.FIELD} field 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 that have a value in the {file.FIELD} field 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 where the year found in the {file.DATE} field is earlier than 1996.»

```
Year ({file.DATE}) > 1992 and  
Year ({file.DATE}) < 1996
```

«Selects those records where 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 where 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

You can use preset date ranges to create selection formulas similar to these:

```
{file.DATE} in LastFullMonth
```

«Selects those records where 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.»

You can use these templates as is (with your own data), or combine them to create complex formulas, or you can 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 518.
- 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.
- Avoid performing record selection based on formula fields if at all possible because 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 that formula (@ExtendedPrice > 1000, for example), the SQL server will not understand the formula so 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. This can tie up network resources and slow processing time considerably.
- 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. 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.

- When using SQL/ODBC data sources, if you are unsure if the record selection is passing through to SQL or not, 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 of your 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 fact that your driver may use slightly different syntax. This is also 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 so SQL pass through will not occur. Search for *ToText* in Seagate Crystal Reports online Help.

## **Record selection with a group selection formula**

If you need to perform record selection on indexed and non-indexed fields, you can set up your record selection in two steps to maximize performance. You do this by creating a record selection formula and a group selection formula, and using them both to select records. A little explanation is called for here.

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 be used to set up record selection as well.

While the two Formula Editors are fundamentally the same and the formulas they produce look the same, they each produce formulas that are evaluated at different times.

- The formulas from the Record Selection Formula Editor get evaluated as the program reads records.
- The formulas from the Group Selection Formula Editor get 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.

Using this functionality:

- You set up record selection based exclusively on indexed fields in a record selection formula.
- You set up record selection based exclusively on non-indexed fields in a group selection formula.

Since the program runs record selection when it reads records and it 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 5000 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 (5000) records that is 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***

*Formulas 101, Page 321*

*Advanced Formulas, Page 345*

Search for *Functions* in Seagate Crystal Reports online Help.

Search for *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

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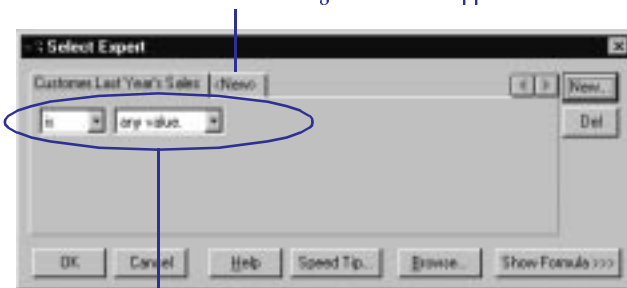
When you work with the Select Expert, you select the field you want to apply selection conditions to and then you specify the conditions.

- 1 You can begin your work in the Select Expert in one of two ways:



- Highlight the field in your report on which you want to base record selection and then 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.
- Without highlighting a report field, click the SELECT EXPERT button on the standard toolbar. The Choose Field dialog box appears with indexed fields identified with colored arrowheads. Select the field you want to base your selection on (preferably an indexed field, see *Indexed tables, Page 518*) and click OK. The Select Expert appears. See *Selection performance tips, Page 260*, and search for *Choose Field dialog box* in Seagate Crystal Reports online Help.

- 2 If you want to base your record selection on more than one field, click the New Tab and choose your next field from the Choose Field dialog box when it appears.



- 3 Use the drop-down boxes to enter your selection criteria for the indicated field.

- 4 Click *OK* when you are finished.

A selection formula will be generated based on your specifications which will limit 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. If you want to use the tools in the Formula Editor to modify the formula, click the Formula Editor button. The formula will appear in the Formula Editor.*

## How to set up group selection using the Select Expert

---

When you work with the Select Expert, you select the summary field you want to apply selection conditions to and then you specify the conditions.

- 1 You can begin your work in the Select Expert in one of two ways:



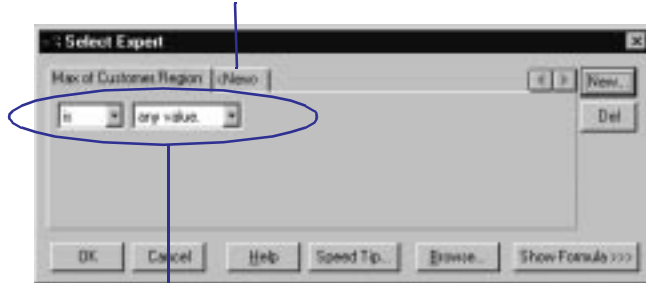
- In your report, highlight the summary field on which you want to base group selection and then click the **SELECT EXPERT** button on the standard toolbar. The program opens the Select Expert, ready for you to set the conditions on the highlighted group field.
- Without highlighting a group field in the report, click the **SELECT EXPERT** button on the standard toolbar. The Choose Field dialog box appears. Select the group field you want to base your selection on and click *OK*. The Select Expert appears.

**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, and they look similar to this in the Choose Field dialog box:*

Group Footer #1: Customer.Region  
Sum of Last Year's Sales



2 If you want to base your group selection on more than one field, click the New Tab and choose your next field from the Choose Field dialog box when it appears.



3 Use the drop-down boxes 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 box. 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 for you to work with.

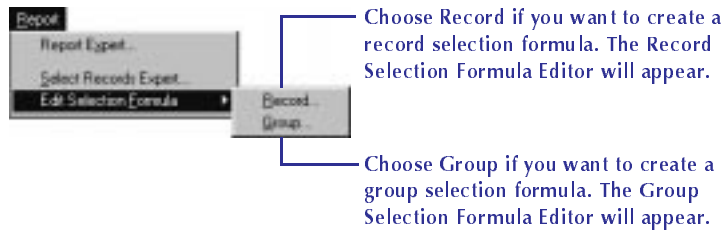
4 When you are finished, click *OK* in the Select Expert to return to your report.

## 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 those tools, see *Formulas 101, Page 321, and Advanced Formulas, Page 345.*

1 Choose the **EDIT SELECTION FORMULA** command from the **Report** menu. A submenu appears.



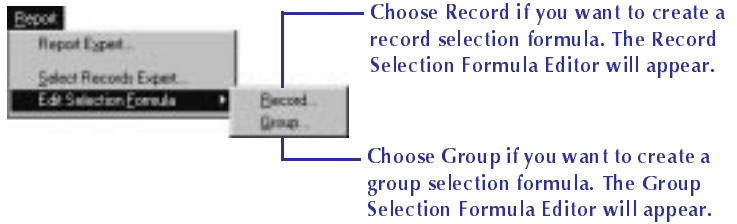
- 2 Enter your selection formula in the *Formula* text box as you would any other formula. Since this is a selection formula, however, the formula must be Boolean (return either a True or False value).
- 3 Click *OK* when finished.
- 4 If the Formula Editor reports errors, debug the formula as necessary and click *OK* again. See *How to debug a formula*, Page 370.

Now, when the program runs the report it will include only those records or groups of records that you specify. See *How to set record selection using parameter fields*, Page 396.

## How to use record/group selection templates

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- 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 256, 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.



- 3 In the *Formula* text box, type in the formula you wrote down in Step 1 or paste it from the Clipboard.
- 4 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 that have a value in the `{orders detail.QUANTITY}` field greater than 25, simply replace the existing values with the values you want so your selection formula reads:

`{orders detail.QUANTITY} > 25`

- 5 Click *Accept* when finished to accept the selection formula and return to your report.
- 6 Click the REFRESH button on the standard toolbar to preview the results.



## How to select the top or bottom N groups

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**NOTE:** *Your report must contain a summary value to be able to perform a top N or bottom N selection.*

When you select top N or bottom N groups:

- choose whether you want 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.

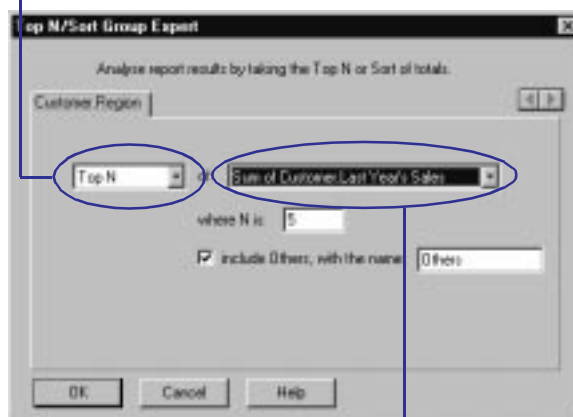
- 1 Create your report and summarize the data as desired. When you summarize the data, the program breaks the data into groups and summarizes each group.
  - With top N grouping, you are instructing the program to display those groups that have the highest summary values (Top N).
  - With bottom N grouping, 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.

**NOTE:** If you have multiple group sections, the program will display a tab for each of the groups.

- 3 Choose Top N, Bottom N, or Sort All from this list.



- 4 Choose the summary that you want to base your selection on.

The summary drop-down box (on the right) is for those cases in which you have multiple summaries in a single group section. For example, in an orders report, you may sum and average the orders for each customer and 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 box.

- 5 In the *where N is* text box, enter the number of groups you want to display. For example, if you want to display the top five groups, type “5” in this box.
- 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 name the group if you want to lump all the other records into a single group.
- 7 Click *OK* when you are finished.

Now, when the program runs the report, it will include only those groups that you specified.



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# 12

## Sorting, Grouping, and Totalling

**What you will find in this chapter...**

*Sorting, Grouping, and Totalling Overview, Page 272*

*Creating custom groups, Page 277*

*HANDS-ON (Sorting, Grouping, and Totalling), Page 280*

## Sorting, Grouping, and Totalling Overview

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Sorting, grouping, and totalling are the steps that turn disorganized data into useful information on a report. Following is an introduction to the concepts behind sorting, grouping, and totalling. Refer to the many Hands-On tutorials for detailed instructions for most of the things you want to be doing in these areas.

### 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 it would have little usefulness if it was not sorted. 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 a John J. Smith, you might use the following levels of sorting to find it.

- The data is sorted 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 by first name so that John Smith comes after Bob Smith. You turn to the John Smiths.
- Finally, when you find the John Smiths (and here again, there are several of them), 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:

- the field you want your sort to be based on (sort field), and
- 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 3.x, Windows NT 3.51 or 4.0) or the Regional section (Windows 95).

You can use any field 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.
  - Then 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 you select a sort field, 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 you group data you have two more sort direction options:

- **Original**

Original order means 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 it begins a new group whenever the value changes in the sort and group by field you select.

- **Specified order**

Specified order means a user-defined order. The program puts each record in 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 277.

## Single field sorts

Single field sorts are sorts in which 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 275, and *How to do a single field sort*, Page 281.

## 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, it then sorts those records only 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. It follows a similar process for three field sorts, four field sorts, and so on. See *Results using different sorting and grouping operations, Page 275*, and *How to do a multiple field sort, Page 283*.

## 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 275*.

## Results using different sorting and grouping operations

The following chart shows the way 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
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.

As you can see, your sorting and grouping choices can have a major impact on the way data appears on your report.

## Creating custom groups

---

Most of the time you sort and group your data based on the values in a field in your 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 and then 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:

- Your report may not contain the field you want to group on. For example, your report contains a City field and a State field but no Country field, but you want to group by country.
- Your report may contain the field you want to group on, but you are not happy with the grouping based on the values in that field. For example, you 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.
- Your report 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 the customized groups you want to appear on your report and the records that each group contains. Your only real limitation is that a record can be assigned to only one group.

To create a custom grouping using specified order grouping, you select *in specified order* as your sort option (whenever the program provides you with that 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,
- whenever you create groups while building a report using one of the Report Creation Experts, or
- whenever you choose the CHANGE GROUP EXPERT command from the Report menu.

## Summarizing group values

One of the primary reasons you might break your data into groups is so 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 of the values in each group and then summarizes them. For example:

- For a customer list, you might want to determine the number of customers in each state. For this report, your 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. For this report, your 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. For this report, your summary would sum or subtotal the order amounts for each sales representative group.

As you can see, you can summarize your grouped data 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,

- the field that is going to 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 are planning 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 two kinds of standard deviations and variances.



You can set up all of these summaries 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

You can sort summarized group values in either ascending or descending order. In an orders report, for example, 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
- the group with the highest subtotal first, then the next highest, and so forth (descending).

You can sort your report based on group values 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 267.

**NOTE:** *To sort groups that are not summarized, choose the CHANGE GROUP EXPERT command from the Report menu.*

## HANDS-ON (Sorting, Grouping, and Totalling)

When you insert a database field into your report, the data within the fields appears in the order it was originally entered into the database.

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>
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

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 \CRW directory.*



## How to do a single field sort

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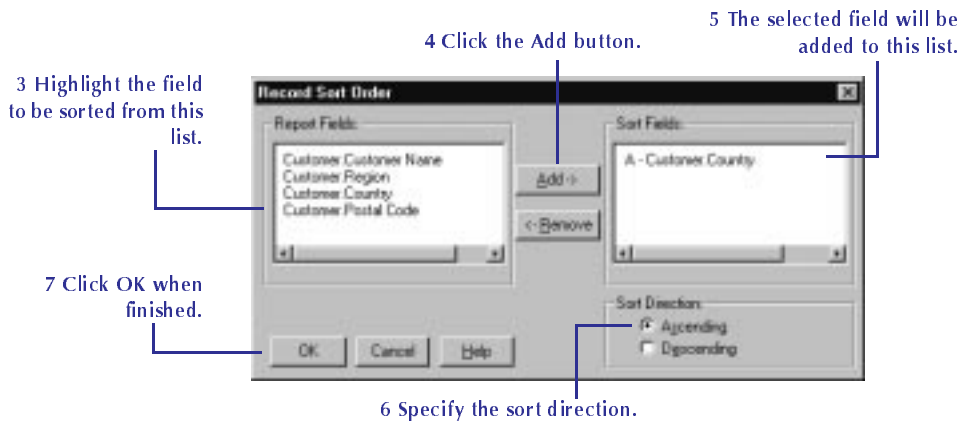
- 1 To get started, create a report using the customer table in CRAZE.MDB, and place the following fields from left to right in the Details section:

```
{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 screenshot 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:

**NOTE:** This example report has been designed to illustrate concepts only, not the actual look of your finished report.

The Regions within each Country remain unsorted.

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>
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.

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, you need to do a multiple field sort.

**NOTE:** To see an example of the above report, open the *SGT02.RPT* file in the \CRW directory.

## ***Related Topics***

*Reporting 101, Page 95*

*How to do a multiple field sort, Page 283*

*How to sort records within groups, Page 287*

## How to do a multiple field sort

---

Using the report you created in *How to do a single field sort*, Page 281, you can further organize your data sorting on multiple fields.



- 1 Click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.

**NOTE:** *The following screenshot 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 second and add it to the Sort Fields list.

4 The selected fields are displayed in the order they are sorted.

6 Click OK when finished.

5 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:

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

	<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>
The Regions within each Country are sorted in alphabetic order.	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
Postal Codes within each Region are unsorted.	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

Countries are sorted in alphabetic order.

Notice that the data is in order 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 \CRW directory.

## ***Related Topics***

*Reporting 101, Page 95*

*How to do a single field sort, Page 281*

*How to sort records within groups, Page 287*

## 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. If you just want your data sorted, follow the sorting procedures outlined in [How to do a single field sort, Page 281](#), and [How to do a multiple field sort, Page 283](#).***

- 1 To get started, create a report using the sample data, CRAZE.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 287*, as well:



- 2 Click the INSERT GROUP button on the supplementary toolbar. The Insert Group dialog box appears.

***NOTE: This example report has been designed to illustrate concepts only, not the actual look of your finished report.***

3 Select the field you want your data grouped by from this drop-down box.

4 Next, specify the sort direction.

5 Click OK when finished.

But, the records within each group are unsorted.

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>
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

The Customers are grouped by Country.

The groups are also sorted in ascending (A-Z) order.

Notice that the values are grouped by Country, and 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 287.

**NOTE:** To see an example of the above report, open the *SGT04.RPT* file in the *\CRW* directory.

### ***Related Topics***

*Reporting 101, Page 95*

*How to sort records within groups, Page 287*

*How to group based on first letter of company name, Page 301*

*How to group data in intervals, Page 305*

*How to create group headers, Page 313*

## **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 example, you must first group your data using the technique in *How to group data, Page 285*.



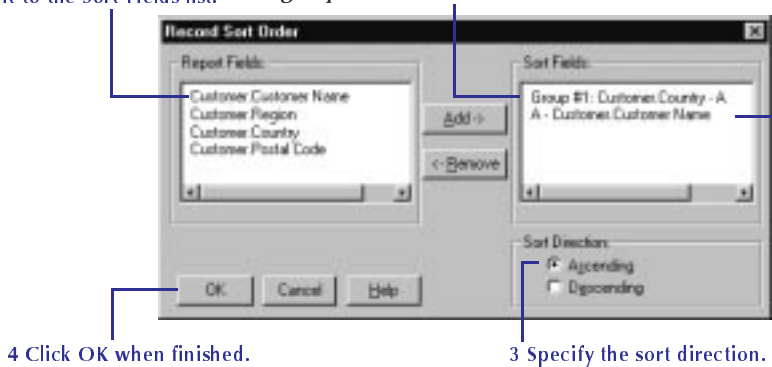
- 1 Once you have your data grouped, click the SORT ORDER button on the standard toolbar. The Record Sort Order dialog box appears.

**NOTE:** The following screenshot 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 to add it to the Sort Fields list.

**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 they are sorted.



**NOTE:** This example report has been designed to illustrate concepts only, not the actual look of your finished report.

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:** To see an example of the above report, open the *SGT05.RPT* file in the *\CRW* directory.

## **Related Topics**

*Reporting 101, Page 95*

*How to do a single field sort, Page 281*

*How to do a multiple field sort, Page 283*

## **How to summarize grouped data**

---

Often you will want to summarize the data in each group and 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 in 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, *CRAZE.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.

**NOTE:** This example report has been designed to illustrate concepts only, not the actual look of your finished report.

3 Select the desired summary operation from this list.

4 Highlight the field you want the data to be grouped by.

5 Specify the sort direction.

6 Click OK when finished.

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>
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
<b>Number of customers in country</b>			<b>4</b>
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
<b>Number of customers in country</b>			<b>6</b>

The data is broken into Country groups.

This will count the records in each group.

**NOTE:** To see an example of the above report, open the *SGT06.RPT* file in the \CRW directory.

## ***Related Topics***

*Reporting 101, Page 95*

*How to subtotal grouped data, Page 291*

*How to create multiple levels of subtotals, Page 297*

*How to extend prices and then subtotal the extensions, Page 293*

*How to calculate a percentage of the grand total, Page 310*

*How to create group headers, Page 313*

## **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.

- 1 To get started, create a report using the sample data, CRAZE.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 the INSERT SUBTOTAL command from the shortcut menu that appears. The Insert Subtotal dialog box appears with the chosen field listed at the top of the dialog box.

**NOTE:** This example report has been designed to illustrate concepts only, not the actual look of your finished report.

Choose the field you want the data grouped by, specify a sort direction and then click OK when finished.

The field you selected to be subtotaled.

Data is broken into Country groups.

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>	<b>Sales</b>
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	
<b>Subtotal</b>				<b>\$66,484.50</b>
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	
<b>Subtotal</b>				<b>\$19,403.10</b>

The values in each group are now subtotaled.

**NOTE:** To see an example of the above report, open the **SGT07.RPT** file in the **\CRW** directory.

## ***Related Topics***

*How to summarize grouped data, Page 289*

*How to create multiple levels of subtotals, Page 297*

*How to extend prices and then subtotal the extensions, Page 293*

*How to calculate a percentage of the grand total, Page 310*

*How to create group headers, Page 313*

## **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 left hand drop-down box.
- 4 In the top drop-down box on the right, select the summary you want to sort by (if 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 for the sort direction you want.
- 6 If you want 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**

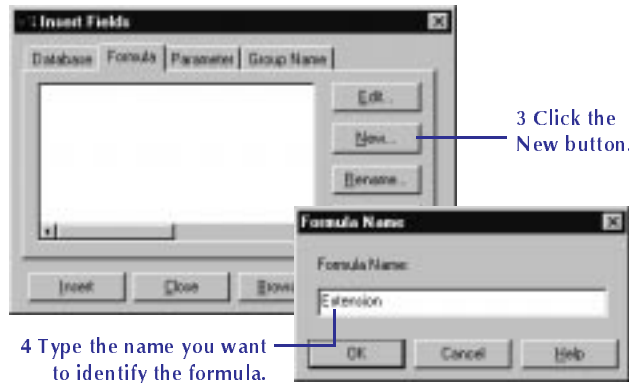
---

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 using a simple formula to extend the prices, and then you subtotal the formula field.

- 1 To get started, create a report using the Orders Detail table in CRAZE.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.

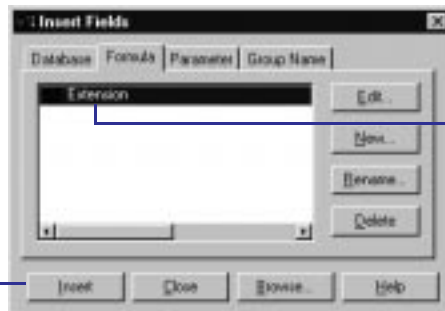


- 5 When you click OK, the Formula Editor appears. Enter the following formula into the *Formula text* box:

```
{orders detail.QUANTITY} *  
{orders detail.UNIT PRICE}
```

See *Formulas 101, Page 321*, for more information on formulas.

- 6 Click the *Accept* 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.



The formula you just created.

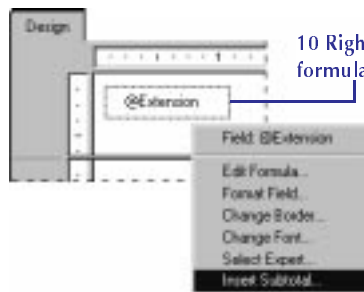
7 Click the Insert button to place the formula in your report.

8 Place the formula field to the right of the Unit Price field in the Details section of your report.

9 Click *Close* to close the Insert Fields dialog box.

Next you will subtotal the extensions.

**NOTE:** In the screenshot below, menus have been shortened by removing some of the commands that are unrelated to the current discussion.



10 Right-click the formula field.

11 Choose the Insert Subtotal command from the shortcut menu that appears.

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.

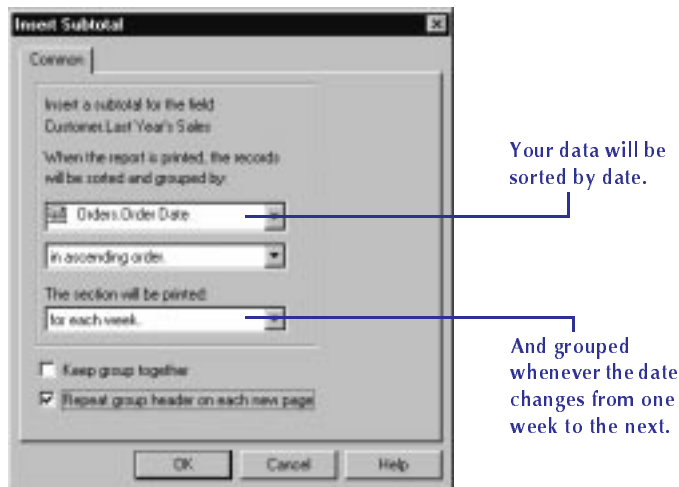
You are interested in weekly sales so you want to create a subtotal whenever the values in the Order Date field change from one week to the next.

- 12 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.*

Your 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:

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*



<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
<b>Sales for Week</b>				<b>\$3,719.40</b>
2	101172	1	\$2,939.85	\$2,939.85
5	402001	2	\$274.35	\$548.70
	301161	2	\$764.85	\$1,529.70
	102151	1	\$1,739.85	\$1,739.85
<b>Sales for Week</b>				<b>\$6,758.10</b>
3	102171	1	\$1,739.85	\$1,739.85
	103181	1	\$899.85	\$899.85
	101182	1	\$2,939.85	\$2,939.85
<b>Sales for Week</b>				<b>\$5,579.55</b>

**NOTE:** To see an example of the above report, open the *SGT08.RPT* file in the \CRW directory.

## ***Related Topics***

*Formulas 101, Page 321*

*How to summarize grouped data, Page 289*

*How to subtotal grouped data, Page 291*

*How to calculate a percentage of the grand total, Page 310*

*How to create group headers, Page 313*

## **How to create multiple levels of subtotals**

---

Sometimes one level of subtotal will not do. For example, you may want to see sales for each region subtotaled, but within each region you may want to see sales for each sales representative or each postal code subtotaled as well. The program enables you to create these multiple subtotals with ease.

There are two keys to effective reporting using multiple subtotals:

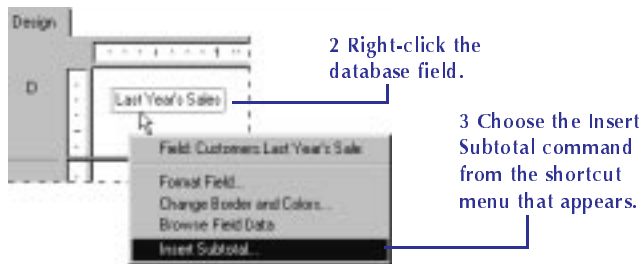
1. First, you need to make sure you enter the subtotals in the correct order. The rule to follow is to go from broad to narrow. For example, if you want to subtotal by country and, within each country, by region, you enter the country subtotal first and then the region subtotal.
2. The other key is to make sure you label the subtotals for clarity. When you have multiple subtotals, it can be difficult to tell which is which unless they are labeled properly.

If you want to subtotal Last Year's Sales by Country and then by Region, here is how you do it:

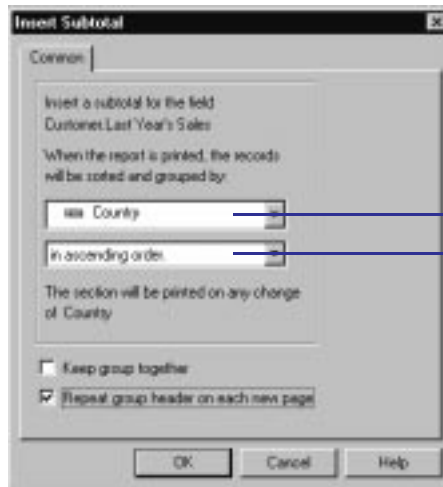
- 1 To get started, create a report using the sample data, CRAZE.MDB, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}  
{customer.REGION}  
{customer.COUNTRY}  
{customer.LAST YEAR'S SALES}
```

***NOTE: In the screenshot below, menus have been shortened by removing some of the commands that are unrelated to the current discussion.***



- 4 When the Insert Subtotal dialog box appears, select Country as your sort and group by field and click OK.



The field you are going to subtotal.

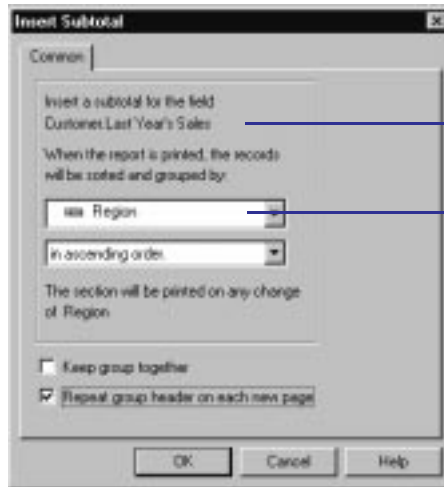
Every time the value in this field changes, this will give you a subtotal for each country.

The program creates a group section (GH1, GF1) and places the subtotal in the Group Footer.



The country subtotal.

- 5 Now right-click the Last Year's Sales field again and choose the INSERT SUBTOTAL from the shortcut menu that appears.



You are subtotaling the same field.

This will give you a subtotal for each region.

- 6 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 285*.



The region subtotal.

The country subtotal.

Your report should look similar to the following:

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

<b>Customer Name</b>	<b>Region</b>	<b>Country</b>	<b>Sales</b>
BG Mountain Inc.	BC	Canada	\$29,485.95
Deely MTB Inc.	BC	Canada	\$3,818.25
<b>Total for BC</b>			<b>\$33,304.20</b>
Allez Distribution	PQ	Canada	\$33,180.30
Montreal Mountain	PQ	Canada	
Hansen MTB Inc.	PQ	Canada	\$5,579.55
<b>Total for PQ</b>			<b>\$38,759.85</b>
<b>Total for Canada</b>			<b>\$72,064.05</b>

Each region is subtotaled.

So is each country.

This report contains multiple levels of subtotals.

**NOTE:** To see an example of the above report, open the *SGT09.RPT* file in the \CRW directory.

### **Related Topics**

For more information on summarizing your data, search for *Summary functions* in Seagate Crystal Reports online Help.

## **How to group based on first letter of company name**

You might want to break your data into groups based on the first letter of the company name. In a customer list, for example, 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 *Formulas 101*, Page 321.

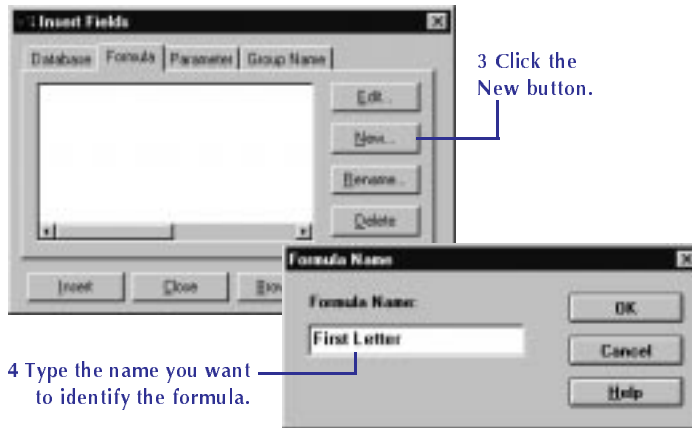
You are going to create a formula that will extract the first letter of each customer's name. Then you are going to group the data using that formula field as the sort and group by field. The program will sort the data based on the first letter of each customer name and start a new group whenever the letter changes.

- 1 To get started, create a report using the sample data, CRAZE.MDB, and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER NAME}
{customer.REGION}
{customer.POSTAL CODE}
{customer.COUNTRY}
```

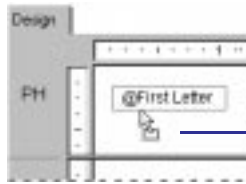


- 2 Click the INSERT FIELDS button on the standard toolbar. When the Insert Fields dialog box appears, click the Formula Tab to activate it.



- 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 *Accept* button. The Formula Editor disappears and you are returned to the Insert Fields dialog box with the name of your formula 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 your report.

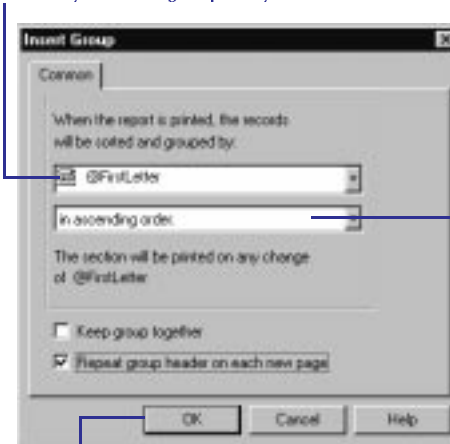
- 9 Place the formula object temporarily in the Page Header section of your report.

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.



- 10 Click the Insert GROUP button on the supplementary toolbar. The Insert Group dialog box appears.

11 Select the formula field as the field you want your data grouped by.



12 Specify the sort direction.

13 Click OK when finished.

You are returned to your report with the data grouped by the formula field as specified.

- 14 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 315.

Your report should look similar to the following:

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

The data is broken into groups based on the first letter in the Customer's Name.

The formula also provides a live header for every group.

Customer Name	Region	Postal Code	Country
<b>A</b>			
Active Outdoors	IL	56478	USA
Allez Distribution	PQ	V6M 4G6	Canada
Amadablam		28001	Spain
<b>B</b>			
BG Mountain Inc.	BC	V3F 2K1	Canada
Bicicleta Conexion		41101	Spain
<b>D</b>			
Deely MTB Inc.	BC	V6Z 2H2	Canada
Desert Mountain	NV	89117	USA

**NOTE:** *To see an example of the above report, open the SGT10.RPT file in the \CRW directory.*

## **Related Topics**

*Formulas 101, Page 321*

*Reporting 101, Page 95*

*How to group data, Page 285*

*How to group data in intervals, Page 305*

*How to create group headers, Page 313*



## 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 you can create 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 in 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, CRAZE.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 the INSERT SUBTOTAL command from the shortcut menu that appears. 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.



- 3 Now click the down arrow in the *Sort Order* list box and select the *in specified order* option. The program creates a new Specified Order Tab in the dialog box.
- 4 Click the Specified Order Tab to activate it.

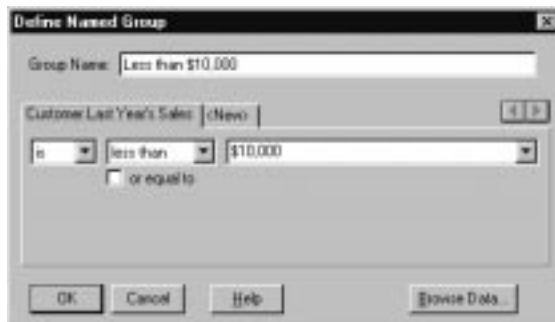


- 5 Click the *New* button. The Define Named Group dialog box appears.



- 6 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.
- 7 Since the first group is to contain only those records that have a Last Year’s Sales figure less than \$10,000, set the three drop-down boxes so your condition reads:

is less than 10000



- 8 Click *OK* to return to the Specified Order Tab.
- 9 Click *New* again, and again the Define Named Group dialog box appears. This time set up a second group that contains values from \$10,000 to \$25,000.
- 10 Type “\$10,000 to \$25,000” in the *Group Name* edit box.
- 11 Set the first two drop-down boxes so your condition reads:

is between

The program creates a fourth drop-down box. There are now two drop-down boxes on the right, one above the other, with the word “and” separating them. Use these drop-down boxes to specify a range of values.

12 To specify the range:

- type “10000” in the top drop-down box, and
- type “25000” in the bottom drop-down box.

You have now set up the group to contain all values between \$10,000 and \$25,000.

13 Click *OK* to return to the Specified Order Tab.

14 To set up your final group, all those values over \$25,000, click the *New* button again.

15 When the Define Named Group dialog box appears, type “Over \$25,000” in the *Group Name* edit box.

16 Set the three drop-down boxes so your condition reads:

is greater than 25000

17 Click *OK* to return to the Specified Order Tab.

18 Immediately to the right of the Specified Order Tab is the Others Tab.



Use this tab to specify how you want it to handle all values that do not fit in any of the groups. Since all of the values in the Last Year's Sales field fall in 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 to identify each of the groups. If you insert the Group Name field into the Group Header (GH) section of your report, the program will use the name you assigned to each group to identify those groups in the report.



- 19 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears.
- 20 Click the Group Name Tab. There should only be one group name in the list: Group #1 Name.
- 21 Drag that name into the Group Header section.

Your report should look similar to this.

***NOTE: This example report has been designed to illustrate concepts only, not the actual look of your finished report.***

<b>Customer Name</b>	<b>Region</b>	<b>Postal Code</b>	<b>Country</b>	<b>Sales</b>
<b>Less than \$10,000</b>				
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
<b>\$10,000 to \$25,000</b>				
Sierra Mountain	NV	86521	USA	\$11,842.95
Desert Mountain	NV	89117	USA	\$18,778.80
<b>Over \$25,000</b>				
BG Mountain Inc.	BC	V3F 2K1	Canada	\$29,485.95
Hansen MTB Inc.	PQ	H1J 1C3	Canada	\$33,180.30

This report is grouped by interval in a specified order.

**NOTE:** To see an example of the above report, open the **SGT11.RPT** file in the **\CRW** directory.

## **Related Topics**

*Formulas 101, Page 321*

*How to group based on first letter of company name, Page 301*

*How to create group headers, Page 313*

## **How to calculate a percentage of the grand total**

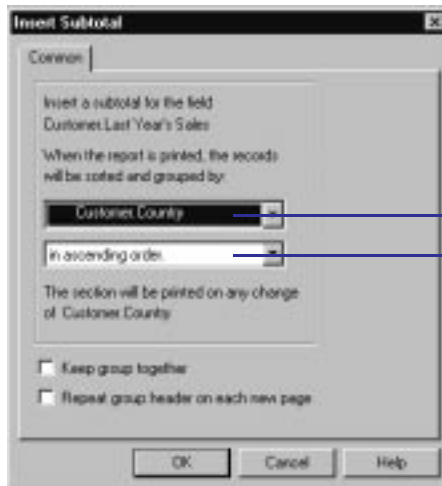
In some reports, you want to see what percentage of the grand total each group contributes. In this example, you will create a report that subtotals orders by country and then determines what percent of total worldwide sales each country generated. The process is simple and straightforward. It uses built-in subtotaling techniques plus one simple formula.

- 1 To get started, create a report using the sample data, CRAZE.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 the INSERT SUBTOTAL command from the shortcut menu that appears.
- 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 your data into country groups and subtotals each group.*

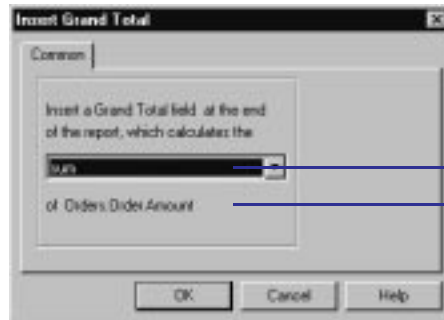


This field will be subtotaled...

whenever the value in this field changes.

- 4 Right-click the Order Amount field again and choose the INSERT GRAND TOTAL command from the shortcut menu that appears. 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.*



The operation to be performed on the field.

The field that is going to be totaled.

All that is left to do now is to determine the percentage of worldwide sales generated by each country. To do this you will need to create a simple formula.

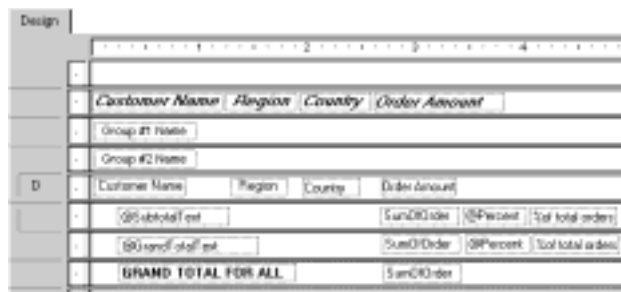
- 5 Open the Formula Editor and enter the following formula in the *Formula text* box:

```
Sum ({orders.ORDER AMOUNT} ,
{customer.COUNTRY})/Sum ({orders.ORDER
AMOUNT} ) *100
```

See *Formulas 101, Page 321*.

- 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:

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

The program calculates the percent of total sales each customer and each country contributes.

Customer Name	Region	Country	Amount
SFB Inc.	CA	USA	\$7,911.80
			\$12,093.60
			\$9,606.30
			\$4,739.55
<b>Subtotal for SFB Inc.</b>			<b>\$34,351.25 8.53% of total orders</b>
Sierra Bicycle Group	CA	USA	\$19,766.20
			\$12,763.95
			\$8,398.50
<b>Subtotal for Sierra Bicycle</b>			<b>\$40,928.65 10.16% of total orders</b>
Sierra Mountain	NV	USA	\$8,233.50
			\$3,609.45
			\$13,543.05
<b>Subtotal for Sierra Mountain</b>			<b>\$25,386.00 6.30% of total orders</b>
<b>Subtotal for USA</b>			<b>\$259,024.65 64.33% of total orders</b>

Each customer is subtotaled.

Each country is subtotaled.

**NOTE:** *To see an example of the above report, open the SGT12.RPT file in the \CRW directory.*

## Related Topics

Formulas 101, Page 321

## 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 topic you will learn how to create the five most common kinds of group headers:

- *Standard headers, Page 314,*
- *Live headers, Page 315,*
- *Live headers for groups based on a formula, Page 317, and*
- *Headers for custom groups, Page 318.*

## 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.



The screenshot shows a preview of a report with a standard header. The header is titled "Region Sales Figures" and lists three items: "Adventure Cycling", "Bohr's Bicycle Distribution", and "The Edge", each followed by the state code "AZ". Below this, another header "Region Sales Figures" lists "BO Mountain Inc." and "Dewey MTD Inc.", each followed by "BC". A third header "Region Sales Figures" lists "Adventure 16" and "Noroad Bike Inc.", each followed by "CA".

Region Sales Figures	
Adventure Cycling	AZ
Bohr's Bicycle Distribution	AZ
The Edge	AZ
Region Sales Figures	
BO Mountain Inc.	BC
Dewey MTD Inc.	BC
Region Sales Figures	
Adventure 16	CA
Noroad Bike Inc.	CA

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 where you want it to print.
- 3 Click inside the frame to select the object for editing, then enter the text you want to use for your 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 120*.

## Live headers

A live header is a header that changes based on the content of the group. If you have your data 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 you create 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 you can 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 simply an identifying field value. To create this kind of live header for region groups, for example, you 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 Field dialog box appears.
- 2 Click the Group Name 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 kind of live header combines text and a field value. A typical group header of this kind for data broken down by region would be, "Sales for California" or "Customers in Postal Code 60606". To create 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 Move the frame for that object in the Group Header section for the group.
- 3 Click inside the object to set the insertion point and type in "Sales for" and a space after it.



- 4 Click the INSERT FIELDS button on the standard toolbar. The Insert Field dialog box appears.
- 5 Click the Group Name 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.

Sales for AZ	
Adventure Cycling	AZ
Bob's Bicycle Distribution	AZ
The Edge	AZ
Sales for BC	
BC Mountain Inc.	BC
Deely MTB Inc.	BC
Sales for CA	
Adventure 15	CA
Monard 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 the letter “B”, and so on. For more information, see *How to group based on first letter of company name, Page 301*.

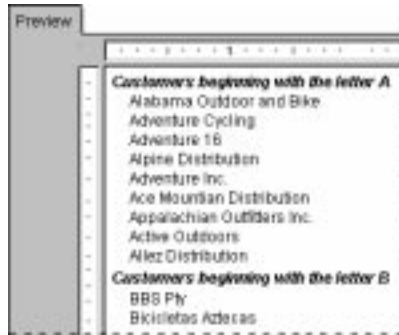


To create a more descriptive header such as “Customers beginning with the letter B”, you simply follow these four steps:

- 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 do not have duplicate headers.



## Headers for custom groups



The final kind of header is a header for the kinds of custom groups you create when you group things in specified order. When using specified order grouping, you specify the name for each group and the records that belong in it. As in the other grouping situations, the program again creates a group name field for each group based on the group names you specified.

- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Field dialog box appears.
- 2 Click the Group Name 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 will automatically apply each of the group names you assigned to the appropriate group.

**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	
	2
<b>\$10,000 or less</b>	
Active Outdoors	\$624.30
Bicicletas Azules	\$0,599.10
Deely MTB Inc.	\$3,819.25
Hansen MTB Inc.	\$0.00
La Bomba de Bicicleta	\$1,856.20
Montreal Mountain Sports	\$5,579.55
<b>Between \$10,001 and \$25,000</b>	
Desert Mountain Bikes	\$18,778.80
Sierra Mountain	\$11,842.95
<b>\$25,001 or more</b>	
Allez Distribution	\$33,180.30
BO Mountain Inc.	\$28,405.95





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# 13

## Formulas 101

### What you will find in this chapter...

*What are formulas?, Page 322*

*How formulas are created - An introduction to the Formula Editor, Page 327*

*Other formula conventions, Page 331*

*Formula syntax, Page 334*

*How formulas are evaluated - Order of precedence, Page 337*

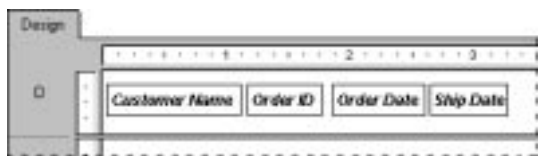
*HANDS-ON (Formulas 101), Page 338*

# What are formulas?

---

In many cases, the data you want to appear on your report already exists in fields in database tables. To prepare an order list, for example, you simply need to place the appropriate fields on your report.

By placing these fields...



<i><b>Customer Name</b></i>	<i><b>Order ID</b></i>	<i><b>Order Date</b></i>	<i><b>Ship Date</b></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

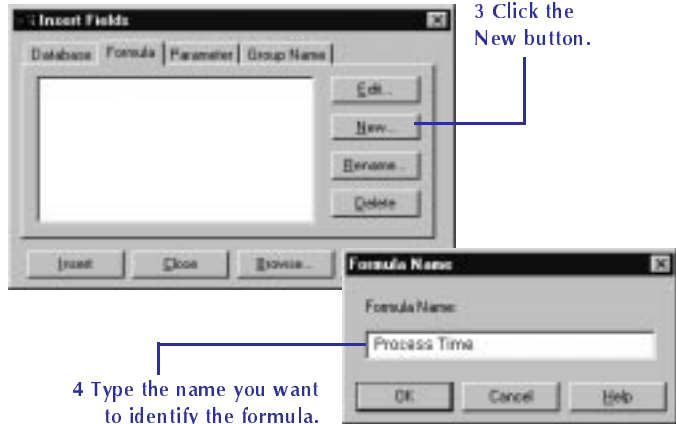
You get this kind of report.

Sometimes, however, you need to put data on your 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.



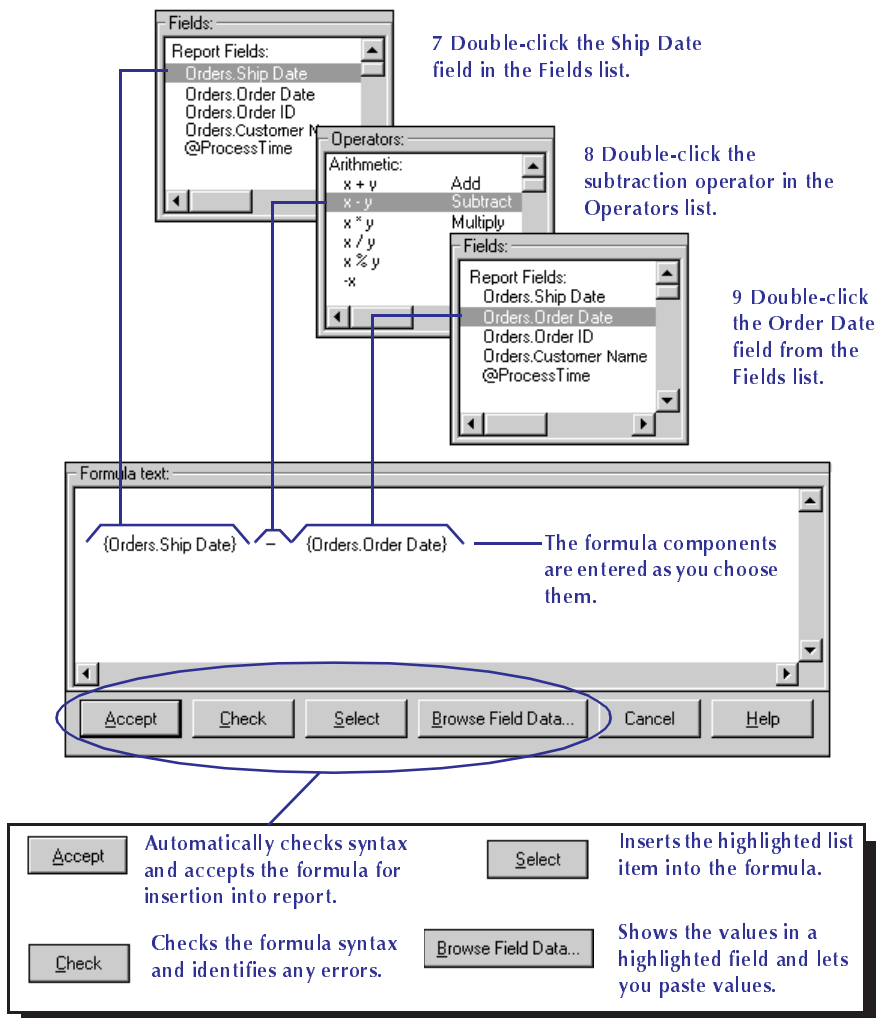
- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears.
- 2 Click the Formula Tab to activate it.



- 5 When you click **OK** in the Formula Name dialog box, the Formula Editor appears. Use the Formula Editor to create, test, and modify your formula.

For more information on the Formula Editor, see *How formulas are created - An introduction to the Formula Editor, Page 327*.

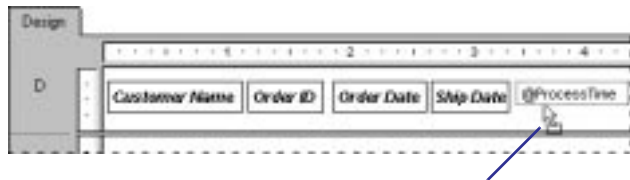
- 6 To build the processing time formula, enter the Ship Date field, the Subtraction operator, and the Order Date field.



**NOTE:** When you double-click an item in the Fields, Functions, or Operators list box, 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 334). If you enter your formula manually, using the keyboard, you have to make certain you enter those syntax items yourself. It is generally safer and quicker to build a formula by choosing list box items.

**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 *Accept* button. The Formula Editor closes and you are returned to the Insert Fields dialog box.
- 12 Click the *Insert* button to place the formula field object in your report.



- 13 When the object frame appears, place it where you want the formula to appear in your report.

<b>Customer Name</b>	<b>Order ID</b>	<b>Order Date</b>	<b>Ship Date</b>	<b>Process Time</b>
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

You get this kind of report.

The formula subtracts the Order Date from the Ship Date and then prints the result here.

This is just one of many of ways you can use formulas 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 349.*»

- pulling out a portion, or portions, of a text string, and

```
{customer.CUSTOMER NAME} [1]
```

«Extracts the first letter of the customer name. See *How to group based on first letter of company name, Page 301*, and search for *Subscript* in 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 345*

## How formulas are created - An introduction to the Formula Editor

---

Creating a formula in Seagate Crystal Reports is much like creating one in your favorite spreadsheet application. You can use:

- **fields:**  
({customer.CUSTOMER LAST NAME}, {customer.LAST YEAR'S SALES}, etc.),
- **numbers:**  
(1, 2, 3.1416),
- **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.).

You combine these components into working formulas using the Formula Editor. 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.

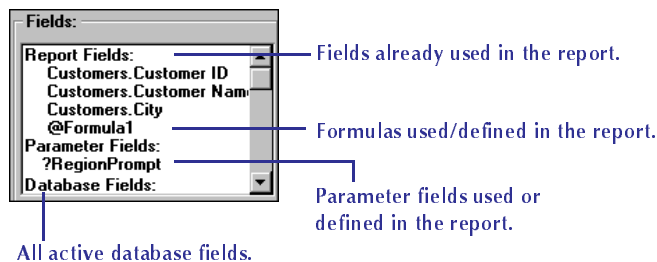
The Formula Editor checks the syntax and helps you debug (fix) problems before you enter the formula into the report.



Using the Formula Editor you combine elements to create a working formula. The three list boxes at the top of the Formula Editor contain the primary formula components.

## Fields box

The *Fields* box contains all the fields you can use as formula arguments.



## HOW TO INSERT FIELDS IN YOUR FORMULA

You can insert fields in your formulas 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* list box, or

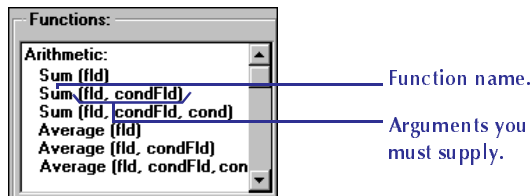


2. by placing the I-beam cursor where you want the field to appear in the *Formula text* box and then typing it in manually.

**NOTE:** Be sure to review the correct syntax for using fields in your formulas. If you do not include the file name, leave out the separating period, or fail to surround the field in braces, the program will generate a *Formula Compiler Error* message detailing your error. See *Formula syntax, Page 334*, and search for *Error Messages and Formula Compiler Warnings in Seagate Crystal Reports online Help*.

## Functions box

The *Functions* box 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 in this box with their arguments and arranged by their use.



## HOW TO INSERT FUNCTIONS IN YOUR FORMULA

You can insert functions in your formulas in the same manner as fields:

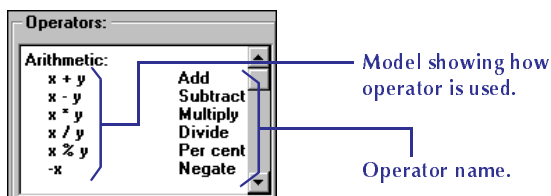
- via the *Functions* box, or
- by typing them in manually.

See *HOW TO INSERT FIELDS IN YOUR FORMULA, Page 328*.

**NOTE:** Be sure to review the correct syntax for using functions in your formula. If a function has required arguments, all arguments must also 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 334*, and search for *Error Messages and Formula Compiler Warnings in Seagate Crystal Reports online Help*.

## Operators box

The *Operators* box 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.



## HOW TO INSERT OPERATORS IN YOUR FORMULA

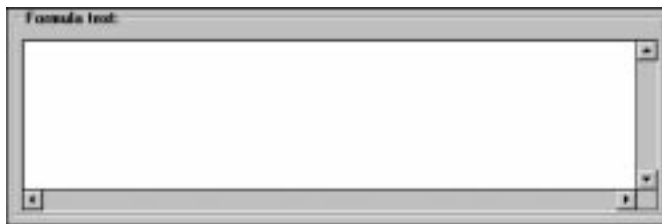
You can insert operators in your formulas in the same manner as fields and functions:

- via the *Operators* box, or
- by typing them in manually.

See *HOW TO INSERT FIELDS IN YOUR FORMULA*, Page 328.

## Formula text box

The *Formula text* box is where you actually enter the formula.



You can:

- enter the formula manually, using the keyboard,
- choose your formula components from the *Fields*, *Functions*, and *Operators* list boxes, 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 IN FORMULAS

You insert text and numbers in 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.

**NOTE:** Be sure to review the correct syntax for text and numbers in formulas. See *Formula syntax*, Page 334.

## 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 enter fields in formulas, you can enter other formulas in 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 337.

## HOW TO INSERT OTHER FORMULAS IN FORMULAS

You can insert other formulas into your formulas in the same manner as you did other fields:

- via the *Fields* box, or
- by typing them in manually.

See *HOW TO INSERT FIELDS IN YOUR FORMULA*, Page 328.

**NOTE:** *Be sure to review the correct syntax for using formula fields in your formula. See Formula syntax, Page 334.*

## 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 many reasons. A typical reason would be to find out the percentage of the grand total that each group contributes. For example, what percentage of the \$2,300,000 US sales figure did the Western Region contribute?

### HOW TO INSERT GROUP FIELD VALUES IN FORMULAS

You can insert group field values into your formulas in the same manner as you did other fields:

- via the *Fields* box, or
- by typing them in manually.

**NOTE:** *Due to the syntax complexity of some group fields, it is highly recommended that you enter group fields by selecting them from the Fields list box versus manually typing them in. See Formula syntax, Page 334.*

## Formula comments

Formula comments are notes that you include 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 over time.

### HOW TO INSERT COMMENTS IN FORMULAS

Type your comments in 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 forcethe 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 your comment is long and automatically wraps to the next line, no additional slashes are necessary; the program treats it as one continuous comment.
- If you break your comment into two or more lines using the Enter key, you must begin each new line with two slashes. If you do not begin each new line 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 you to enter the various components of a formula according to a specific set of rules called syntax. Syntax, like the grammar of any language, takes practice to learn and perfect. 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'`

(enclosed within single (') or double quotes ("))

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.

For example:

#### **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 { } with the table name to identify which database table you are referring to followed by a period and then 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 to do so is optional (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 writing 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 when using the Subscript or Array Operator:

```
{customer.CUSTOMER NAME} [1]
```

- ( ) are called Parentheses and are placed around the arguments of a function:

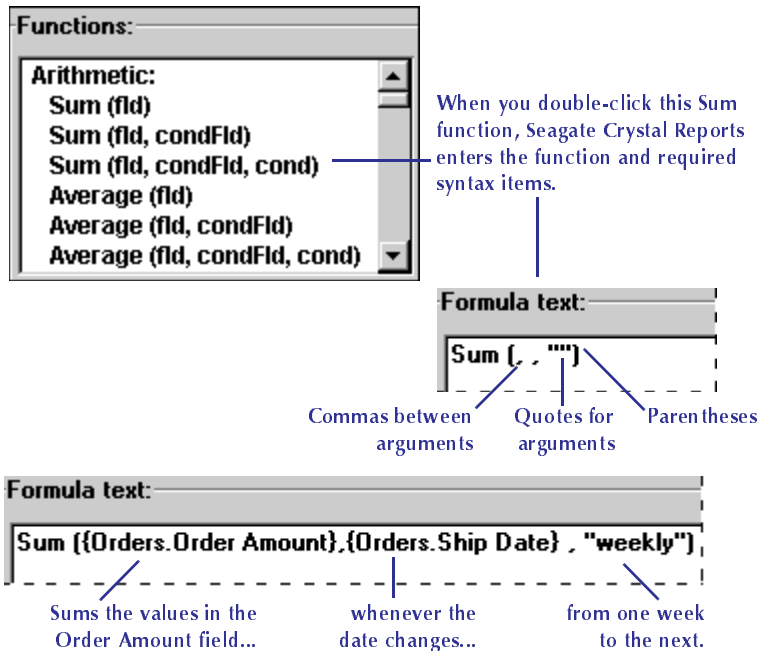
```
Round(x, # places), Abs(x)
```

**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 337.

**HINT:** A useful way to remember which brackets are used for what is the following:

- French { } = Fields
- Square [ ] = Subscript (and Array)
- Parentheses ( ) = Parameters

Whether you enter the formula manually or by double-clicking formula components from the component list boxes, you must use the correct syntax for your formula to work.





## How formulas are evaluated - Order of precedence

---

When you are creating formulas that contain different kinds of operators, it is important to consider the order in which the program evaluates the separate parts 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 with 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.***

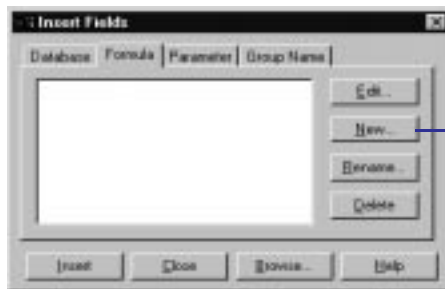
# HANDS-ON (Formulas 101)

## How to insert a formula in your report

---

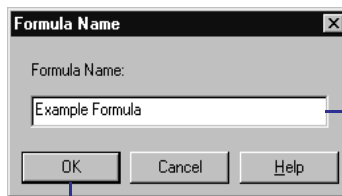


- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box with the Database Tab active. Click the Formula Tab to activate it.



2 Click the New button.

The Formula Name dialog box appears.



3 Enter the name you want to identify the formula in this edit box.

4 Click OK when finished.

The Formula Editor appears.



5 Enter the formula by typing in the components or selecting them from the scroll lists.

- 6 Click the *Check* button to check the syntax in your formula when finished and fix any syntax errors the Formula Checker identifies.
- 7 When the formula has the correct syntax, click the *Accept* button to return to the Insert Fields dialog box. Your formula appears in the *Formula Name* list box.

**NOTE:** When you click the *Accept* 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 your report.
- 9 When you place your cursor over your report, an object frame appears. Click once to set the field in the desired position.

## How to delete formulas from your report

---

When you create a formula and add it to your report, Seagate Crystal Reports:

- stores the specification for creating the formula, using the name you assigned 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 in your report.
- 2 Press the Delete key.

**NOTE:** *Even after you have deleted all of the working copies of a formula from your 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 your 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 cannot 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 choose the Copy command from the Edit menu or press Ctrl-C when finished. 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 used 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 In your report, select the formula field you want to copy.
- 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 where you want it.
- 6 Change the fields, formulas, group fields, conditional statements, and text strings if necessary for use with the data used in this report.

To make these changes (if necessary), right-click the formula and choose the EDIT FORMULA command from the shortcut menu that appears. 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* list boxes. 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 *Accept* when finished.

### ***Related Topics***

*HOW TO INSERT FIELDS IN YOUR FORMULA, Page 328*

*HOW TO INSERT FUNCTIONS IN YOUR FORMULA, Page 329*

*HOW TO INSERT OPERATORS IN YOUR FORMULA, Page 330*





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# 14

## Advanced Formulas

### What you will find in this chapter...

*How to create if-then-else formulas, Page 346*

*How to print Time or dateTime values conditionally, Page 347*

*How to create multi-condition if-then-else formulas, Page 348*

*How to format text with formulas, Page 349*

*How to use variables in formulas, Page 349*

*How to declare a variable, Page 353*

*How to assign a value to a variable, Page 354*

*How to combine a variable declaration and assignment expression, Page 356*

*How to declare and assign values to multiple variables, Page 357*

*How to conditionally assign values to variables, Page 357*

*How to use an array in a formula, Page 358*

*How to use a range in a formula, Page 361*

*How to use semicolons in formulas, Page 363*

*How to fine tune group selection formulas, Page 364*

*How to fine tune record selection formulas, Page 366*

*How to debug a formula, Page 370*

## 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, 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.

### Example

- 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 part is less than or equal to the reorder amount, reorder according to the reorder instructions; if the quantity is greater 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 parts 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 your formula must be the same.*

Thus, if the action that takes place if the condition is met (*Then*) is to print a text string, the action that takes place if 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:** *You can not create 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 because there are no null or empty values for those data types. You can print Time or dateTime values conditionally. See How to print Time or dateTime values conditionally, Page 347.*

## How to print Time or dateTime values conditionally

---

If you want to print Time or dateTime values conditionally (print the field if the condition is met, print the 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 your report and set its *Suppress* property conditionally.

- 1 Place the dateTime field where you want it to print on your 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 in to 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

---

You can create powerful multi-condition formulas using the If-Then-Else operator.

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 346.

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," "Y Action" is printed.
  - If the value of FIELD2 is not "Y," "Y Alternative" is printed.

- If the value of FIELD1 is not “X,” “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 given the work they perform.

## 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.

### Example

```
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 231*

## 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 a newer value, etc.

## Using variables to streamline formulas

Using 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 346, 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 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 formula using a 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
    ""
```

## Using variables to expand formula capabilities

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.

Besides their impact on streamlining formulas, variables allow you to expand your formula writing capabilities. Before discussing the specifics of using variables in formulas, it is important to understand some things about the way the Formula Editor reads formulas.

### SPECIAL REQUIREMENTS FOR USING VARIABLES IN FORMULAS

Through the discussion thus far, formula elements that 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 definition allows 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 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 aside and 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 hold.

The program uses this information to set aside a piece of 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, 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 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:** *You can not declare variables 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 datatype 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 ;
```

If you want to declare a Boolean variable named Outstanding, enter the following declaration statement:

```
BooleanVar Outstanding ;
```

If you want 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 <sup>1</sup>
time	TimeVar	No default <sup>1</sup>
<sup>1</sup> Since Time (00:00:00) is midnight, you can not use 00:00:00 as a default time and you can not use this time value 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 to assign 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 is 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 STATEMENT

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. This type of expression is useful in running total situations where each running total consists of the current amount plus an additional value. See *Advanced Totalling*, Page 377.»

```
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 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 that 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 conditions being met or not 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.
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 order 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".»

You can create an array of values 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.
- There can be a maximum of 100 elements in an array.
- Each element in an array of string values can have a maximum of 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 prefer to use arrays dynamically like this. 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 formula example

To better understand how arrays can be used in formulas, examine the following formula example:

```
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 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 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 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.

1. A variable declaration operator appropriate to the type of values stored by the range, *NumberVar* in this example.
2. The word *Range* follows the variable declaration operator.
3. The name of the range variable follows the word *Range*, *GradeA* in this example.
4. The Assignment operator follows the name and is used to assign the range of values the range variable will store.

Search for *Assignment* in Seagate Crystal Reports online Help.

The range is indicated using the *Make Range* operator with a minimum and a maximum value for the range.

Search for *Make Range* in Seagate Crystal Reports online Help.

Ranges have two principle uses:

- To extract a range of values from all possible values, and
- 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 with the minimum and maximum test scores for each range.

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 prints letter grades in the report that are appropriate to the test scores received by each student.

See *How to create multi-condition if-then-else formulas*, Page 348.

## Extracting a range of characters

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 which region the fax number is in.

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: You can not use a range as an element or as part of an element in an array.***

See *How to create if-then-else formulas*, Page 346, 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 a semicolon 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

---

You may run into situations when using a group selection formula in which no values print, 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 Using CRAZE.MDB, 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 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 291*.
- 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 orders for each state group as a percentage of all orders placed. Place the formula in the Group Footer section of your 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% 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 cannot 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 *Accept* 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 have run into 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 things that you can look for as the cause of your problem in the selection formula:

- *Uppercase/lowercase inconsistencies, Page 366*
- *Number in text object not in quotes, Page 367*
- *Unwanted spaces appear in selection formula, Page 368*

### 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 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 last 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" "b" will be a match, regardless of case, because the case will be converted first to uppercase for consistency.

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 case correct on any text you are trying to match. If in doubt, use the UpperCase (or LowerCase) function to assure consistency and proper matches.

Another formula that does much the same as that above is:

```
"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 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 surround the number with quotes in the selection formula, the selection formula will find no matches and thus 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 in 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 will first begin 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 the written copy of the selection formula to help you reconstruct the selection formula a 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 *Accept* when finished.
- 4 Make certain that all fields referenced in the record selection formula (the selectors) are on the report physically and 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 in an obvious place on the report.

Or, if one of the fields referenced in the selection formula is on the report but 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 referenced by the selection formula prints 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 you are getting satisfactory results without the selection formula, enter the selection formula using only one of the selectors.

For example, if you want to use this as your 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 your first test selection formula:

```
{customer.LAST YEAR'S SALES} > "80000"
```

Print the report and evaluate the data that prints with only one selector activated. In your example, evaluate the data in the {customer.POSTAL CODE} field. Does the 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. In your 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 with the two selectors activated. In your example, 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 you know that 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 your problem and the formula should be selecting records according to your wishes.

## How to debug a formula

---

Follow the example below to practice the necessary steps to debug a formula. After completing this exercise, use the same principles to debug your own formula.

***NOTE: This tutorial uses the CRAZE.MDB sample database located in the \CRW directory or the directory in which Seagate Crystal Reports 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” and 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 CRAZE.MDB and place the following fields from left to right in the Details section:

```
{customer.CUSTOMER ID}  
{customer.CUSTOMER NAME}
```

For each portion of the formula you will place a new formula field next to these two fields in the report to check the condition.

- 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 *Accept* to return to the Insert Fields dialog box.



- 8 Place 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 see 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 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 (,) with a period (.) in the field name.
- 5 Click the *Check* button again. Your 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 see 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. Your 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 see 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. Your 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 see 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 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 your report. You can now delete all other formula fields from your report. See *How to delete formulas from your report*, Page 340.

Use this same process of condition-by-condition testing for any formulas as a means of systematically checking them.





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# 15

## Advanced Totalling

**What you will find in this chapter...**

*Introduction, Page 378*

*HANDS-ON (Advanced Totalling), Page 378*

# Introduction

---

Advanced totalling is any kind of report totalling that requires the extensive use of formulas. Tutorials included in this chapter demonstrate the techniques needed to produce many of the most common reports that require advanced totalling. Each tutorial takes you step-by-step through the process of creating the report and adding the necessary formulas.

The topics covered in this chapter are advanced techniques. Before starting, you should be familiar with how to design reports in Seagate Crystal Reports, how to group values in a report and how to summarize data. You should also know how to use the formula language, including variables, to create formulas and add them to a report.

## Related Topics

*Sorting, Grouping, and Totalling, Page 271*

*Formulas 101, Page 321*

*Advanced Formulas, Page 345*

Search for *Functions Index* in Seagate Crystal Reports online Help.

# HANDS-ON (Advanced Totalling)

## 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, 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 as follows:

<i>Values</i>	<i>Running Total</i>
2	$2 = 0 + 2$
4	$6 = 2 + 4$
6	$12 = 6 + 6$

The most basic form of running total is a single running total maintained throughout a list. In this tutorial you will create that kind of report, setting up a running total for a list of order amounts.

To set up this report, you will create two formulas:

1. **ResetTotal**

This formula resets the Amount variable to \$0.00 at the beginning of the report.

2. **@RunningTotal**

This formula adds the value of the current record to the Amount variable and displays the current total as the running total.

**NOTE:** To see an example of this report, open the report file *RTO1.RPT* located in the \CRW directory.

- 1 To get started, create a report using the sample data, CRAZE.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 Create a formula named *ResetTotal* and enter the following in the Formula Editor:

```
ResetTotal ( "Amount" )
```

This formula says:

```
Reset the value in the Amount variable to  
$0.00.
```

- 3 Place the formula in the Report Header section of your report. Since it's in the Report Header section, it will run only once, at the beginning of the report.
- 4 Right-click the @ResetTotal field and choose the FORMAT FIELD command from the shortcut menu that appears. The Format Editor appears.
- 5 Click the Common Tab to activate it.

- 6 Toggle the *Suppress* option on to hide the field from view when printing, and click *OK* when finished to return to your report.
- 7 Create a formula named *RunningTotal* and enter the following into the Formula Editor:

```
RT ("Amount", "Sum", ToNumber ({orders.ORDER  
AMOUNT})), {customer.CUSTOMER NAME})
```

This formula says:

```
Convert the value in the {orders.ORDER  
AMOUNT} field to a number (if necessary), add  
the value in that field to the Amount  
variable, and keep track of the customer name.
```

***NOTE: If you have NULL values in the field you are performing a running total on, you will have to add code to check for NULL values or toggle the Convert NULL field value to default check box on using the Reporting Tab of the File Options dialog box. Search for File Options dialog box in online Help.***

- 8 Place this formula in the Details section of your report, just to the right of the Order Amount field.

***NOTE: When you place @RunningTotal in the Details section of the report, the formula executes for every record, thus keeping a running total of the Order Amount field. See Area printing characteristics, Page 69.***

Your report should look similar to the following:

***NOTE: This example report has been designed to illustrate concepts only, not the actual look of your finished report.***

The value in each record is added to the sum of the previous value in the report.

<i>Customer Name</i>	<i>OrderID</i>	<i>Amount</i>	<i>Running Total</i>
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 subtotal running totals within groups, Page 381*

*Formulas 101, Page 321*

*Advanced Formulas, Page 345*

*Reporting 101, Page 95*

**How to subtotal running totals within groups**

Another common use of running totals is for 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 example, 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, you will create three formulas:

1. **ResetTotal**  
Sets the value of the Amount variable to \$0.00 at the beginning of each group.
2. **RunningTotal**  
Adds the value of the current record to the Amount variable, and displays the current total as the running total.
3. **PrintTotal**  
Prints the final running total value for the group as the group subtotal.

**NOTE:** To see an example of this report, open the report file *RTO2.RPT* in the \CRW directory.

- 1 To get started, create a report using the sample data, CRAZE.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 Create a formula named *ResetTotal* and enter the following in the Formula Editor:

```
ResetTotal ( "Amount" )
```

This formula says:

```
Reset the value in the "Amount" variable to  
$0.00.
```

- 3 Place this formula in the Group Header section of your report. Since it's in the Group Header section, it will run each time a new group is started. See *Area printing characteristics, Page 69*.

- 4 Right-click the @ResetTotal field and choose the FORMAT FIELD command from the shortcut menu that appears. The Format Editor appears.
- 5 Click the Common Tab to activate it.
- 6 Toggle the *Suppress* option on to hide the field from view when printing, and click *OK* when finished to return to your report.
- 7 Create a formula named *RunningTotal* and enter the following into the Formula Editor:

```
RT ( "Amount" , "Sum" , ToNumber( {Orders.Order  
Amount} ) , {Customer.Customer Name} )
```

This formula says:

Convert the value in the {orders.ORDER AMOUNT} field to a number (if necessary), add the value in that field to the Amount variable, and keep track of the customer name.

***NOTE: If you have NULL values in the field you are performing a running total on, you will have to add code to check for NULL values or toggle the Convert NULL field value to default check box on using the Reporting Tab of the File Options dialog box. Search for File Options dialog box in online Help.***

- 8 Place this formula in the Details section of your report, just to the right of the Order Amount field.

***NOTE: When you place @RunningTotal in the Details section of the report, the formula executes for every record, thus keeping a running total of the Order Amount field. See Area printing characteristics, Page 69.***

Your report should look similar to the following:

***NOTE: This example report has been designed to illustrate concepts only, not the actual look of your finished report.***

This report displays the running total in each group.

Customer Name	Order ID	Amount	Running Total
CyclePath Corp.	10875	\$1,739.85	\$1,739.85
CyclePath Corp.	10898	\$1,799.70	\$3,539.55
CyclePath Corp.	12702	\$2,699.55	\$6,239.10
CyclePath Corp.	13635	\$1,799.70	\$8,038.80
	<b>Total</b>		<b>\$8,038.80</b>
Feel Great Bikes Inc.	10887	\$1,739.85	\$1,739.85
Feel Great Bikes Inc.	11792	\$1,739.85	\$3,479.70
Feel Great Bikes Inc.	12566	\$2,939.85	\$6,419.55
Feel Great Bikes Inc.	14470	\$548.70	\$6,968.25
	<b>Total</b>		<b>\$6,968.25</b>
Paris Mountain Sports	10890	\$1,739.85	\$1,739.85
Paris Mountain Sports	12545	\$2,939.85	\$4,679.70
Paris Mountain Sports	12756	\$1,664.70	\$6,344.40
	<b>Total</b>		<b>\$6,344.40</b>

The value in each record is added to the sum of the previous value in the report.

The running total starts fresh with each new group.

The final running total for each group becomes the subtotal for that group (Header total).

## Related Topics

*How to create group headers, Page 313*

*Formulas 101, Page 321*

*Advanced Formulas, Page 345*

*Reporting 101, Page 95*

## How to subtotal without grouping

There may be times when you have a list of values that are ungrouped, and you only want to subtotal some of the values in the list. For example:

- you have a list that contains both Canadian and US 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 US records.

To do this you will need to create three formulas, one to keep track of US and Canadian records, one to print the US total, and one to print the Canadian total.

1. **USCan**

Maintains separate running totals of US and Canadian records.

2. **PrintUSA**

Prints the grand total of US records.

3. **PrintCanada**

Prints the grand total of Canadian records.

**NOTE:** To see an example of this report, open the *SUBTOTL.RPT* file in the \CRW directory.

- 1 To get started, create a report using the sample data, CRAZE.MDB, and 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 Create the formula *USCan* and enter the following in the Formula Editor:

```
If {Customer.Country} = "Canada" Then
    RT ("CanadaAmount", "Sum",
        ToNumber({Customer.Last Year's Sales}),
        {Customer.Customer Name})
Else If {Customer.Country} = "USA" Then
    RT ("USAAmount", "Sum",
        ToNumber({Customer.Last Year's Sales}),
        {Customer.Customer Name})
Else
    0
```

This formula says look at each record:

- If the value in the {customer.COUNTRY} field is “Canada”, add the value in the {customer.LAST YEAR’S SALES} field to the value in the CanadaAmount variable.
  - If the value in the {customer.COUNTRY} field is “USA”, add the value in the {customer.LAST YEAR’S SALES} field to the value in the USAAmount variable.
  - If the value is something other than “Canada” or “USA”, print 0.
- 4 Place this formula in the Details section, just to the right of the {customer.LAST YEAR’S SALES} field.

***NOTE: It is critical that you place this formula in the Details section. Since the formula has to evaluate each record, it has to run every time the program prints a record and that happens only if you place it in the Details section. See Area printing characteristics, Page 69.***

- 5 Create the *PrintCanada* formula and enter the following in the Formula Editor:

```
RT ( "CanadaAmount" , "Fetchsum" ,  
ToNumber( {Customer.Last Year's Sales} ) , "" )
```

This formula says to print, as a total, the value in the CanadaAmount variable.

- 6 Place this formula in the Report Footer section, just below the Last Year’s Sales field.

***NOTE: It is critical that you place this formula in the Report Footer section so it gets evaluated and printed just once, at the end of the report. This will provide you with a total of all the US values for the entire report. See Area printing characteristics, Page 69.***

- 7 Create the *PrintUSA* formula and enter the following in the Formula Editor:

```
RT ( "USAAmount" , "Fetchsum" ,  
ToNumber( {Customer.Last Year's Sales} ) , "" )
```

This formula says to print, as a total, the value in the USAAmount variable.

- Place this formula in the Report Footer section, just to the right of the @PrintCanada formula.

**NOTE:** Just as before, it is critical that you place this formula in the Report Footer section.



Your report should look similar to the following:

**NOTE:** This example report has been designed to illustrate concepts only, not the actual look of your finished report.

<b>Customer Name</b>	<b>Country</b>	<b>Last Year's Sales</b>
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
	<b>USA Total</b>	<b>\$82,034.10</b>
	<b>Canada Total</b>	<b>\$68,548.02</b>

## How to subtotal true A to B, A to C reports

The term A to B, A to C report has been 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 532). 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 that 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
Smith	3	-45.00	4	30.00

Using a standard subtotal on these groups for both the Order Amount field and the Credit Amount field, the single credit for Jones is counted twice, and the subtotal displays an inaccurate value of -20.00. It should only count this value once and display a subtotal of -10.00 because that is the total credit Jones has.

<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 would also occur in the Order Amount field if, for instance, Jones had two different Credit Amounts and only one Order Amount. You can avoid this problem by creating a formula for each field you want subtotaled, and placing the formula in the Group Footer (GF).

**NOTE:** For an example of this report, open the *TRUEABAC.RPT* file in the *\CRW* directory.

- 1 To get started, create a report using the sample data, *ORDRCR.MDB*, and place the following fields from left to right in the Details section:

```
{cust.NAME}  
{credits.CREDIT ID}  
{credits.CREDIT AMOUNT}  
{orders.ORDER ID}  
{orders.ORDER AMOUNT}
```

**NOTE:** The sample data in *ORDRCR.MDB* has been specially designed to demonstrate a true A to B, A to C link. Make sure that the {credits.CUST} field is linked to both the {orders.CUSTOMER} and {cust.NUMBER} fields in the Visual Linking Expert.



- 2 In the Design Tab, highlight the {orders.ORDER AMOUNT} field and insert a subtotal, grouping on the {cust.NAME} field.



- 3 Create a second subtotal for {credits.CREDIT}, again grouping on {cust.NAME}.
- 4 Click the Preview Tab, and notice that the {credits.CREDIT AMOUNT} subtotal for Jones is twice as large as it should be (there is only one credit for Jones, but it appears twice, once for each order).



- 5 Create a new formula, named *Credits Subtotal*. Enter the following in the Formula Editor:

```
DistinctCount({credits.CREDIT ID},  
{cust.NAME}) * Average({credits.CREDIT},  
{cust.NAME})
```

This formula says:

Count the number of actual credits given to the customer in {cust.NAME}. Multiply this value by the average of all credit amounts displayed in the report for the customer in {cust.NAME}.

Jones has only one credit. The average of all of the credit amounts displayed for Jones is -10.00 ( $-10.00 + -10.00 = -20.00$ ,  $-20.00 / 2 = -10.00$ ).

- 6 Click *Accept* in the Formula Editor and place the formula in the Group Footer (GF) section next to the subtotal on the {credits.CREDIT AMOUNT} field.
- 7 Notice that the new formula-based subtotal produces the correct result. Delete the original, incorrect subtotal for the {credits.CREDIT AMOUNT} field.

### ***Related Topics***

*Formulas 101, Page 321*

*Advanced Formulas, Page 345*

*Reporting 101, Page 95*

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# 16

## Parameter Fields

### What you will find in this chapter...

*Parameter field objects overview, Page 392*

*Multiple parameter fields, Page 393*

*Parameter field considerations, Page 393*

*HANDS-ON (Parameter Field Objects), Page 394*

## Parameter field objects overview

---

Parameter fields are fields that prompt you to specify a value each time you refresh the data in your 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 one report that you can modify quickly as your needs change. See *Formulas 101, Page 321*.

Imagine that you are creating a report and you want to include only California records. Without parameter fields, you would enter a record selection formula similar to this:

```
{customer.REGION} = "CA"
```

This formula always tests the {customer.REGION} field to see if it holds the value "CA". If it does, it uses the record in the report. If it does not, it rejects the record. The report runs exactly the way you want it. This is fine if you always want to run the report using only California records. But if you want to run it 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 263*.

Using a parameter field in place of the state field value, however, lets you make changes "on the fly", without hard coding a new value. Here is how it works...

- 1 Set up a parameter field by choosing the **PARAMETER FIELD** command from the Insert menu. For the purpose of this example, call that parameter field *Region*.
- 2 Use the parameter field in your 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 you created in Step 1. The program uses the *{?ParameterFieldName}* format for parameter fields in formulas and Experts.

- 3 Whenever you refresh the data in your report, the program prompts you to supply a value for the parameter field or to accept the default value. When you do, the program selects the records for the report using the value you specified.

Using parameter fields, you can create one 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 using multiple parameter fields, the program prompts you for each parameter before it refreshes the data. Thus, you can use a selection formula similar to the following:

```
{customer.REGION} = {?Region} AND  
{customer.LAST YEAR'S SALES} <= {?Sales}
```

This formula will prompt you first for the region you want to report on and then, for the amount that you want to compare last year's sales against.

## Parameter field considerations

---

There are a number of things to keep in mind when you are working with parameter fields.

- You do not have to place a parameter field in your report in order to use it 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, and date.

- Parameter field prompts can be up to two lines long with approximately 40-50 characters per line (depending on character width, up to 255 character limit). The program performs automatic word wrap on prompts more than one line long.
- A parameter field can have only one default value.
- You can use parameter fields in compiled reports to prompt for record selection criteria that you normally would not be prompted for in a compiled report. In this way, the program gives you the opportunity to specify values in compiled report selection formulas that contain fields and operators only. But 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)

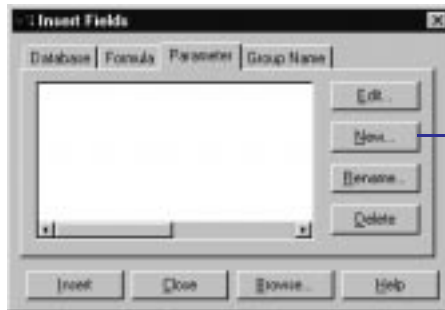
This section includes Hands-On tutorials for performing a number of different tasks using parameter fields. *How to create a parameter field*, Page 394, *How to use a parameter field in a formula*, Page 398, and *How to respond to parameter field prompts*, Page 399, are sequential; they provide an overview of a typical process using parameter fields. The remaining tutorials can be read individually, as needed.

### How to create a parameter field

---

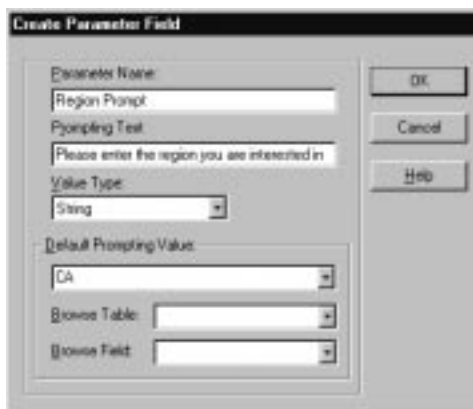


- 1 Click the INSERT FIELDS button on the standard toolbar. The Insert Fields dialog box appears. Click the Parameter Tab to activate it.



- 3 The Create Parameter Field dialog box appears. Enter the following information into the fields provided:
- **Parameter Name:** Enter the name you want to use to identify the parameter field.
  - **Prompting Text:** Enter the text you want to appear when the program prompts you.
  - **Value Type:** Enter the data type of the parameter field.
  - **Default Prompting Value:** Enter the value you want the program to use if you do not supply a new value.
  - **Browse Table:** Use this drop-down box to specify a default table.
  - **Browse Field:** Use this drop-down box to specify a default field.

Your dialog box should look like this:



- 4 Click *OK* to return to the Insert Fields dialog box. The new parameter field is name displayed in the *Parameter Fields* list.

## How to set record selection using parameter fields

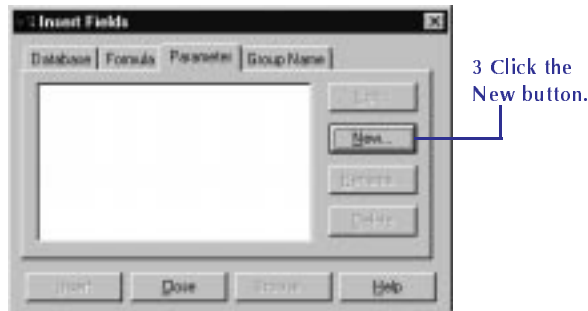
---

You can easily use parameter fields for record selection. In this example, you will create a parameter field that selects regions to include in the report.

- 1 To get started, create a report using the Customer table in CRAZE.MDB, and 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 to activate it.



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 box.
  - Type “CA” in the *Default Prompting Value* drop-down box.
  - Select Customer from the *Browse Table* drop-down box.
  - Select Region from the *Browse Field* drop-down box.
- 5 Click *OK*. You are returned to the Insert Fields dialog box. The parameter field you just created now appears in the list box.
- 6 Click the SELECT EXPERT button on the standard toolbar. The Choose Field dialog box appears.
- 7 Select Region and click *OK*. The Select Expert appears.
- 8 Leave the first drop-down box set to *is*. Choose *equal to* from the second drop-down box. A third drop-down box appears.
- 9 Click the arrow on the drop-down box to display the list of regions. The prompting variable that you created now appears at the top of the list.
- 10 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 base record selection on the values you provide. See *How to create a record or group selection formula*, Page 265.

## How to use a parameter field in a formula

---

- 1 In the Insert Fields dialog box, click the Formula Tab to activate it.
- 2 Click the *New* button and type a name for the formula in the Formula Name dialog box when it appears.
- 3 Click *OK* when finished. The Formula Editor appears.
- 4 Create your formula using the parameter field as you would any constant value. For example, instead of creating a formula that hard-codes the region name:

```
{customer.REGION} = "CA"
```

Use a parameter field in place of "CA":

```
{customer.REGION} = {?ParameterFieldName}
```

When you click *Accept*, the program returns you to the Insert Fields dialog box with the name of the formula you just created highlighted in the *Formula* list box.

- 5 Click the *Insert* button and place the formula where you want it to appear in your report.
- 6 Click *Close* to exit the Insert Fields dialog box.
- 7 To see how this field works, click the PRINT PREVIEW button on the standard toolbar to run the report.



A dialog box will appear prompting you for values. See *How to respond to parameter field prompts*, Page 399.

**NOTE:** *The program automatically puts a question mark before the field name to identify it as a parameter field. See Formulas 101, Page 321.*

## 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, you must supply a value before the program will refresh the data.

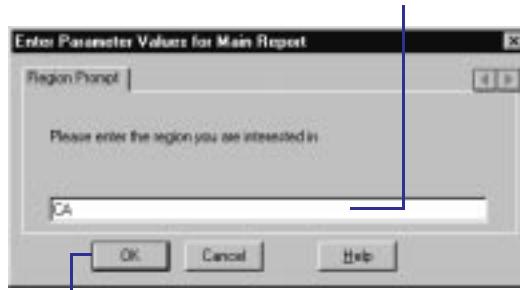
### Refreshing report data

When you refresh data from the Preview Tab, the Refresh Report Data dialog box appears.



- Click the *Use current parameter values* button if you want to use the current parameter value.
- Click the *Prompt for new parameter values* button if you want to enter a new parameter value. If you choose this option and click *OK*, the Enter Parameter Values for Main Report dialog box appears.
  - Date values are entered using the following format: Date (Year, Month, Day). For example, Date (1997, 5, 21).
  - Boolean values are entered using the following format: TRUE or FALSE.
  - String values are entered exactly as they appear in the field.

If you want to use a different value than the default displayed, type a new value in the text box, and click OK.



If you want to use the default value, simply click OK.

The program will now run the report using the new value you specify.

## How to use wildcards with parameter fields

---

You can use wildcards in your parameter field values to increase their flexibility. When prompted for a value, simply respond with a value using a wildcard.

***NOTE: You can only use a wildcard in a parameter field value if the wildcard would have been appropriate in the non-parameterized value (for example, in formulas using the Like operator or the LooksLike function). Search for Functions and Operators and Variables in Seagate Crystal Reports online Help.***

Putting your parameter field in a selection formula using the Like operator, for example, and then responding to the prompt using a wildcard, you can create record selection requests like this:

```
{customer.REGION} like "A?"
```

«The program uses all the records that have a value in the Region field beginning with A, regardless of what the second character is. This kind of request would return records from Alaska (AK), Alabama (AL), Arizona (AZ), and so forth.»

```
{customer.REGION} like "?A"
```



«The program uses all the records with Region values ending in A, regardless of what the first character is. In this case, the request would return records from California (CA), Pennsylvania (PA), Washington (WA), and so forth.»

You can also use the \* wildcard to create record selection requests like this:

```
{customer.POSTAL CODE} like "8*"
```

Here the program uses all the records with Postal Code values beginning with 8. Because you are using a wildcard to designate any and all missing characters, the request would return both five digit and nine-digit (ZIP plus 4) postal codes.

You can restrict your report to a smaller postal code range by increasing the number of constant characters before the wildcard. For example:

```
{customer.POSTAL CODE} like "84*"
```

In this case the program uses all the records with Postal Code values beginning with 84.

### ***Related Topics***

*Record and Group Selection, Page 249*

## **How to conditionally format using parameter fields**

---

You can create conditional formatting formulas using parameter fields that you can customize whenever you refresh the data in the report. A typical use for such a formula would be for color-flagging data if it meets certain conditions. For example:

- sales representatives who have sales 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 changes, you do not need to use parameter fields. You can just use formulas

(for text flags) or conditional formatting (for color or border flags). But if you want to change the conditions from report to report, you can use parameter fields in formulas and conditional formatting formulas to do it.

- 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 print the names in red of all the customers who had sales last year over a certain value (that you want to be prompted for), 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 over the threshold figure. You can change the figure if you wish every time you run the report and the program will flag a different set of Customer Names each time.

## ***Related Topics***

*How to create if-then-else formulas, Page 346*

*Conditional attribute properties, Page 236*

*Conditional formatting, Page 235*

*How to format objects conditionally, Page 224*

## How to set a report title using parameter fields

---

Using a parameter field, Seagate Crystal Reports allows you 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 *Parameter Name* edit box. Type any prompting text you want to appear in the Prompting Text edit box. Select String in the *Value Type* drop-down box.
- 4 Click *OK* when finished. You are returned to the Insert Fields dialog box. The parameter field you created appears in the list.
- 5 Select the parameter field and click the *Insert* button.
- 6 Place the parameter field in the Page Header section of your report if you want the title to 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. You can change the title if you wish every time you run the report.

## How to set sort order using parameter fields

---

To set the sort order using parameter fields, you need to create a formula that includes a parameter field and then sort 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 394.
- 2 In the *Prompting Text* edit box, type 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 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 348.»



- 4 Place the formula in the Report Header section of your report and toggle its *Suppress* option on in the Section Expert so it does not print. Search for *Section Expert* in Seagate Crystal Reports online Help.



- 5 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 281.

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.

---

# 17

## Graphing

### What you will find in this chapter...

*Graphing Overview, Page 406*

*Where to place your graph, Page 407*

*Data you can graph on, Page 408*

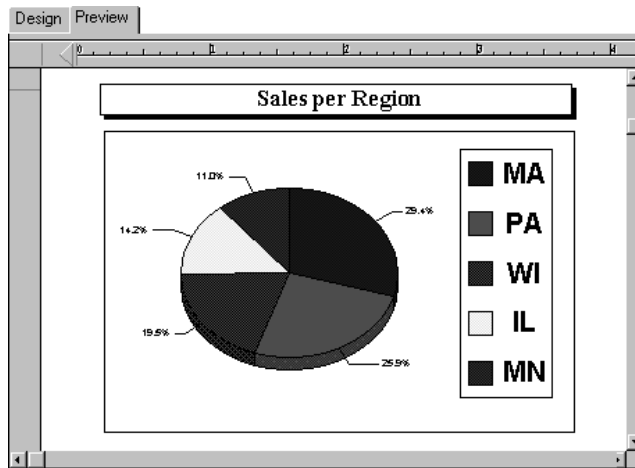
*Before you create your graph, Page 408*

*HANDS-ON (Graphing), Page 408*

## Graphing Overview

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Seagate Crystal Reports enables you to include sophisticated, colorful charts and graphs in your reports. You can use graphs any time you want to improve the usability of your report. For example, you can use graphs to show 1995 fiscal results or the sales within the fiscal quarters.



## Choosing a graph or chart type

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Seagate Crystal Reports provides 12 graph/chart types. Different sets of data are particularly suited to a certain graph/chart type. The following is an overview of main graph/chart types and their most popular uses.

- **Side by Side bar graph**

A Side by Side bar graph (also known as a column graph) displays a series of vertical bars. This type of graph is best suited for showing data for several groups over a period of time (for example, last year's sales figures for CA, AZ, OR, and WA). Also available is a 3D Side graph.

- **Stacked Bar**

A Stacked Bar graph displays data as a series of vertical bars. This type of graph is best suited for representing three series of data, each series displayed as a different color stacked in a single bar (for example, sales for 1994, 1995, and 1996). Also available are a 3D Stacked graph, Percent Bar graph, and a 3D Percent Bar graph.

- **Line**

A Line graph displays data as a series of points connected by a line. This type of graph is best suited for showing data for a large number of groups (for example, total sales over the past several years).

- **Area**

An Area graph displays data as areas filled with color or patterns. This type of graph 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. This type of chart can only be used with one group of data (for example, the percentage of sales for entire inventory). Also available are a Multiple Pie chart and a Weighted Pie chart.

## Where to place your graph

---

Where you place your graph determines what data gets displayed and where it is printed. For example, if you place a graph in the Report Header section, the graph 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 graphs in those subreports as well. See Subreports, Page 429.*

### Drill down with graphs

Not only is a graph a powerful way of presenting data, it is also a powerful analysis tool. When you place your mouse pointer over a segment of the graph in the Preview Tab your mouse will become a drill down cursor. You can double-click to see the details supporting that section of the graph.

## Data you can graph on

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You can graph on the following:

- summary and subtotal fields (see *How to graph on a summary or subtotal field*, Page 408),
- detail fields (see *How to graph on a details field*, Page 409).
- formula fields (see *How to graph on a formula field*, Page 411), and
- cross-tab summaries (see *How to graph on cross-tab summaries*, Page 412),

## Before you create your graph

---

By default, graphing is performed on summarized data at the group level. In other words, you are graphing summary and subtotal information. Before you can create a graph, you must have at least one group and one summary or subtotal in your report.

For example, if you have a sales report grouped by Region and a subtotal of Last Year's Sales for each Region, you can quickly create a graph that will display sales by Region.

## HANDS-ON (Graphing)

### How to graph on a summary or subtotal field

---

Many of the graphs/charts you will create will be based on summary or subtotals within your report. In order to create these graphs/charts, you must have a summary or subtotal already inserted in your report. For more information on inserting summaries or subtotals, see *How to summarize grouped data*, Page 289 and *How to subtotal grouped data*, Page 291.





- 1 With the summary or subtotal field selected, click the INSERT CHART button on the standard toolbar. The Graph/Chart Expert appears with the Type Tab active. Twelve graph/chart types appear as buttons.
- 2 Click the type of graph/chart that will best illustrate your data (see *Choosing a graph or chart type*, Page 406).
- 3 Click the *Group* button on the Data Tab to specify that your graph/chart will be based on grouped data.

**NOTE:** *When you summarize or subtotal a field the data is automatically grouped. For more information, see *Sorting, Grouping, and Totalling*, Page 271.*

- 4 Specify the data you want to graph on using the appropriate drop-down boxes.
- 5 If desired, add text to your graph using the Text Tab and add a legend, grid lines, etc., using the Options Tab.
- 6 Click the *Graph Done* button when you are finished. An object frame appears. Position the frame where you want the graph to print and click once to place it.

**NOTE:** *When you insert a graph/chart, it may cover a portion of your report. You will need to move the graph/chart and possibly resize it to fit in your report the way you want.*

## How to graph on a details field

---

A Detail Graph/Chart allows you to create a graph or chart based on specific values. Often, graphs are created based on some type of summary field in your report where the values plotted in the chart are dependent on the values in the summary field. With a Detail Graph/Chart, you can create a graph or chart without the need for a summary field by using values that appear in the Details section of your report.

To create a Detail Graph/Chart, you need to specify two things:

1. Condition.
2. Value.

## Condition

The *Condition* is used to indicate **when** to plot the point. For example, the graph 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 Graph/Chart uses the *Value* to indicate **what** is plotted as the points on your graph. For example, if you want to create a graph 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 representing the corresponding value in the Last Year's Sales field.

Creating and modifying your Detail Graph/Chart is easy with the use of the Graph/Chart Expert. The Expert walks you through the creation of your graph step-by-step.



- 1 Highlight the details field you want to graph on and click the INSERT CHART button on the standard toolbar. The Graph/Chart Expert appears.
- 2 Choose the type of graph/chart you want to create by clicking the corresponding button on the Type Tab.
- 3 Click the Data Tab to activate it.
- 4 Click the *Detail, Formula* button to specify a Detail graph/chart.
- 5 Enter the condition (**when** values will be plotted) and value (**what** values will be plotted) in the appropriate boxes.
- 6 Enter a title, headings, etc., if desired using the Text Tab.
- 7 Add a legend, grid lines, and other elements to your graph/chart using the Options Tab.
- 8 Click the *Graph Done* button when you are finished. An object frame appears. Position the frame where you want the graph to print and click once to place it.

**NOTE:** *When you insert a graph/chart, it may cover a portion of your report. You will need to move the graph/chart and possibly resize it to fit in your report the way you want.*

## How to graph on a formula field

---

Seagate Crystal Reports allows you to create a graph based on a formula field. Graphing on a formula field is much like graphing on a details field (see *How to graph on a details field*, Page 409).

To create a graph/chart for a formula field you need to specify two things:

1. Condition.
2. Value.

### Condition

The *Condition* is used to indicate **when** to plot the point. For example, the graph 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** is plotted as points on your graph. For example, if you want to create a graph 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 representing the corresponding value in the Last Year's Sales field.



- 1 Highlight the formula field you want to graph on and click the INSERT CHART button on the standard toolbar. The Graph/Chart Expert appears.
- 2 Choose the type of graph/chart you want to create by clicking the corresponding button on the Type Tab.
- 3 Click the Data Tab to activate it.
- 4 Click the *Detail, Formula* button to specify a graph/chart for formulas.
- 5 Enter the condition (**when** values will be plotted) and value (**what** values will be plotted) in the appropriate boxes.
- 6 Enter a title, headings, etc., if desired using the Text Tab.
- 7 Add a legend, grid lines, and other elements to your graph/chart using the Options Tab.

- 8 Click the *Graph Done* button when you are finished. An object frame appears. Position the frame where you want the graph to print and click once to place it.

**NOTE:** *When you insert a graph/chart, it may cover a portion of your report. You will need to move the graph/chart and possibly resize it to fit in your report the way you want.*

## How to graph on cross-tab summaries

---

Seagate Crystal Reports allows you to include a graph/chart based on summary values in your cross-tab report. For example, with a cross-tab that shows the total number of a certain product sold in each region of the United States, you may want to include a graph that shows what percentage of the total sales of the product were provided by each region.

To create a cross-tab graph/chart you must of course have a cross-tab inserted in your report. For more information, see *Cross-Tab Objects, Page 445*.



- 1 With the cross-tab highlighted, click the INSERT CHART button on the standard toolbar. The Graph/Chart Expert appears.
- 2 Click the Graph Tab to activate it.
- 3 Click the *Cross-tab* button to specify you want to create a cross-tab graph/chart.
- 4 Specify the summarized field you want your graph based on using the *Graph on* drop-down box.
- 5 Specify the primary row or column you want your graph based on using the *By* drop-down box.
- 6 If desired, specify the secondary row or column you want your graph based on using the *Subdivided By* drop-down box.
- 7 Click the *Graph Done* button when you are finished. An object frame appears. Position the frame where you want the graph to print and click once to place it.

**NOTE:** *When you insert a graph/chart, it may cover a portion of your report. You will need to move the graph/chart and possibly resize it to fit in your report the way you want.*

## How to edit a graph/chart using the Graph/Chart Expert

---

Once you have created your graph/chart, you may want to add a title, headings, legend, change fonts, or even the type of graph itself. Modifying your graphs is easy with the use of the Graph/Chart Expert.

- 1 Right-click the graph/chart you want to edit and choose the **FORMAT CHART** command from the shortcut menu that appears.
- 2 The Graph/Chart Expert appears with all the details of the selected graph/chart.
- 3 Make the desired changes and click the *Graph Done* button when finished to update your graph/chart

## How to edit graphs using PGEitor

---

The PGEitor is a powerful graph editor offering you 80 graph types and full formatting control of every graph element. The PGEitor is commonly used to format the graph title, change the colors of graphs, and resize portions of the graph.

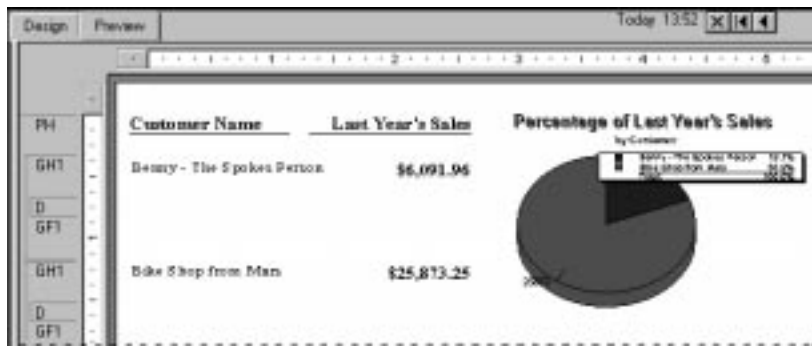
A very popular feature of the PGEitor is the ability to save graph formatting templates. These templates are like stylesheets for graphs. They contain custom formatting instructions that can be applied instantly to new graphs. If you continually create pie charts, for example, and you need the charts to appear in custom colors, you can create a template with those colors. Then, whenever you create a new graph, you simply apply the template and the graph is formatted to your template specifications.

See PGEDITOR.HLP (located in the \CRW directory or directory in which the program resides) for more information on the PGEitor application.

## How to use the underlay feature with graphs

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Because graphs can only print in certain areas and sections of your report (see *Area printing characteristics*, Page 69), the underlay feature makes graphing more powerful than ever before. Now, instead of having a graph print before the data it represents, you can have the graph appear beside it, to make the data more understandable.



- 1 Create your graph and place it in the Report Header section. For more information see *How to graph on a summary or subtotal field*, Page 408.
- 2 Click the OBJECT PROPERTIES 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.
- 5 You are returned to your report, and the graph will underlay the sections below it. Move/resize the graph as desired.

### ***Related Topics***

*How to make an object underlay a following section(s)*, Page 124

## What you will find in this chapter...

*OLE Objects Overview, Page 416*

*Inserting OLE objects in your reports, Page 418*

*Linked vs. Embedded Objects, Page 419*

*The dynamic OLE menu commands, Page 420*

*OLE and the Picture command, Page 421*

*General OLE considerations, Page 421*

*HANDS-ON (OLE Objects), Page 422*

## OLE Objects Overview

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Often when you insert a graphic, spreadsheet, or some other object into a report, you may later find it necessary to change that object. Normally to make the 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 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 created using the container application and one that contains an OLE object.

- **OLE Server Application**

An OLE server application is one that can create OLE objects that can then be placed in documents created by container applications. Microsoft Word and Excel are examples of applications that are both OLE servers and OLE containers. That is, they can create OLE objects and they can contain OLE objects created elsewhere.

- **Server Document**

A server document is the 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 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. 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 want to be able 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 while in Seagate Crystal Reports (or another OLE container application). The container application's menu items change to provide the editing tools from the server application so that you can make the changes easily.

- **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.

When you place an OLE object in a report, the object becomes part of your report. If you want to edit the object, you simply double-click it and modify it using the editing tools from the application used to create the object in the first place (or a similar application that allows such editing). This applies to all but static OLE objects. Using OLE objects in your report enables you to create robust documents that are easy to maintain.

## Inserting OLE objects in your reports

---

There are several ways of inserting OLE objects into your application.

- You can cut the object from an OLE server application and paste it in your report using the PASTE SPECIAL command on the Edit menu. If the object can be pasted in multiple formats, you decide which format to use. For example, when you're 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. Using the PASTE SPECIAL command you can place either embedded or linked objects.

- You can create a new object or import an existing one using the OLE OBJECT command on the Insert menu. You can place either embedded or linked objects this way.
- 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, then dragging the object between the two. When you drag an object into a report, the object is embedded, not linked.

*NOTE: Using the COPY and PASTE SPECIAL commands on the Edit menu or drag and drop are most appropriate when you are inserting selected information (pieces of larger files). The OBJECT command on the Insert menu is most appropriate when you are inserting entire files.*

## Linked vs. Embedded Objects

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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 you insert a linked object, 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 you open the object from within your report, the original file is opened inside the application that was used to create it. Any changes you make directly change the original file.

If you want the data in your object to remain available to other applications, and to always reflect the most current changes to the data, link the object to your report.

*NOTE: When you have a linked object and you break the link using the Links dialog box, you are breaking all connections to the original data in the server document. A linked object in a container application is simply a presentation of an object and a link between the object and the server document. When you break the link you're left with simply the representation and 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 not be edited using OLE capabilities or converted into an editable OLE object.*

## Embedded objects

You can create an embedded object from within Seagate Crystal Reports, or you can create one using a file that already exists. The data, as well as the image of the object, is saved with your report.

If you want to create a new object for your report from scratch, or if you want to copy the information from an existing file and edit the data without ever affecting the original file, embed the object in your report.

- If you change the original object, the embedded object does not change.
- If you edit an embedded object, changes you make to the object are stored with the report file; the changes do not affect the original.

## The dynamic OLE menu commands

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The OBJECT command on the Insert menu is dynamic. It changes to reflect the properties of the selected object and your options with that object.

The object may be described as a Document object, a Bitmap Image object, a Picture object, a 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

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If you place pictures in your report using the `OBJECT` command on the Insert menu, the picture can be treated as either an embedded or linked object.

If you place pictures in your report using the `PICTURE` command on the Insert menu, however, Seagate Crystal Reports converts them into static OLE objects to enhance online and printing performance.

Static objects do not support in-place editing. If you want to edit the object in place, you will have to convert it to an editable type of object using the `CONVERT` command on the Edit menu.

While Seagate Crystal Reports automatically converts bitmaps to static OLE objects if you insert them using the `OBJECT` or `PASTE SPECIAL` commands on the Insert menu, it does not convert bitmaps that are stored as `BLOB` field values in databases. If you place database bitmap fields into your report, the program displays them as normal bitmaps with no OLE characteristics.

## General OLE considerations

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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 the 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, 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 is shipping Microsoft Paint (MSPAIN.T.EXE) as the new bitmap editor. While Windows 95 knows to register and convert PBRUSH.EXE OLE bitmaps as MSPAIN.T OLE bitmaps, the opposite is not true. You can open a report created in Windows 3.1 containing OLE bitmaps using Windows 95, however you can not open a Windows 95 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 under Windows 3.1 instead of under Windows 95.

## HANDS-ON (OLE Objects)

### How OLE objects are represented in your report

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An OLE object can be displayed in your report in several different formats depending on the choices available in the Insert Object dialog box and how you choose to insert the object.

- If you have chosen to display your object as an icon, the icon will appear in your report. You may want to use this capability if you have large bitmaps to speed up report processing. Users can choose to load the bitmap later if they desire by double-clicking the icon.
- If you have created your object from an existing file, the data from that file (or an icon) will be displayed in your report. You can edit that data if you wish by double-clicking the object or its icon.
- If you are creating a new object, the object application for the object type that you chose will open, and you can begin creating your object. When finished, close or exit the application. Your object or its icon will be displayed in your report.

#### *Related Topics*

Search for *Insert Object dialog box* in online Help.

# How to use OLE - General Overview Tutorial

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The easiest way to understand the OLE concepts is to create a sample report that uses static, embedded, and linked objects in order to show their differences.

## Static OLE object

- 1 To begin, create a report using the sample data, CRAZE.MDB, and place any field in the Details section of the report. This is simply done to set up the report; since you're only interested in the OLE objects, the field you insert is unimportant.
- 2 Choose the PICTURE command from the Insert menu, choose CRAZEOLE.BMP from the \CRW directory, and when the placement rectangle appears, place the picture in the Report Header section, as far to the left as it will go.
- 3 Right-click the picture. When the shortcut menu appears you will see that the picture is identified as an OLE object.
- 4 Double-click the object and 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 type in the name of an object or browse for an object.
- 3 Click *Browse* and choose CRAZEOLE.BMP from the CRW directory.
- 4 Click *OK* to return to your report. A placement rectangle appears.
- 5 Place the object in the Report Header section, just to the right of the first picture.
- 6 Right-click this picture and you'll see that it too is 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.
- 7 Now double-click the object. Note how you have remained in Seagate Crystal Reports but all of the menus and tools have

changed to those in Microsoft Paint. Using those tools you can edit the bitmap in place if you wish. 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 of the object and nothing you do here will affect the original.

- 8 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't be edited in place. It also shows you how to stop editing an embedded object; when your editing is finished, simply clicking outside the edited object will return you to Seagate Crystal Reports.

## Linked bitmap image object

- 1 Choose the **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 type in the name of an object or browse for an object.
- 3 Click *Browse* and choose CRAZEOLE.BMP from the CRW directory.
- 4 This time toggle the *Link* check box on.
- 5 Click *OK* to return to your report. A placement rectangle appears.
- 6 Place the object just to the right of the embedded object.
- 7 Right-click this object and you'll see that it too is identified as an OLE object. The second command from the bottom of the shortcut menu identifies this as a Linked Bitmap Image Object.
- 8 Double-click the object. Note how Microsoft Paint opens displaying the original version of the object. Any changes you make to the original will be reflected in the version that appears in your report.
- 9 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 an editable OLE object.
- 4 Right-click the object you just converted and note that the second command from the bottom of the shortcut menu is now BITMAP IMAGE OBJECT, the same command that appeared with the center object you embedded.
- 5 Now double-click the object. Note that 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 example, you'll 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 which is an OLE server application.*

- 1 Open both Seagate Crystal Reports and Microsoft Excel and size (tile) the program windows so they both are visible at the same time. You need to be able to see where the object is coming from and where it is going to.
- 2 In Seagate Crystal Reports, open OLE.RPT if it's not already open.
- 3 Create a simple spreadsheet in Microsoft Excel by placing the numbers one through ten (1-10) in cells A1 through A10.
- 4 Highlight cells A1 through A10.
- 5 Move the pointer to the left edge of the highlighted cells until you get an arrow pointer.
- 6 Press the mouse button and hold it down. This sets up the cells to be moved.

- 7 Since you're only going to copy the cells, press the Control key and hold it down too.
- 8 Now drag the cells into the Details section of the report in Seagate Crystal Reports and release the mouse button and Control key when you have the cells positioned. That's all there is to it. You have just dragged an OLE object into your report.
- 9 Save the file you created in Excel and close the application.
- 10 Right-click the spreadsheet object in the report and when the shortcut menu appears you will see that it's identified as an OLE object and the second command from the last identifies it as a Worksheet Object.
- 11 Double-click the spreadsheet object and the menus and tools change to those from the OLE server application so you can edit the object in place. The object is an embedded object. Any changes you make to the object won't affect the original.
- 12 Click outside the object when you're finished. The menus and tools change back to those from Seagate Crystal Reports.

You now have a working understanding of OLE. You can use these capabilities with Seagate Crystal Reports to make your work more efficient.

## How to insert a graphic/picture as an OLE object

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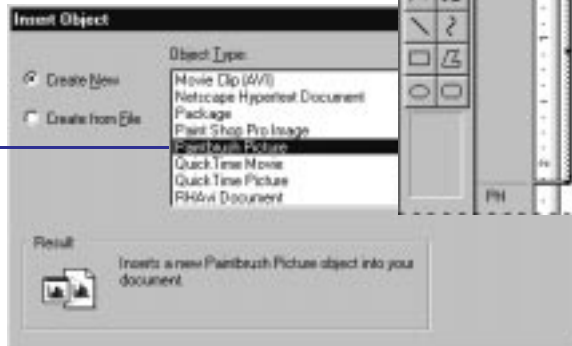
You can add already existing graphics/pictures to your reports as OLE objects or you can create new graphics/pictures from scratch.

- 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 directly in Seagate Crystal Reports using in-place editing.

*When you choose the Create New option...*

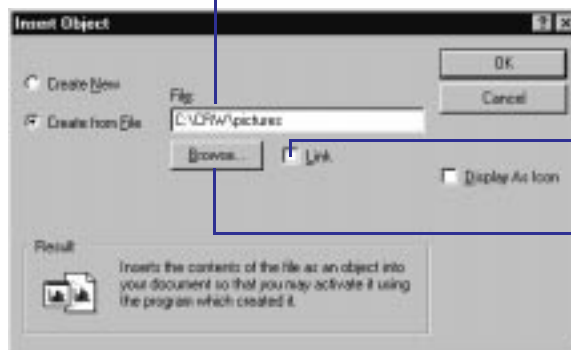
The associated program will take control of Seagate Crystal Reports allowing you to create the object in place.

Select the Object Type you want to create.



When finished, click anywhere on your report to exit the graphic program.

*When you choose the Create from File option...*

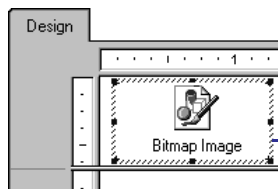


Type in the full path of the object you want to insert.

Toggle this option on if you want the object automatically updated.

If you do not know the path, click the Browse button to locate the object.

A frame approximating the size of the object (or icon) appears.



Position the OLE object (icon shown here) where you want it to appear in your report.



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# 19

## Subreports

### What you will find in this chapter...

*What are subreports?, Page 430*

*Unlinked vs. linked subreports, Page 430*

*Unlinked, Page 430*

*Linked, Page 431*

*Database links vs. subreports in one-to-many situations, Page 433*

*Linking to/from a formula field, Page 442*

*Linking unindexed tables, Page 443*

*HANDS-ON (Subreports), Page 433*

## What are subreports?

---

A subreport is a report within a report. You create it in much the same way as you create a regular report. A subreport has most of the characteristics of a report, and it can have 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,
- can be placed in any report section and the entire subreport will print in that section, and
- can't itself contain a subreport.

There are four times that you would typically use a subreport:

1. When you want to combine unrelated reports into a single report. See *How to combine unrelated reports using subreports*, Page 439.
2. When you want to coordinate data that can not be otherwise linked.
3. When you want to present different views of the same data in a single report. See *How to show different views of the same data in one report*, Page 444.
4. When you are performing one-to-many lookups from a field that is not indexed on the lookup field. See *ONE-TO-MANY RELATIONSHIPS*, Page 522.

## Unlinked vs. linked subreports

---

### Unlinked

Unlinked subreports are freestanding; their data is not coordinated with the data in the primary report in any way.

This does not mean that an unlinked subreport has to use the same data as the primary report; it can use the same data source or a different data source entirely. It also does not mean that the subreport is limited to reporting on a single table. A linked subreport can be based on a single table or on multiple tables.

What it does means is that there is no attempt to match up the records in one report with the records in the other. 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 the 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 using a parameter field. See *Parameter Fields, Page 391*.

When you select a subreport link field:

- the program creates a parameter field in the subreport that is used to retrieve values passed to it by the primary report.
- the program also creates 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.

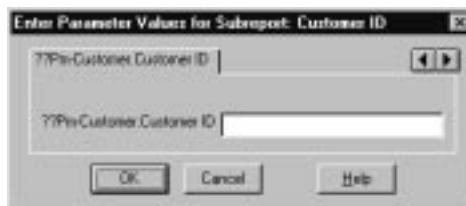
When you run the report, the program finds the first primary field record it needs and passes the value in the link field to the parameter field in the subreport. The program then creates the subreport with record selection based on the parameter field value. Here is an example:

- You create a report that shows customer data and a subreport that shows order data and 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 finishes, the program goes to 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 you want to use to 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, the program runs the subreport on its own, without first receiving a parameter field value from the primary report. In this case, the program displays the Enter Parameter Values for Subreport dialog box prompting you for a value.*



*Type in a value and the program runs the subreport using that value.*



## Database links vs. subreports in one-to-many situations

---

When two tables in your 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 linked tables or a subreport, you need to understand the ramifications of each. These issues are discussed fully in the *Performance considerations in one-to-many links*, Page 522.

As a general rule, if you:

- have indexed tables,
- are linking on the indexed fields, and
- have 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, however, there may be a performance advantage using linked tables. See *Indexed tables*, Page 518.

## HANDS-ON (Subreports)

*How to insert a subreport*, Page 434, and *How to link a subreport to the data in the primary report*, Page 436, explain in detail how to perform the two basic subreporting tasks. You will do one or both of these tasks every time you set up a subreport. All other subreport tutorials, deal with subreport specifics: how to create specific kinds of reports using subreports. These are explained in broad terms (create a subreport, link these two fields, and so forth). Refer back to the first two topics for the specifics of performing those tasks.

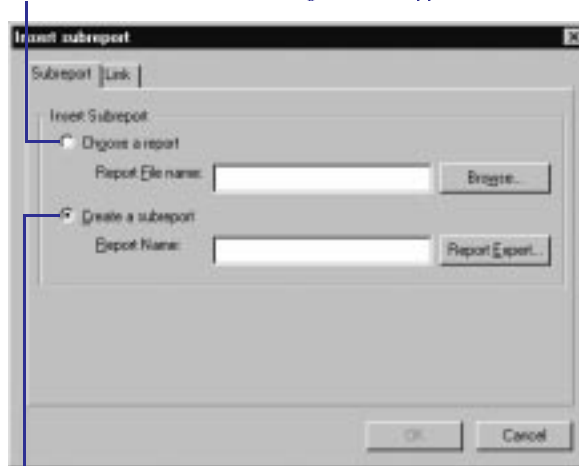
## How to insert a subreport

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- 1 Click the SUBREPORT button on the supplementary toolbar. The Insert Subreport dialog box appears.

To choose an existing subreport, click this option button and type the 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.



To create a new subreport, click this option button and type a name into the text box. If you would like assistance in creating the subreport, click the Report Expert button.

- 2 Click *OK*. The program displays a rectangular placement frame.



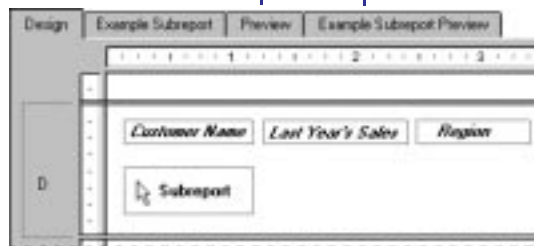
- 3 Move the frame where you want it to appear in your report and click once to place it.

- If you imported your subreport, the program creates a subreport Design Tab labelled with the subreport name.
  - If you do not need to edit your report, you are finished.
  - If you want to edit your report, click the Subreport Design Tab and make your modifications.

- If you are creating a new report, the program creates a Subreport Design Tab labeled with the subreport name.
  - If you want to do more to your report than you did in the Expert, click the Subreport Design Tab and finish your subreport as you would any other report.
  - If you do not want to do more to your report, you are finished.

Click the Preview Tab to see your parent report.

Click the Subreport Preview Tab to see your subreport.



## How to preview your subreport

---

There may be times that you want to preview a subreport by itself instead of previewing it as a part of the main report. For example, you might want to preview the subreport to view and analyze the data for a significant set of parameter values. While most Windows report designers do not allow you to preview subreports alone, 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

Many times the data in a subreport supplements the data in the primary report. You might, for example, have customer data in a primary report and 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 a case, you will need to coordinate the data in the primary report and subreport so the orders in each subreport match up with the correct customer.

To do this, you need to specify a field in the subreport and one in the primary report that contain common data. Seagate Crystal Reports uses these companion fields to coordinate the data. You coordinate the data in the subreport with the data in the primary report using the Subreport Links dialog box. You get to that dialog box in one of two ways:

1. If you are importing a report as a subreport or creating one from scratch, you get to it by clicking the *Subreport Link* button

in the Insert Subreport dialog box. Thus you can build or import your subreport and link it to the primary report in one coordinated process.

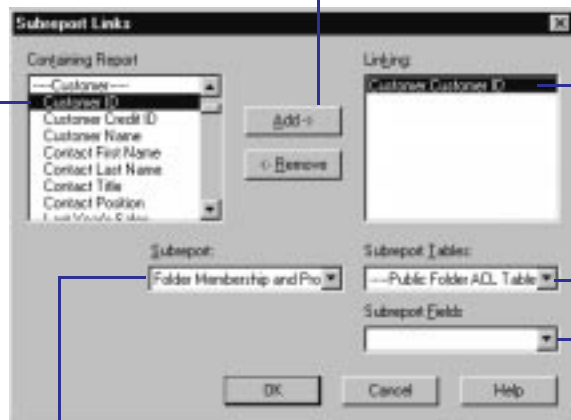
2. If you already have a subreport in your primary report and you did not link it when you were setting it up, you can get to the Subreport Links dialog box by choosing the SUBREPORT LINKS command on the Edit menu.

Once you are in the Subreport Links dialog box, follow these steps:

1 Highlight the field you want to use as the link field in the primary (containing) report.

2 Click the Add button.

The field will be added to the Linking list box, thus selecting it as a link field.



3 Choose the subreport you want to link from this drop-down list (if it is not already selected).

5 Choose the subreport field you want to use to link to the containing report from this drop-down list.

- 6 Repeat Steps 1 and 2 for each additional link as desired.
- 7 Click *OK* when finished. Now, when you run the report, the program will coordinate the data in the primary report and the subreport.

## How to link a subreport to the main report without modifying the selection formula

---

There may be times that you want to use a linked parameter field in a subreport but you don't want that parameter field used as part of the selection formula for that subreport. For example, 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 do these things with Seagate Crystal Reports, but you need to understand the way the program handles subreport linking in order to have it work the way you want to.

Seagate Crystal Reports uses a parameter field mechanism to link subreports to main reports.

If you link a field in the main report to a field in the subreport that is not a parameter field, the program:

- automatically creates a parameter field to complete the link, and
- modifies the subreport record selection formula to select those records where the subreport field is equal to the parameter field value.

The need for a parameter field is implied, thus this 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 Expert accepts the link you have specified. It:

- does not create any additional parameter fields, and it
- does not modify the subreport record selection formula.

When you so specify a link, it is called an “Explicit Link” situation.

Thus, if you want to link a subreport to the main report but you don't want to modify the selection formula, you need to use an Explicit link:

- 1 Create a parameter field in the subreport.

- 2 Then, link a field in the main report to that parameter field using the Subreport Linking Expert.

## How to combine unrelated reports using subreports

---

There may be times when you want to combine unrelated reports into a single report. For example, you may want to create a single report that presents:

- sales by sales representative, and
- sales by item.

While both reports deal with sales data, there is no real linear relationship between the reports.

**NOTE:** *This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

<b>Sales Summaries</b>		
<b>Employee Sales</b>	<b>Employee Name</b>	<b>Employee Sales</b>
	Nancy Davolio	\$58,872.03
	Andrew Fuller	\$24,972.18
	Janet Leverling	\$71,245.08
	Margaret Peacock	\$89,799.32
<b>Product Sales</b>	<b>Product Name</b>	<b>Product Sales</b>
	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

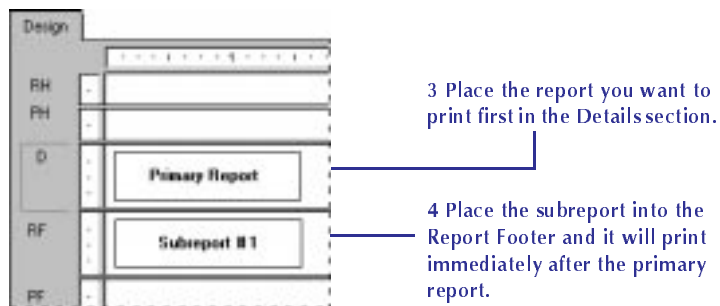
You can combine unrelated reports into a single report like this using subreports. While the reports could be based on the same data set, they do not have to be. They could each be based on entirely different data sets.

Each of these reports is freestanding; the data in any of the reports is not linked in any way to the data in any of the other reports. This is the easiest of the subreport options to work with.

## TWO UNRELATED REPORTS

If you want your report to consist entirely of two unrelated reports:

- 1 Create the report you want to print first as the primary report.
- 2 Import an existing report for use as a subreport or create one.



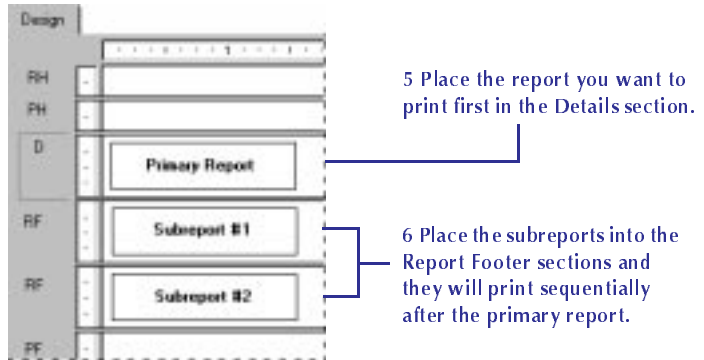
## THREE OR MORE UNRELATED REPORTS

If you want your report to consist of three or more unrelated reports:

- 1 Create the report you want to print first as the primary report.
- 2 Import or create each of the other reports you want to use as subreports.
- 3 Using the Section Expert, 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 you have a total of three Report Footer sections.
- 4 Place the subreport you want to print immediately after the primary report in Report Footer A, the subreport you want to print next in Report Footer B, and so forth. The primary report will print and the subreports will print in the order you placed them on your report.



**NOTE:** You can also place the subreports 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 69*

*How to add, delete, move, and merge sections, Page 89*

## **How to use subreports with unlinkable data**

---

You can link tables 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.

There are some circumstances, however, where you can not coordinate data in different tables because your situation does not fit the linking criteria.

## Linking to/from a formula field

For example:

- if you want to link to or from a formula field, or
- if you want to link two unindexed tables,

you can not do it in a single report. You have to use subreports.

There are situations where 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). Using the formula language, it is 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, using a subreport. Search *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 434.
- 3 Insert 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}) with

the formula that extracts the number in the subreport ({@EXTRACT}). See *How to link a subreport to the data in the primary report*, Page 436.

## 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 434.
- 3 Insert 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}) with the Social Security Number field in the subreport ({file.SSN}). See *How to link a subreport to the data in the primary report*, Page 436.

## Linking unindexed tables

When using PC databases (not SQL or ODBC), the link field in the lookup database needs to be indexed to create a valid link. When two tables contain related data yet neither is indexed on the field you want to use as a link field, or if the primary table is indexed but the lookup table is not, you can not link the tables in a single report. 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 makes for inefficient reporting. If your data set is large, expect this kind of report to take a considerable time to run. Use this technique only if you do not have any other options.***

- 1 Create your primary report.
- 2 Create (or import) the subreport and insert it into the primary report. See *How to insert a subreport*, Page 434.
- 3 Link the subreport to the primary report using the unindexed fields (or the indexed field in the primary table and the unindexed field in the lookup table). See *How to link a subreport to the data in the primary report*, Page 436.

## How to show different views of the same data in one report

---

You can use subreports to provide a different view of the same data as the primary report. For example, assume you want to show summary values at the top of your report and details at the bottom, like this:

*NOTE: This example report has been designed to illustrate concepts only, not the actual look of your finished report.*

<b>Sales by Year</b>		
<b>1995 Summary</b>		<b>Total Orders</b>
Last Quarter 1994		\$161,261.31
1st Quarter 1995		\$566,532.69
2nd Quarter 1995		\$571,829.90
3rd Quarter 1995		\$639,669.34
<b>Details</b>		
<b>Region</b>	<b>Order Date</b>	<b>Order Amount</b>
ID	12/30/94	\$6,539.40
CA	12/31/94	\$4,709.50
MN	12/31/94	\$7,764.90
<b>Subtotal for Quarter</b>		<b>\$19,013.80</b>
IA	1/1/95	\$1,025.40

You can do this in different ways. The two easiest ways are:

1. Create the summary report as the primary report and the details report as the subreport. If you do this, you can place the details subreport in the Report Footer section.
2. Create the summary report as the subreport and the details report as the primary report. If you do this, you can place the summary report in the Report Header section.

Coordinate the data in the two reports by linking the report using the appropriate link fields.

---

# 20

## Cross-Tab Objects

### What you will find in this chapter...

*Cross-tab overview, Page 446*

*Cross-tab components, Page 451*

*HANDS-ON (Cross-Tab Objects), Page 452*

## Cross-tab overview

---

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 make comparisons and identify trends.

Report examples are provided to demonstrate the power of a cross-tab in those situations in which the cross-tab is an option. Those are often situations in which the word *by* is included in your report description:

- 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 generally present more data in a more compact, easier to understand form than other reporting methods.

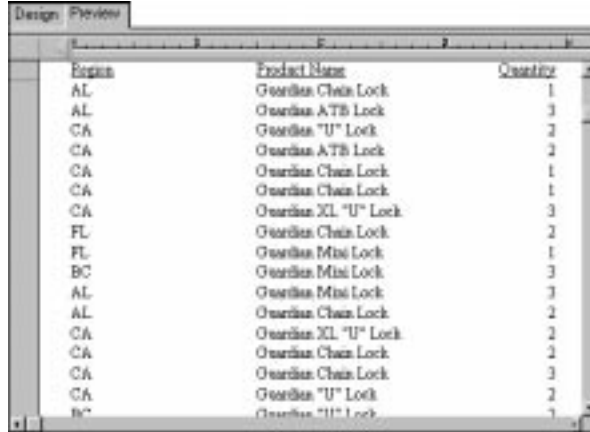
***NOTE: You can insert as many cross-tab objects in your report as you need. You can even place them in subreports. Thus, you can use cross-tabs to show summarized data in a report that presents the details in another form.***

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 clarity, only the most essential information in these reports has been included:

- the region the order came from,
- 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	Guardian Chain Lock	1
AL	Guardian ATB Lock	3
CA	Guardian "U" Lock	2
CA	Guardian ATB Lock	2
CA	Guardian Chain Lock	1
CA	Guardian Chain Lock	1
CA	Guardian XL "U" Lock	3
FL	Guardian Chain Lock	2
FL	Guardian Mini Lock	1
BC	Guardian Mini Lock	3
AL	Guardian Mini Lock	3
AL	Guardian Chain Lock	2
CA	Guardian XL "U" Lock	2
CA	Guardian Chain Lock	2
CA	Guardian Chain Lock	3
CA	Guardian "U" Lock	2
BC	Guardian "U" Lock	1

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. You will take 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 for each Region are grouped together, but each regional group contains orders for different kinds 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 kind.

Region	Product Name	Quantity
AL	Guardian Chain Lock	1
AL	Guardian ATB Lock	3
AL	Guardian Mini Lock	3
AL	Guardian Chain Lock	2
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.

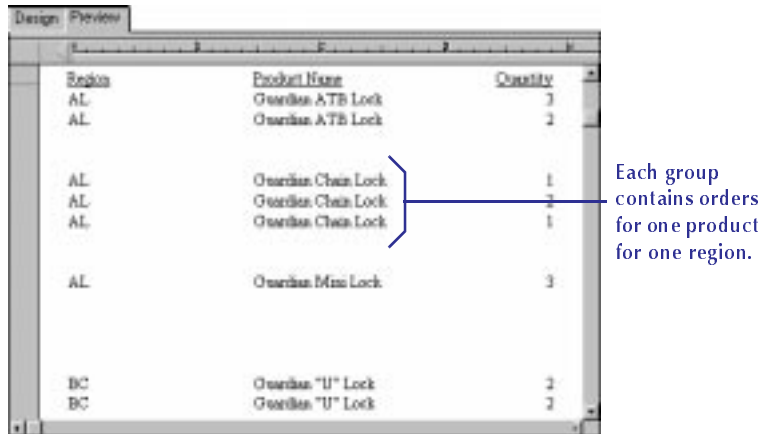
Region	Product Name	Quantity
CA	Guardian "U" Lock	2
CA	Guardian "U" Lock	2
BC	Guardian "U" Lock	2
BC	Guardian "U" Lock	2
AL	Guardian "U" Lock	2
AL	Guardian ATB Lock	3
CA	Guardian ATB Lock	2
AL	Guardian ATB Lock	2
AL	Guardian Chain Lock	1
CA	Guardian Chain Lock	1
CA	Guardian Chain Lock	1

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.

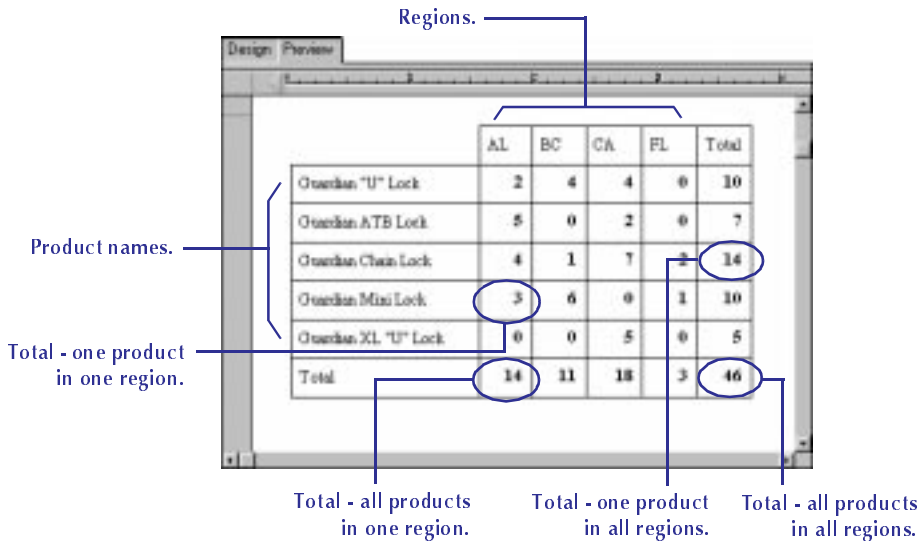


Region	Product Name	Quantity
AL	Guardian A/TB Lock	3
AL	Guardian A/TB Lock	2
AL	Guardian Chain Lock	1
AL	Guardian Chain Lock	2
AL	Guardian Chain Lock	1
AL	Guardian Mini Lock	3
BC	Guardian "U" Lock	2
BC	Guardian "U" Lock	2

But the data is all spread out and remains difficult to analyze. The information is useful, and with a little work you can use a report like this to get the comparison information you need. But a cross-tab offers a better solution.

## Order data in a cross-tab object

Using a cross-tab, all the information you need is provided in a compact format. The report shows what products were sold in which regions 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.



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 from a particular region, for example, the total number of Guardian Mini Locks ordered 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 ordered 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 data and then presents the summaries in a compact row and column format that makes it easy to make comparisons and identify trends. A cross-tab is made up of three elements:

- rows,
- columns, and
- summary fields.

Diagram illustrating a cross-tab structure. The table has rows (Gloves, Belts, Shoes, Total) and columns (USA, MEXICO, CANADA, UK, Total). The value 4 at the intersection of 'Gloves' and 'USA' is circled, and an arrow points to it from the text 'SUM OF GLOVES IN USA (INTERSECTION)'.

	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 is 4 at the intersection of “Gloves” and “USA”, 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	← TOTAL OF PRODUCTS IN ROW (GLOVES)
Belts	0	1	1	1	3	
Shoes	0	0	0	1	1	
Total	4	1	5	2	12	← GRAND TOTAL ALL PRODUCTS ALL ROWS (GLOVES IN USA)

↑  
TOTAL OF PRODUCTS  
IN COLUMN (USA)

- At the end of each row is a total for that row. In the example above, this total represents the number of 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 the number of all products sold in a single country. At the bottom of the “USA” column is the value 4, 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 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 cross-tab using CRAZE.MDB (located in the \CRW directory or the directory in which the program resides).

The Craze database contains several tables; for this example use the following tables:

- Customer
- Product

**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.

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 just a subset of those products and regions. You will restrict the report to: Craze Mtn, Craze Rhino, and Craze Titan locks sold in California, Florida, Illinois, and Oregon. To do this, you will limit the number of regions and products using record selection tools.



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. See *Record and Group Selection, Page 249*.

## Selecting regions

- 1 Highlight the Region field of the Customer Table and, using the Select Expert, select the following records:
  - CA
  - FL
  - IL
  - OR

## Selecting products

- 2 Highlight the Product Name field of the Products Table and, using the Select Expert, select the following records:
  - Craze Mtn Lock
  - Craze Rhino Lock
  - Craze Titan Lock

Now you are ready to create your cross-tab.



- 3 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Using this dialog box you will add the rows, columns, and summary fields that will make up your cross-tab.

## Adding rows

- 4 In the *Fields* list box, highlight the {product.PRODUCT NAME} field found listed under the Report Fields heading and click the *Add Row* button. The highlighted field will be added to the *Rows* list box.

## Adding columns

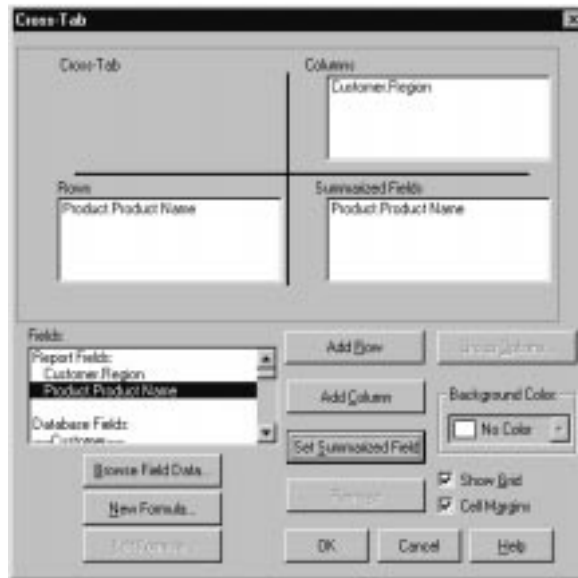
- 5 In the *Fields* list box, highlight the {customer.REGION} field found listed under the Report Fields heading and click the *Add Column* button. The highlighted field will be added to the *Columns* list box.

## Adding summarized fields

- 6 In the *Fields* list box, highlight the {product.PRODUCT NAME} field, click the *Set Summarized Field* button. The field will be added to the *Summarized Fields* list.

**NOTE:** You can also drag the desired 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.

Your dialog box should look similar to the following:



- 7 Click *OK*. A placement frame will appear. Position the cross-tab in the Report Header section of your report.

**NOTE:** *Placing your cross-tab in different sections of your report will produce 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 67, and Area printing characteristics, Page 69.*



- 8 Click the PRINT PREVIEW button on the standard toolbar to preview your cross-tab. It should look similar to the following:

Design

Preview

	CA	FL	IL	OR	Total
Craze Mtn	0	0	4	0	4
Craze Rhino	0	1	1	1	3
Craze Titan	1	0	0	1	2
Total	1	1	5	2	9

**NOTE:** *You can independently format rows and columns of your cross-tab with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. See How to format a cross-tab, Page 463.*

## How to create a cross-tab with multiple rows/columns

You will often want to create reports that contain multiple levels of information. For example, you may have a report that contains the sales data for a single product sold to all customers in the USA. You may then want to break your report down further into a region by region analysis for an easy comparison of sales between regions within the USA. 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 using CRAZE.MDB (located in the \CRW directory or the directory in which the program resides).

The Craze database contains several tables; for this example you will use the following tables:

- Customer
- Orders
- Orders Detail

***NOTE: The Customer table must be linked to 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, and Orders Detail tables contain records for a variety of products, countries, and sales regions. To keep the report a manageable size, you will create a cross-tab that shows a subset of the products, regions, and countries included in the sample data. You will restrict the report to: Craze Adult, Triumph Pro, and Triumph Vertigo helmets sold in the USA in California and Oregon only. To do this, you will limit the number of products, regions, and countries using record selection tools.



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 249*.

## Selecting countries

- 1 Highlight the Country field of the Customer Table and, using the Select Expert, select the following record:
  - USA

## Selecting regions

- 2 Highlight the Region field of the Customer Table and, using the Select Expert, select the following records:
  - CA
  - OR



## Selecting products



- 3 Highlight the Product Name field of the Products Table and, using the Select Expert, select the following records:

- Craze Adult Helmet
- Triumph Pro Helmet
- Triumph Vertigo Helmet

Now you are ready to create your cross-tab.

- 4 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Using this dialog box you will add the rows, columns, and summary fields that will make up your cross-tab.

## Adding multiple rows

- 5 In the *Fields* list box, highlight the {customer.COUNTRY} and click the *Add Row* button. The highlighted field will be added to the *Rows* list box.
- 6 Repeat Step 5 adding the {customer.REGION} to the *Rows* list box as well.

**NOTE:** *The order in which you add rows, columns, and summary fields 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. For more information on multiple summary fields, see How to create a cross-tab with multiple summary fields, Page 459.*

## Adding the column

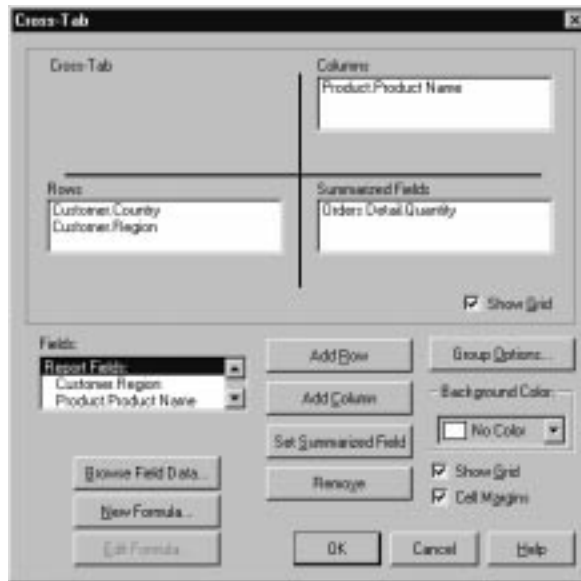
- 7 In the *Fields* list box again, highlight {product.PRODUCT NAME} and click the *Add Column* button. The highlighted field will be added to the *Columns* list box.

**NOTE:** *To create a cross-tab with multiple columns, simply add the desired columns to the Columns list box by following the instructions for adding multiple rows.*

## Adding the summarized field

- 8 In the *Fields* list box again, highlight {orders detail.QUANTITY} and click the *Set Summarized Field* button. The highlighted field will be added to the *Summarized Fields* list box.

Your dialog box should look similar to the following:



- 9 Click OK. A placement frame will appear. Position the cross-tab in the Report Header section of your report.

***NOTE: Placing your cross-tab in different sections of your report will produce 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 67, and Area printing characteristics, Page 69.***



- 10 Click the PRINT PREVIEW button on the standard toolbar to preview your cross-tab. It should look similar to the following:

		Crazy Adult Helmet	Trough Pro Helmet	Trough Vertigo Helmet	Totals
USA	CA	37	22	35	94
	OR	4	8	23	35
	Total	41	30	58	129
Total		41	30	58	129

**NOTE:** You can independently format rows and columns of your cross-tab with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. For more information on formatting your cross-tab, see *How to format a cross-tab*, Page 463.

## How to create a cross-tab with multiple summary fields

---

You will often find it useful to include multiple summaries in your reports. For example, you may have a report that shows the total number of orders for each of your California and Oregon customers. You may then want to show what the average dollar amount of each customer's order is in order to compare the purchasing habits of your customers. Seagate Crystal Reports enables you to create cross-tabs with multiple summary fields to accommodate situations such as these.

In this tutorial you will create a cross-tab with multiple summary fields using CRAZE.MDB (located in the \CRW directory or the directory in which the program resides).

The Craze database contains several tables; for this example you will use the following tables:

- Customer
- 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., The Cyclists Incorporated, and XYZ Company customers in California and Oregon only. To do this, you will limit the number of customers and regions using record selection tools.



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 249.

## Selecting regions

- 1 Highlight the Region field of the Customer Table and, using the Select Expert, select the following records:
  - CA
  - OR

## Selecting customer

- 2 Highlight the Customer Name field of the Customer Table and, using the Select Expert, select the following records:
  - Sporting Wheels Inc.
  - Xtreme Cycle

Now you are ready to create your cross-tab.



- 3 Click the INSERT CROSS-TAB button on the supplementary toolbar. The Cross-Tab dialog box appears. Using this dialog box you will add the rows, columns, and summary fields that will make up your cross-tab.

## Adding rows

- 4 In the *Fields* list box, highlight {customer.REGION} and click the *Add Row* button. The highlighted field will be added to the *Rows* list box.

## Adding columns

- 5 In the *Fields* list box again, highlight the {customer.CUSTOMER NAME} field and click the *Add Column* button. The highlighted field will be added to the *Columns* list box.

## Adding multiple summary fields

- 6 In the *Fields* list box again, highlight {customer.CUSTOMER NAME} and click the *Set Summarized Field* button. The highlighted field will be 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 you add rows, columns, and summary fields affects their placement in the cross-tab. The first row or column added will remain outermost in the cross-tab. Consecutive rows will be add inside (to the right of the first row and below the first column). Consecutive summary fields will be added below the first summary field.*

Your dialog box should look similar to the following:



- 8 Click *OK*. A placement frame will appear. Position the cross-tab in the Report Header section of your report.

**NOTE:** *Placing your cross-tab in different sections of your report will produce 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 67, and Area printing characteristics, Page 69.*



- 9 Click the PRINT PREVIEW button on the standard toolbar to preview your cross-tab. It should look similar to the following:

Design Preview			
	Sporting Wheels Inc.	Kixans Cycles	Total
CA	26 \$66,321.01	0 \$0.00	26 \$66,321.01
Total	0 \$0.00	25 \$41,495.94	25 \$41,495.94
Total	26 \$66,321.01	25 \$41,495.94	51 \$107,816.95

The first summary operation in your 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, instead of a sum of all orders, you want to calculate the average order amount for each customer. To do this you will need to change the summary operation for the {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 Right-click the summary field that you want to change {orders.ORDER AMOUNT} and choose the CHANGE SUMMARY OPERATION command from the shortcut menu. The Change Summary Operation dialog box appears.
- 11 Select the desired function from the *Summary Operation* drop-down box and click *OK* when finished. 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 your cross-tab. It should now look similar to the following:

	Sporting Wheels Inc.	Xinma 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 \$1,721.90

The first summary operation in your 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:** *You can independently format rows and columns of your cross-tab with background colors, shading, borders, and fonts to emphasize important data and create professional-looking reports. For more information on formatting your cross-tab, see How to format a cross-tab, Page 463.*

## How to format a cross-tab

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Seagate Crystal Reports has powerful formatting capabilities that can be applied to your cross-tab: You can:

- format the background color of an entire row/column at one time,
- format fields individually,

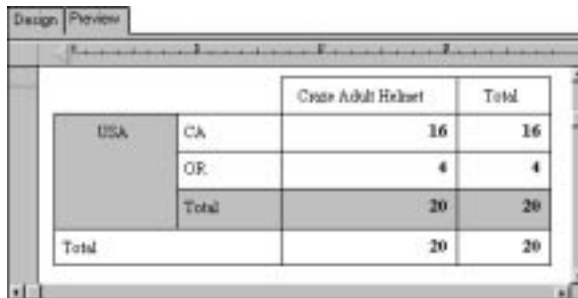
- format several fields at one time, and
- print cross-tabs that span multiple pages.

By applying such formatting as background color, borders, and fonts you can emphasize important data and create professional-looking and easier-to-understand cross-tabs.

## Formatting background color of entire rows/columns

- 1 Right-click the cross-tab and choose the **CHANGE FORMAT** command 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) that you want to change the background color for and select the desired color from the *Background Color* drop-down box.
- 3 Click **OK** when finished to return to your cross-tab. The row/column will be formatted as specified.

A cross-tab with a single row highlighted will look similar to the following:



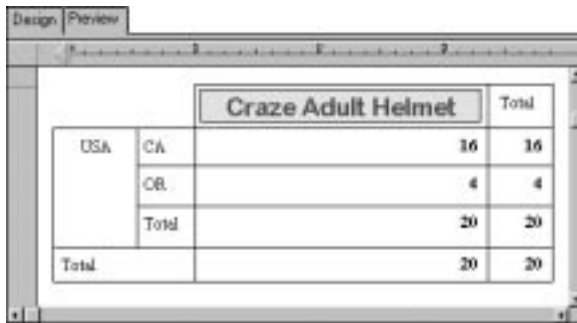
		Create Adult Helmet	Total
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

## Formatting fields individually

- 1 Right-click the field you want to format and choose the **FORMAT FIELD** command from the shortcut menu. The Format Editor appears.
- 2 In the Format Editor, select the font, background, borders, numbering, currency symbols, printing characteristics, etc., as desired using the corresponding tab(s).
- 3 Click **OK** when finished to return to your cross-tab. The field will be formatted as specified.



A cross-tab with a single field formatted will look similar to the following:



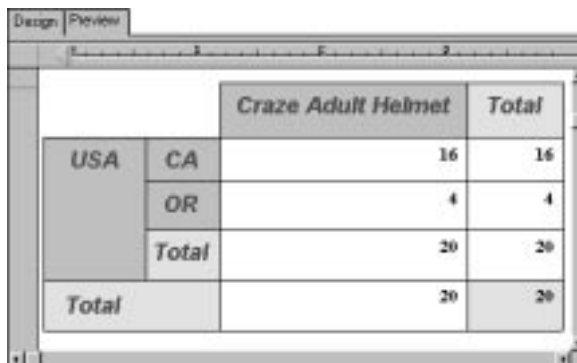
The screenshot shows a software window with 'Design' and 'Preview' tabs. The 'Preview' tab is active, displaying a cross-tab table. The table has a header row with 'Craze Adult Helmet' and 'Total'. The rows are categorized by 'USA' and 'CA', with a 'Total' row for each. The values are 16, 4, and 20 for the 'Craze Adult Helmet' column, and 16, 4, and 20 for the 'Total' column. The 'Craze Adult Helmet' column is highlighted with a gray background.

		Craze Adult Helmet	Total
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

## Formatting several fields at one time

- 1 Select the desired fields using the Shift-click method.
- 2 Once all the fields are selected, right-click any of them and choose the FORMAT OBJECTS command from the shortcut menu. The Format Editor appears.
- 3 In the Format Editor, select the font, background, borders, numbering, currency symbols, printing characteristics, etc., as desired using the corresponding tab(s).
- 4 Click *OK* when finished to return to your cross-tab. The fields will be formatted as specified.

A cross-tab with several fields formatted will look similar to the following:



The screenshot shows the same software window as before, but now the 'USA' and 'CA' rows are also highlighted with a gray background, indicating that multiple fields have been formatted.

		Craze Adult Helmet	Total
USA	CA	16	16
	OR	4	4
	Total	20	20
Total		20	20

## 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. For ease in reading, row and column headings will be repeated on subsequent pages.

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# 21

## Queries

### What you will find in this chapter...

*The Crystal Query Designer, Page 468*

*Why use a query?, Page 468*

*Using the Query Designer, Page 469*

*HANDS-ON (Queries), Page 470*

## The Crystal Query Designer

---

A query is simply 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), 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 using SQL can take quite a while. Since the Crystal Query Designer eliminates the need to understand SQL, it can get you building effective queries right away.

The Crystal Query 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 Query Designer helps you create queries. 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 and it 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 Query 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 Crystal Query Designer can be a powerful tool for many of your information gathering needs.

***NOTE: The Query Designer can only access data stored in an ODBC data source. Any SQL or 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 Query Designer allows you to reuse your existing queries, quickly and easily. All of your existing work becomes convenient query files that can be used 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 of an SQL statement. By using the Query Designer to create data sets to base your reports on, 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.*

## Using the Query Designer

The Query 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 you make projections, etc.). The

Query Designer makes it easy for you 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 Query Designer can not retrieve any number value larger than 20 characters or calculate a formula with a value larger than 20 characters. Values larger than 20 characters will be truncated.*

## HANDS-ON (Queries)

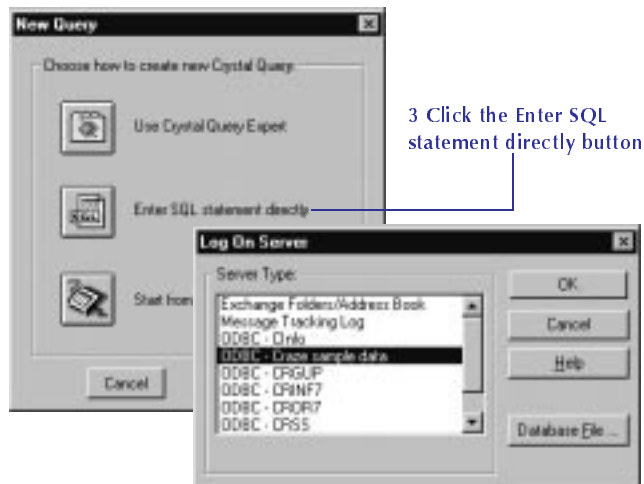
### How to use an SQL query that you designed elsewhere

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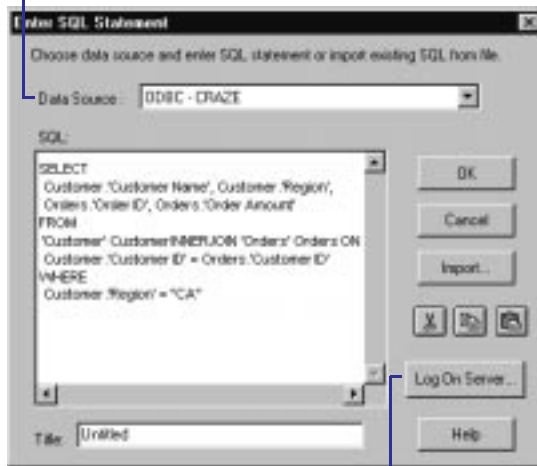
- 1 Copy your SQL statement to the Windows Clipboard. Many SQL editors will let you copy the SQL statement to the Clipboard using the Ctrl-C key combination.
- 2 Click the NEW button on the toolbar in the Crystal Query Designer.



The New Query dialog box appears.

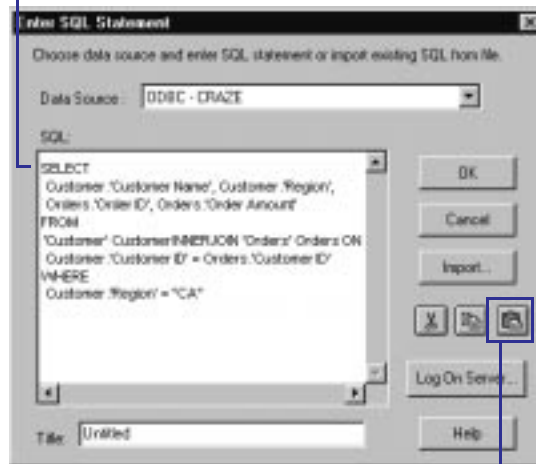


- 4 Select the desired SQL server for your SQL statement, and click *OK*. The SQL Server Login dialog box appears.
- 5 Enter your user ID and password to log on to the SQL server, and click *OK*.
- 6 After a message appears indicating the success of your log on (assuming you logged on correctly) the Enter SQL Statement dialog box appears.
- 7 Specify the ODBC data source from this drop-down box.



- 8 If you are not already logged on to an SQL Server, click the *Log On Server* button and log on using the Log On Server dialog box.
- 9 If you need 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 box.
- 10 Use the *Title* text box to give a title to your query that describes its purpose.
- 11 Enter your SQL statement in the large *SQL* edit box. Click anywhere inside the box to place an insertion point.
- 12 Press Ctrl-V or click the *Paste* button in the dialog box to paste your SQL statement into the *SQL* edit box.

Edit your SQL query in this box.



Paste button.

- 13 The *SQL* edit box allows you to make any changes you wish to your *SQL* statement. You can even enter an entirely new *SQL* statement if you wish. Make any changes you need and click the *OK* button when you are finished.

Your 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.

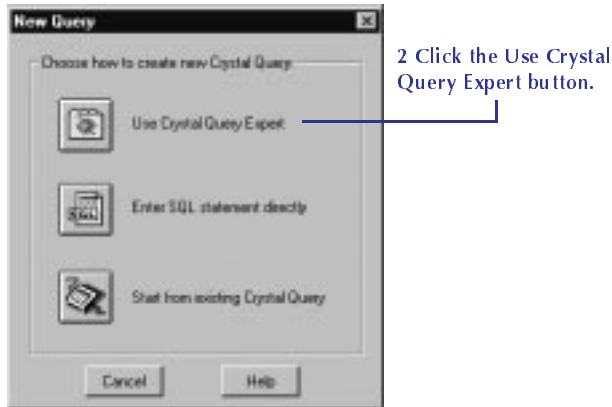
## How to create a new query

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- 1 Click the *NEW* button in the Crystal Query 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.

Step 1: Tables | 2: Links | 3: Fields | 4: Sort | 5: Select | 6: SQL

**NOTE:** *The Links Tab only appears if you select two or more database tables on the Tables Tab.*

The remaining sections in this chapter explain how to perform specific tasks with the Crystal Query Designer.

**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

---

### Generates 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 Crystal Query Expert.



- 2 Click the *SQL/ODBC* or *Dictionary* button.
  - If you click *SQL/ODBC*:
    - Highlight 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*.
    - Highlight *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 491, for further information.*

## How to link tables and specify a join type

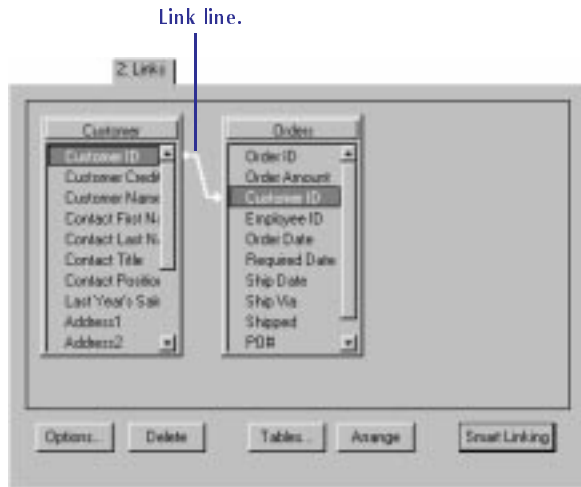
---

### Generates WHERE clause

The WHERE clause indicates how two database tables are joined.

**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 possible links it can detect between tables. These links are represented by an arrow between fields in two tables, called a link line.



- 2 Click one of the link lines between tables. The link line becomes highlighted, along with the fields in each table that it is linking.
- 3 Click the *Options* button to open the Link Options dialog box. This dialog box describes the link between the tables in more detail. Search for *Link Options dialog box* in Crystal Query Designer online Help.



4 Select an SQL join type.

## ***Related Topics***

*SQL join types (ODBC data sources), Page 537*

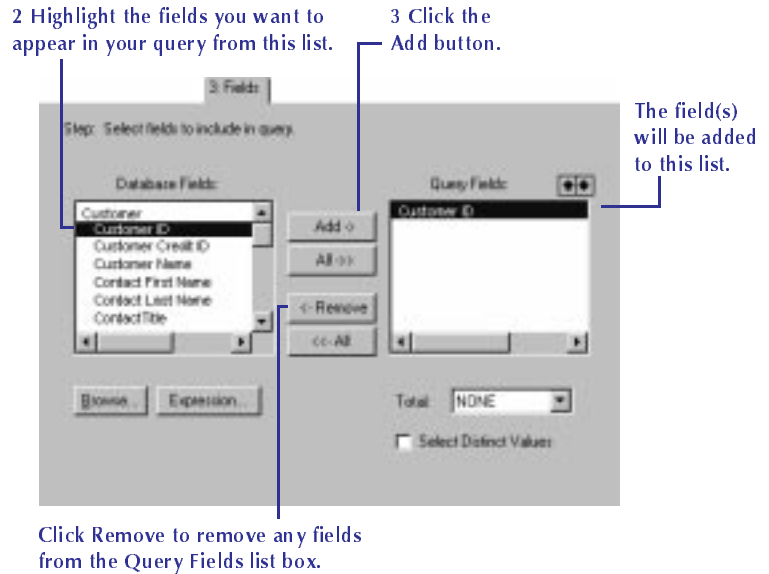
*WHERE, Page 552*

## **How to add fields to a query**

### **Generates SELECT clause**

The SELECT clause selects specific data items to retrieve from the database tables indicated by the FROM clause.

- 1 Click the Fields Tab in the Create Query Expert.



## ***Related Topics***

*SELECT*, Page 551

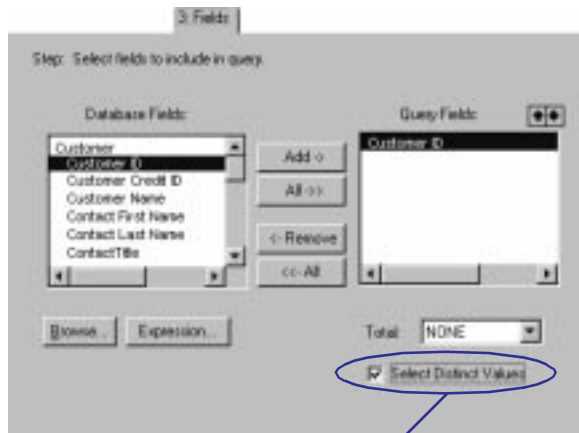
## **How to identify unique values in a query**

---

### **Generates 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 Click the Select Distinct Values option to activate it.

## ***Related Topics***

*DISTINCT*, Page 551

# **How to summarize data with aggregate functions**

---

## **Generates GROUP BY clause**

The GROUP BY clause retrieves a set of summary data.

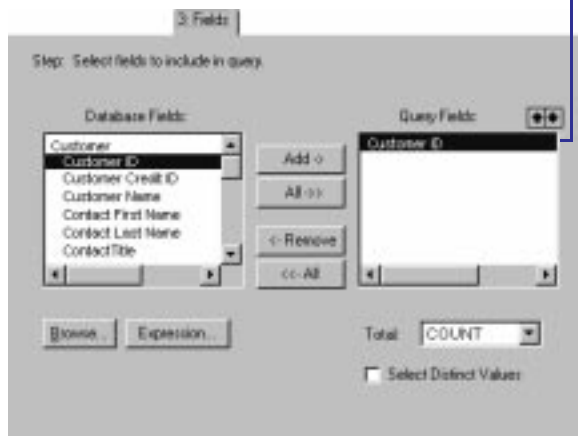
## **Aggregate functions**

Use aggregate functions to obtain summary information on all records or on groups of records. Aggregate functions are most useful when you do not need the detail information and only want to examine totals.

For example, you might need to know the total number of orders made and the average amount of each order. For this kind 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 you want to summarize from this list.



- 3 In the *Total* drop-down box, choose an aggregate function to apply to the highlighted field.
  - COUNT() counts the number of values within a group.
  - SUM() adds together the values within a group for a total.
  - AVG() finds the average value of all values within a group.
  - MIN() finds the minimum value within a group.
  - MAX() finds the maximum value within a group.
- 4 The query summarizes the field that the aggregate function is applied to. Any other fields that appear in the *Query Fields* list box are used to sort the data.

### ***Related Topics***

*GROUP BY*, Page 553

## **How to sort records according to field values**

---

### **Generates ORDER BY clause**

The ORDER BY clause indicates that the database records retrieved be sorted according to the values in a specific field.

Query data can be grouped 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 478. This section shows you how to group data by sorting.

1 Click the Sort Tab in the Create Query Expert.

2 Highlight the field you want sorted from this list.

3 Click the Add button.

Use up/down arrows to move fields up/down the list.

The field will be added to the Group Fields list.



4 Select the order in which you want the data sorted.

## Related Topics

*ORDER BY*, Page 552

## How to specify records to be included in a query

### Generates WHERE clause

The WHERE clause can specify record selection criteria.

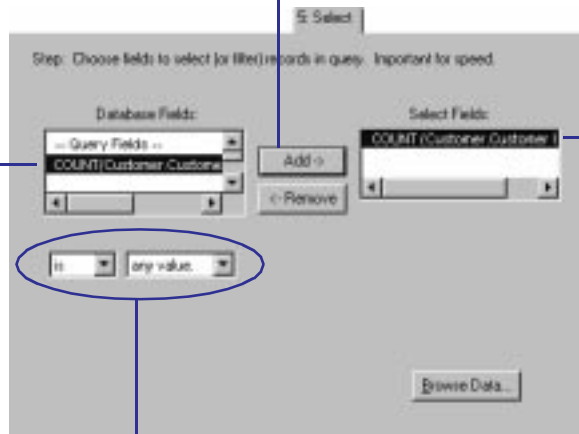
1 Click the Select Tab of the Create Query Expert.



2 Highlight the field which contains the data you want to base selection criteria on from this list.

3 Click the Add button.

The field will be added to the Select Fields list.



Use these controls to specify the selection criteria to be applied to the field highlighted in the Select Fields dialog box.

These choices work much like the Select Expert in Seagate Crystal Reports. Search for *Select Expert* in Crystal Query Designer online Help.

4 Repeat Steps 2 and 3 for every field that appears in the *Select Fields* list box.

### ***Related Topics***

*WHERE*, Page 552

## **How to select groups to be included in a query**

---

### **Generates 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 Highlight the field you want to summarize in this list.



3 Select the aggregate function from this drop-down list that you want to apply to the highlighted field.

4 Click the Select Tab.

5 Select the aggregate function from this list box.

6 Click the Add button...

The field will be added to the Select Fields list.



7 Use the selection criteria controls to specify which group summary values based on the aggregate function should appear in the result.

## *Related Topics*

*GROUP BY, Page 553*

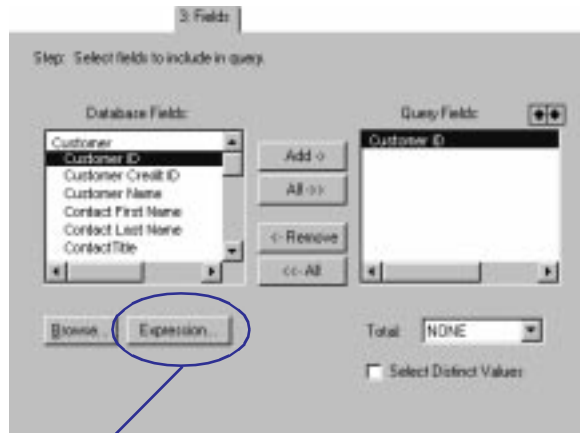
*HAVING, Page 553*

## 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.*

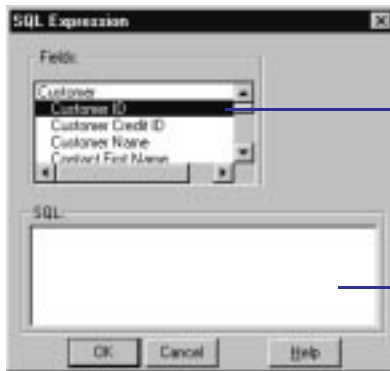
- 1 Click the Fields Tab in the Create Query Expert.



- 2 Click the Expression button. The SQL Expression Name dialog box will appear.



- 3 Type a name for your new expression and then click OK.



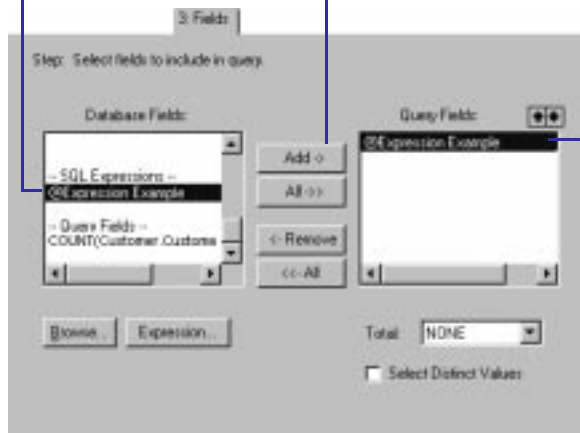
4 Double-click a field in this list to add it to your expression.

5 Edit the expression in this edit box.

- 6 When you are finished designing your SQL expression, click OK, you are returned to the Fields Tab.

7 Highlight the new SQL expression. It will be indicated by an @ sign.

8 Click the Add button.



The field will be added to the Query Fields list.

## How to create a query from another Crystal Query



- 1 Click the NEW button in the Crystal Query Designer. The New Query dialog box appears.



2 Click the Start from existing Crystal Query button.

- 3 Use the File Open dialog box to highlight the query (\*.QRY) file that you want to use 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 display the new query results.

- 6 Choose the SAVE AS command 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 the *Query* button. The File Open dialog box appears.
- 4 Use the controls in the File Open dialog box to locate and highlight the query (.QRY) file you want to use to create a new report.
- 5 Click *OK*. The query is opened for your report. 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. However, the name of the query file will appear above the fields in list boxes where you would normally see the name of a database table.

**NOTE:** *You can not use more than one query file in a report.*

## How to create a parameter field for use in a query

---

A parameter field can be created while previewing a query in the Query Designer.

- 1 Choose the PARAMETER FIELD command from the Edit menu. The Parameter Field dialog box appears.



- 2 Enter the following information in the fields provided:
  - *Parameter Name*: Enter the name you want to use to identify the parameter field.
  - *Prompting Text*: Enter the text you want to appear when the program prompts you.
  - *Value Type*: Enter the data type of the parameter field.
  - *Default Prompting Value*: Enter the value you want the program to use if you do not supply a new value.
  - *Browse Field*: Use this drop-down box to specify a default field.
- 3 Click **OK**.

The parameter field can now be used in your query. See *How to use a parameter field in a query*, Page 487.

## How to use a parameter field in a query

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- 1 After you have created a parameter field in the Query Designer (see *How to create a parameter field for use in a query*, Page 486), return to the Create Query Expert by choosing the **QUERY** command on the **Edit** menu.
- 2 Click the **Select** Tab to activate it.

- 3 Select the database field you would like to select records for from the *Database Fields* list box.
- 4 Click the *Add* button. The field now appears in the *Select Fields* list box and two drop-down boxes appear.
- 5 When you select *equal to*, *one of*, *less than*, *greater than*, *between*, *starting with*, or *like* from the second drop-down box, one or more additional drop-down boxes appear.

The parameter field you created will appear in the field drop-down box.



- 6 Select the parameter field from the field drop-down box.
- 7 Click to the SQL Tab to activate it.

You will see exactly how the parameter field is used in the SQL statement.







---

# 22

## Dictionaries

### What you will find in this chapter...

*Dictionaries Overview, Page 492*

*Why use a dictionary?, Page 492*

*HANDS-ON (Dictionaries), Page 493*

## 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 let you:

- 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.

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.

### 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 than 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.

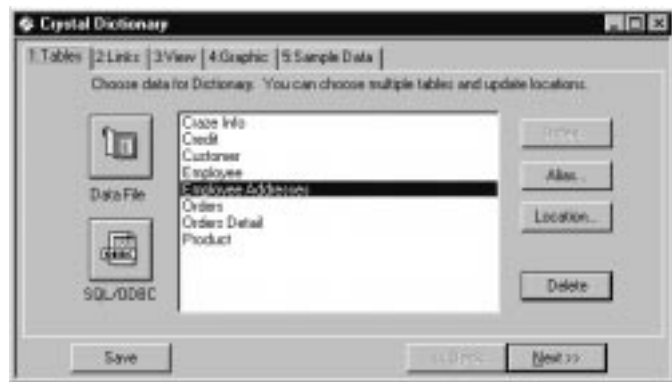
# HANDS-ON (Dictionaries)

## How to create a new dictionary

---



- 1 Click the NEW button on the standard toolbar. The Dictionaries 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.

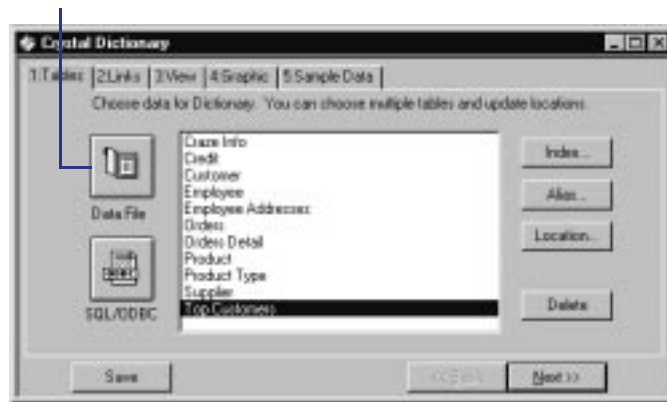
**NOTE:** Since a dictionary must contain some database data, the *Save* button will be disabled until you add at least one field to the *Headings & fields* in *View* list box on the *View* Tab.

## How to add a data file

---

- 1 While in the Dictionaries Expert, click the Tables Tab to activate it.

- 2 Click the Data File button.



The Choose Database File dialog box appears.

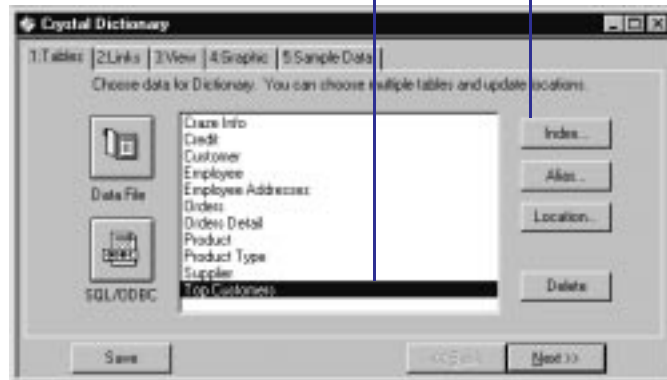
- 3 Use the options in the Choose Database File dialog box to highlight a database file.
- 4 Click *Add* to add the file. All tables from that file will appear in the list box on the Tables Tab.
- 5 Repeat Steps 3 and 4 for each database file you want to add to the dictionary.
- 6 Click *Done* when you are finished adding database files.

**NOTE:** When you add a database file, 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 498.

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 the Index button.



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.

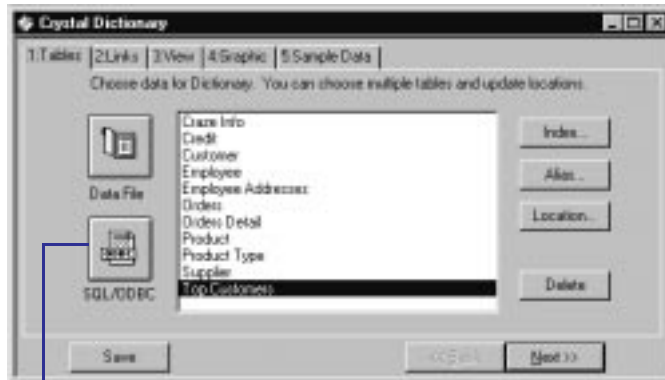
**NOTE:** By default, Crystal Dictionaries will use any index file it finds with the same name as the database file. You only need to select an index file if you want to use an index with a different name than the database file. For more information on indexes, see *Indexed tables*, Page 518.

**NOTE:** You can mix data files and ODBC data sources in the same dictionary file. However, if you wish 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 Dictionaries Expert, click the Tables Tab to activate it.



- 2 Click the SQL/ODBC button.

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**, and the Choose SQL Table dialog box appears.
- 6 Highlight a database table in the Choose SQL Table dialog box, 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 you add an SQL or ODBC data source 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 498.

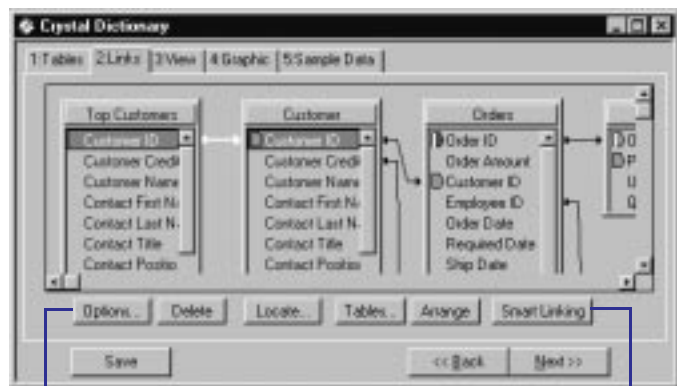
**NOTE:** You can mix data files and ODBC data sources in the same dictionary file. However, if you wish to link data files and ODBC data sources together, you can only use string fields to perform the links.

## How to link multiple tables

---

- 1 If you have added more than one database table to your dictionary, click the *Links Tab* in the *Dictionaries Expert*.

To create a link manually, drag a field name from one table to the other.



Click the *Options* button for a detailed description of a highlighted link.

Click *Smart Linking* to let the program create logical links between tables in your dictionary.

- 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 *Linking tables*, Page 520.

- 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 online Help.

## How to select tables and fields for users

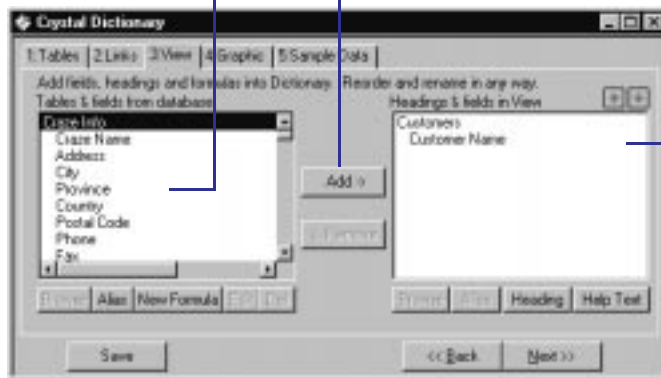
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After you add tables to your dictionary using the Tables Tab, those tables, and the fields in them, are not automatically available to your users. You must expose the fields using the View Tab. The View Tab lets you design the actual view of the data that your users will see.

- 1 While in the Dictionaries 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 Sort Fields list box will no longer appear in the Report Fields list box.*

- 2 Highlight the field you want to make available to users from this list.
- 3 Click the Add button.
- 4 The field will be 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.

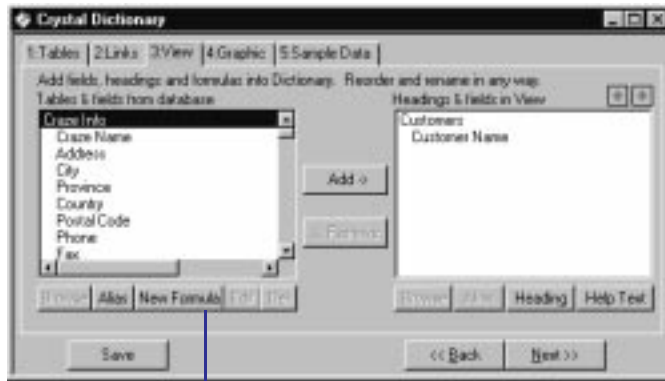
When adding and organizing tables and fields in the View Tab, keep in mind the following points:

- 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 503.
- 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 field headings, fields, and formulas*, Page 501.

## How to add/create formulas

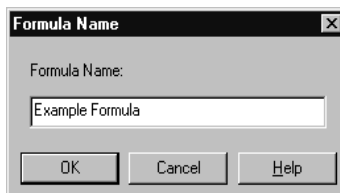
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- 1 While in the Dictionaries Expert, click the View Tab to activate it.



- 2 To create a formula, click the New Formula button.

The Insert Formula dialog box appears.



- 3 Type a name for your 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 *Formulas 101, Page 321*, or search for *Formula Editor* in online Help.
- 5 Click Accept when finished. The new formula is added to the *Tables & fields from database* list box.

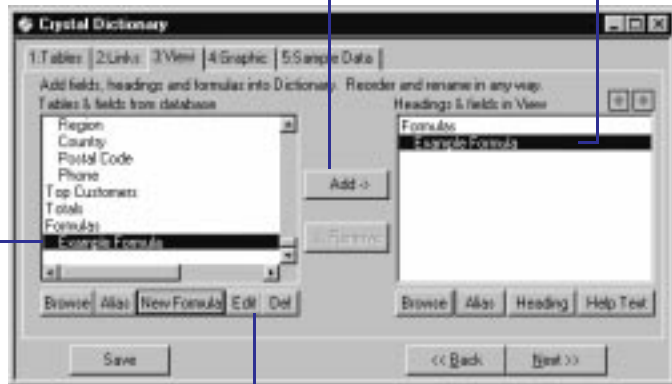
Next, you will need to add the formula to the view.

**NOTE:** The following screenshot 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 the Add button.

The field will be added to this list.



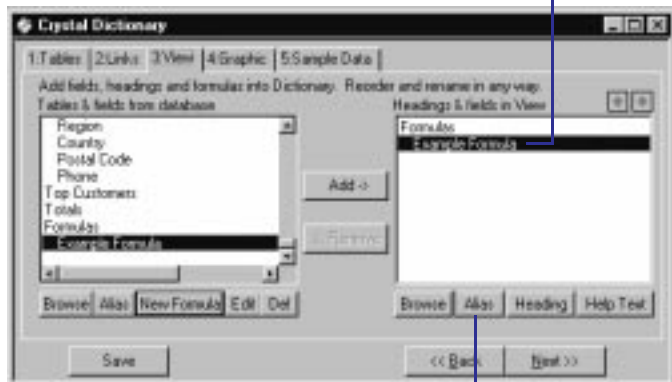
8 Highlight the formula and click the Edit button if you would like to modify your formula.

**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 field headings, fields, and formulas

1 While in the Dictionaries Expert, click the View Tab.

2 Highlight the heading or field you want to rename from this list.

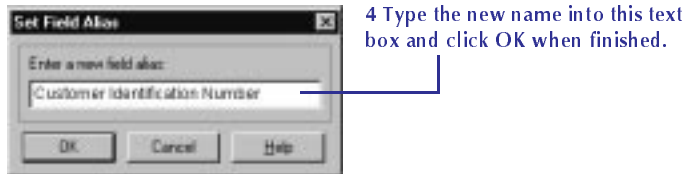


3 Click the Alias button.

A 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 515.



**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 Dictionaries Expert, click the View Tab to activate it.
- 2 Highlight the heading or field that you want to move from the *Headings & fields in View* list and drag it up or down to the desired position.

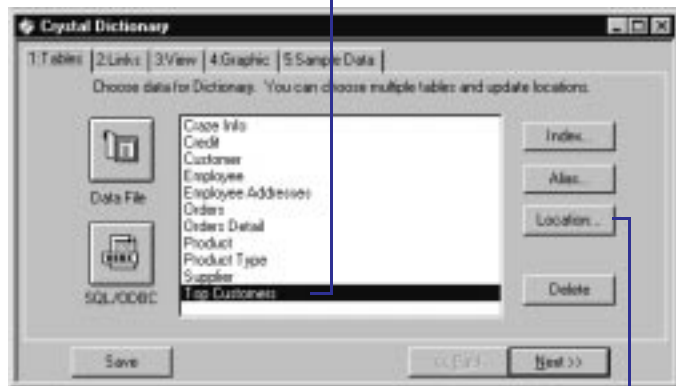
The order that the fields and field headings appear in this list box is the order that they will appear to users.

**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 Dictionaries 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 the Location button.

**NOTE:** Remember, the table names that appear here are aliases rather than the actual database table names. See *Aliases*, Page 515.

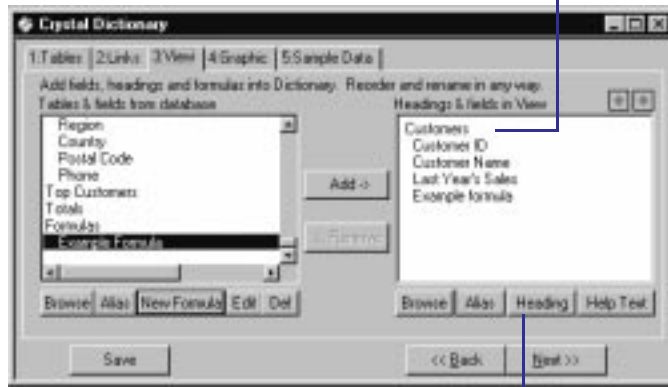
- If the table is from a data file, the Choose New Location dialog box appears.
  - If the table is from an SQL server or other ODBC data source, the Choose SQL Table dialog box appears.
- 4 Highlight the new name or location of the database table from the dialog box that appears, and click **OK**.

## How to add a new field heading

---

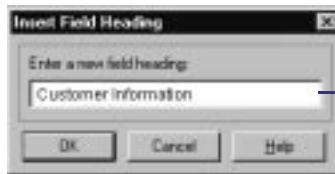
- 1 While in the Dictionaries Expert, click the View Tab to activate it.

2 Highlight the field that will be the first to appear under the new field heading from this list.



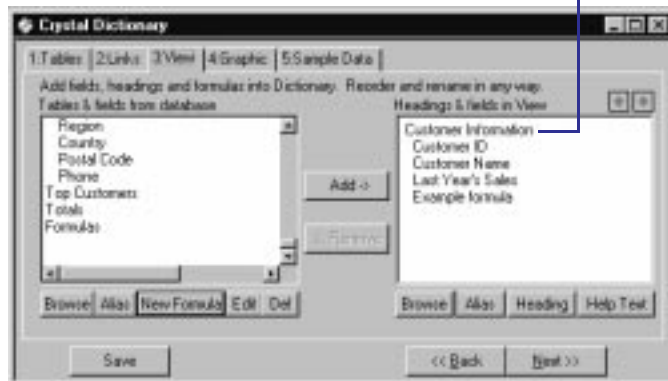
3 Click the Heading button.

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 as specified.



The new field heading appears in the *Headings & fields in View* list box with the new name.



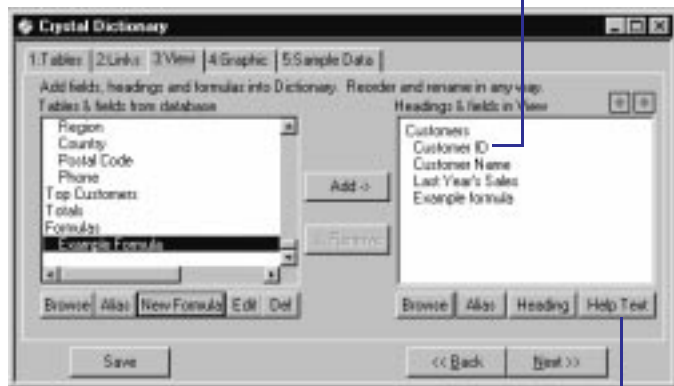
## How to add Help text

---

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.

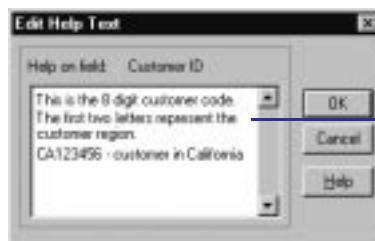
- 1 While in the Dictionaries Expert, click the View Tab to activate it.

- 2 Highlight the field that you want to add Help text to from this list.



- 3 Click the Help Text button.

The Edit Help Text dialog box appears.



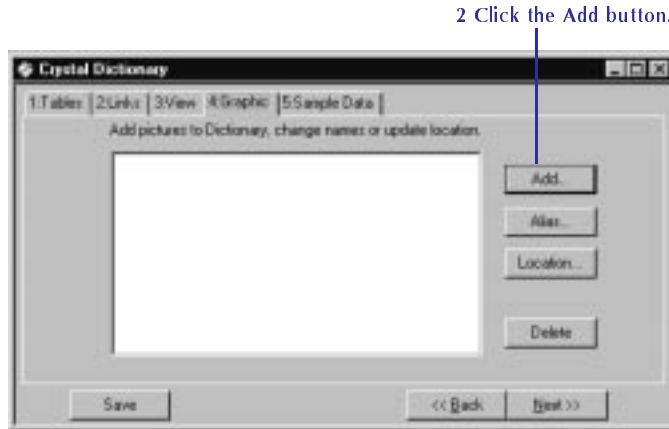
- 4 Enter the Help text and click OK when finished.

When the user selects a field or field heading and holds the cursor over the selected item, the Help text will appear in a pop-up window.

## How to add a graphic

---

- 1 While in the Dictionaries Expert, click the Graphic Tab to activate it.



The File Open dialog box appears.

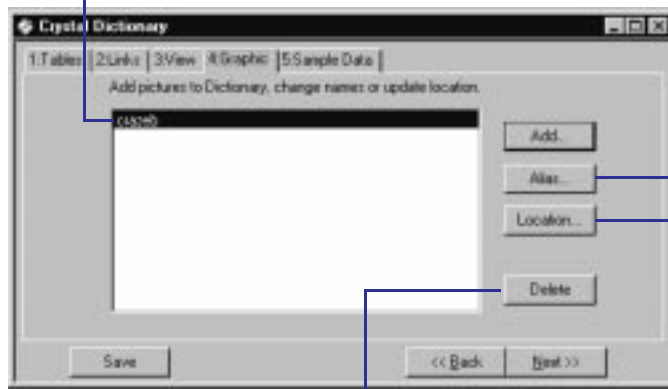
- 3 Use the controls in the File Open dialog box to highlight a graphic image file, and click *OK* to add it to your dictionary.

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.

4 Highlight the desired graphic in this list box.

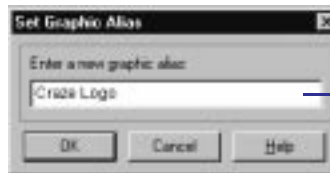
5 Click the Alias button to change the name.



Or, click Delete to delete the graphic from the list.

Or, click the Location button to change the location.

- If you clicked the *Alias* button, the Set Graphic Alias dialog box appears.



6 Type a new name for the graphic in this text box and click OK when finished.

- 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

---

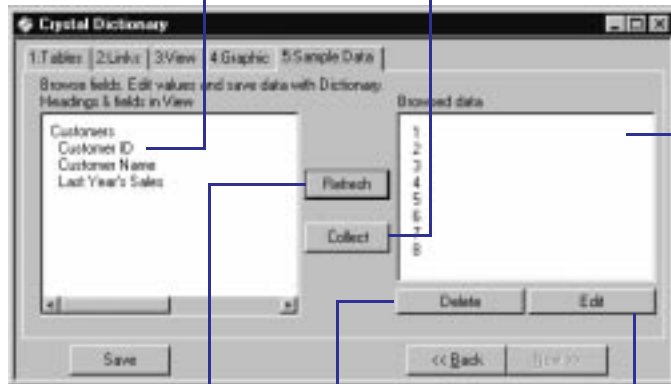
The Sample Data Tab in the Dictionaries Expert lets you create a set of custom sample data that appears to users when they browse field data. The data they see may or may not reflect actual data in the database, depending on the sample data you design.

- 1 While in the Dictionaries Expert, click the Sample Data Tab to activate it.

2 Highlight a field that you want to make browseable from this list.

3 Click the Collect button.

The field values will appear in this list.



If the data has changed, click the Refresh button to retrieve a list of the new data.

To edit a highlighted value from this list, click the Edit button.

To delete a highlighted field value from the list above, click the Delete button.

If you clicked the *Edit button*, the Edit Value dialog box appears.



Enter the new value in this text box and click OK when finished.

The new value will appear 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 standard 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 Dictionaries Expert appears.
- 3 Use the Dictionaries Expert to make changes to your dictionary file.

## How to convert a 3.x or 4.x dictionary file

---



- 1 Click the OPEN button on the standard 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 Dictionaries 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 3.x or 4.x file, you must open each view in the file separately and save it as a new dictionary file.***

- 4 Use the Dictionaries Expert to make changes to your new file.
- 5 When you save your file, it will be saved in the new dictionary format (\*.DC5).

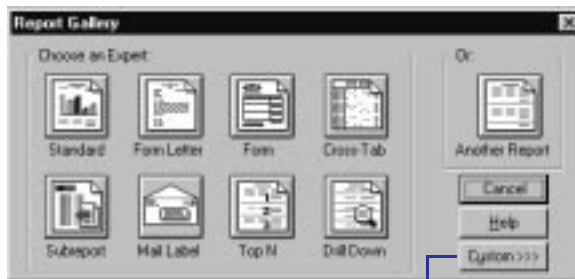
## How to select a dictionary for a report

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When creating a new report in 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 Seagate Crystal Reports. The Report Gallery appears.



- 2 Click the Custom button.

An additional section will be added to the dialog box, revealing custom report options.



- 3 Click the Custom Report, Custom Cross-Tab, or Custom Multi-Column button.

- 4 Click Dictionary.

- 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.***





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# 23

## Working With Databases

### What you will find in this chapter...

*Databases Overview, Page 514*

*Relational Database basics, Page 514*

*Aliases, Page 515*

*Locating files, Page 517*

*Indexed tables, Page 518*

*Linking tables, Page 520*

*Using SQL and SQL databases, Page 545*

*HANDS-ON (Working With Databases), Page 554*

# 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 section 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 545, 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:

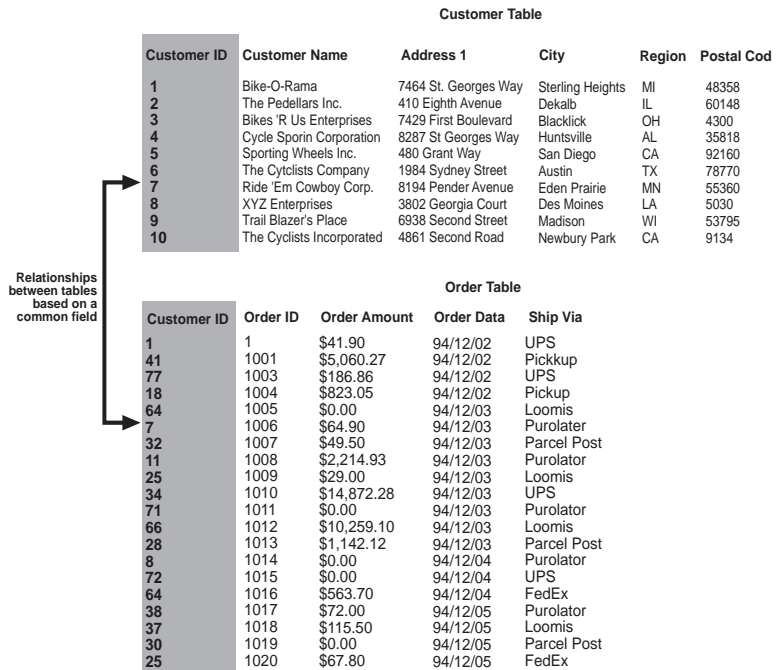
Customer Table

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 Cyclists Incorporated	4861 Second Road	Newbury Park	CA	9134

Column

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. This demonstrates a relationship between tables. The two tables can be linked (*Linking tables, Page 520*) by their common field. Examine the following diagram to understand how two tables can have a relationship:

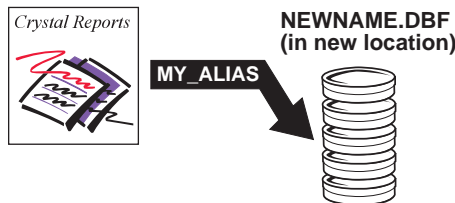
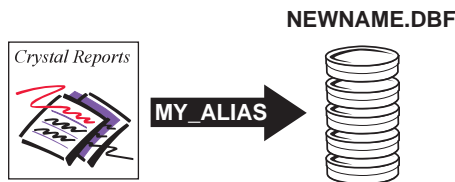
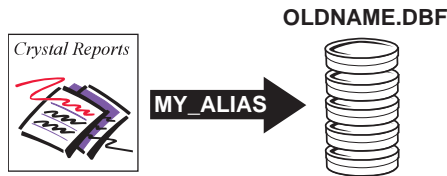


## Aliases

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 517. 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.

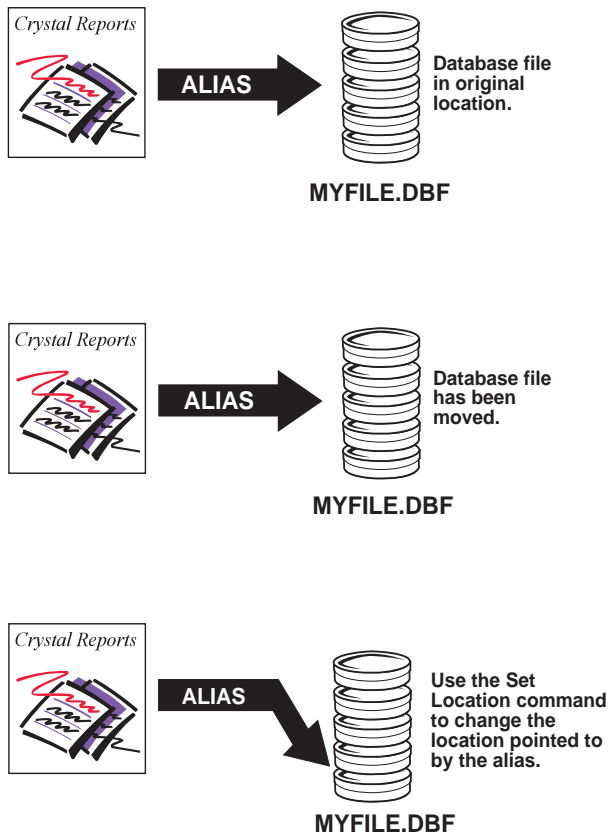


Seagate Crystal Reports automatically assigns default alias names to database tables when you first select the table or file. By default, an alias matches the original name of the table. In databases where the database table is a separate file (for instance, dBASE), the name of the database file is used without the file name extension. For example, if you are using the dBASE database file COMPANYY.DBF, the program will assign a default alias name of COMPANYY 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 570, 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:

<i>Order#</i>	<i>Customer</i>	<i>Amount</i>
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

<i>Order#</i>	<i>Customer</i>	<i>Amount</i>
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

<i>Customer</i>	<i>Pointer to Order#</i>
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 result 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
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 CRAZE.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 CRAZE.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 583.*

## 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 indexed on the field you are going to use to match up the records?
- **Index B**  
Is Table B indexed on the field you are going to use 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
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 linking tables in a single report or when adding a subreport to your report.

### LINKING DATA FILES

The process the program follows in retrieving data from linked data files in one-to-many situations is as follows:

- 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. For example, 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 on the Region field. The region must fall alphabetically between “CA” and “IL”. The program passes this kind of condition down to the database DLL (for PC data) or the server (for SQL data). See *Record and Group Selection, Page 249*.

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, it locates the first matching record in Table B, using the Table B index.
  - It passes this merged record (A+B) back to Seagate Crystal Reports which tests it against the entire selection formula.

- It then reads the second matching record and passes the merged record on, then the third matching record, and so on, until it has read all of the matching records.
- 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 it 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, it begins the matching process again for that record.
- It 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 or 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 very first record that it finds.
  - For that record, it locates the first matching record in Table B, using the Table B index.
  - It passes this merged record (A+B) back to the Report Engine which tests it against the entire selection formula.
  - It 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.
  - It then returns 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 and 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 is determined by the index and 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 2 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 that get 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) each time 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) every time it runs a subreport.

### *SQL database considerations*

Since indexes are not critical with SQL data, your primary concern with both linked tables and with 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 525*.

## 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 both cases, the Report Engine then applies the entire selection formula to the merged records.

## SUBREPORTS AND SQL DATABASES

If you are creating a primary report from Table A and a subreport from 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 is the same whether or not 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 it 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, it passes down the criteria that it can to the database translation layer.



- In the case of SQL databases, it 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 (field 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 need to be considered. In these situations, there are multiple conditions in the record selection formula and some can be passed down while others can not.

- **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, it passes down the first condition, retrieves the data set that satisfies the condition, and then applies the second condition to only 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.*

- **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) so 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 passes down all the tests or none of the tests.

***NOTE: If all of 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 File Options dialog box. Search for *File 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 it. 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 US. 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 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 forward (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 together. 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 the additional 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 value in a field 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 the 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 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 if you wish, 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
- select the link line of interest, right-click, and choose the *OPTIONS* command from the shortcut menu that appears.

The *Index* section of the Link Options dialog box has two parts:

1. An *Index In Use* drop-down box displays the index that is currently in use. If you click the arrow, it also 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 expect to see on the list, use the *Add Index* button.
2. A *Fields in Index* list box displays the fields that are included in the index that is currently selected in the *Index In Use* 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 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 different 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 533.
2. *LOOK UP ALL OF ONE, THEN ALL OF OTHERS (A TO B, A TO C)*, Page 534.
3. *LOOK UP ALL THE COMBINATIONS OF THE TWO FILES*, Page 535.

**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 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 when the Orders table runs out of records, but the Credit table still has some.

### **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 all the matching records in the Orders table (Table C). Then it repeats the process with the next record in the Customer table, then 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 your report before Table B data (Credit table), you will need to change your links so the A to C link comes first, then the A to B link. You do this via 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.

### 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, then it 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 (Orders table in this example), then find all matching records in Table B (Credit table), the reverse of the current process, you will need to change your links so the A to C link comes first, then the A to B link. You do this via 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 SQL tables are linked. An SQL join indicates how linked fields in two SQL tables are compared when records are read. The SQL Join Type options are specified using the Link Options dialog box.

***NOTE: When linking using SQL joins, no indexed fields are required.***

The join types are:

- *Equal [=] join, Page 537*
- *Left Outer [= (+), \*=] join, Page 538*
- *Right Outer [(+) =, =\*] join, Page 539*
- *Greater Than [>] join, Page 540*
- *Less Than [<] join, Page 541*
- *Greater Than Or Equal [>=] join, Page 542*
- *Less Than Or Equal [<=] join, Page 543*
- *Not Equal [!=, <>] join, Page 544*

### **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 a Customer ID is found in the Orders table that matches a Customer ID in the Customer table, information is displayed 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 ID</i>	<i>Customer Table</i> <i>Customer Name</i>	<i>Orders Table</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 where the linked field value in both tables is an exact match. It also includes a row for every record in the primary (left) table whose 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 that has not placed any orders. These customers appear at the end of the list with blanks in the fields that would hold order information:

<i>Customer Table</i> <i>Customer ID</i>	<i>Customer Table</i> <i>Customer Name</i>	<i>Orders Table</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

<i>Customer Table</i> <i>Customer ID</i>	<i>Customer Table</i> <i>Customer Name</i>	<i>Orders Table</i> <i>Order Amount</i>
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 complete information on what an Outer join looks like in a SQL statement, refer to Microsoft ODBC documentation or the documentation for your SQL database.***

### **Right Outer [(+)=, =\*] join**

The result set from a Right Outer join includes all the records where the linked field value in both tables is an exact match. It also includes a row for every record in the lookup (right) table whose linked field value has no match in the primary table. If you link the Customer table to the Orders table, you get a row in the table for every order a customer has placed, just like 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 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 complete information on what an Outer join looks like in an SQL statement, refer to Microsoft ODBC documentation or 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 of their sales representatives to the salaries made by all of 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>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	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 between sales representatives and sales managers established. 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 from 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 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 from 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, but 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>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	Fuller	\$32,000.00
Davolio	\$35,000.00	Brid	\$30,000.00
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 from 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, but 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 like the following:

<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
Brid	\$30,000.00	Patterson	\$30,000.00
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	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 from 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 as 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><b>Product1</b></i>	<i><b>Product2</b></i>
<i><b>Product Name</b></i>	<i><b>Product Name</b></i>
Craze Adult Helmet	Craze Mtn Lock
Craze Adult Helmet	InFlux Lycra Glove
Craze Adult Helmet	Roadster Micro Mtn Saddle
Craze Mtn Lock	Craze Adult Helmet
Craze Mtn Lock	InFlux Lycra Glove
Craze Mtn Lock	Roadster Micro Mtn Saddle
InFlux Lycra Glove	Craze Adult Helmet
InFlux Lycra Glove	Craze Mtn Lock
InFlux Lycra Glove	Roadster Micro Mtn Saddle
Roadster Micro Mtn Saddle	Craze Adult Helmet
Roadster Micro Mtn Saddle	Craze 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.*

## Using SQL and SQL databases

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 to not only design and work with database files, but to also retrieve useful and meaningful data that will help them in their everyday work.

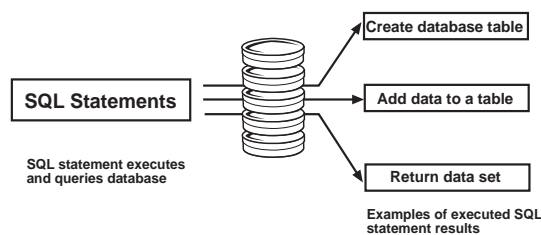
### ***What is SQL?***

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 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 can not be used to create stand-alone computer applications or operating systems. SQL is often referred to as a sublanguage that can be used from 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 the database, adding records to tables, or retrieving data from databases. The SQL server analyzes the SQL statement and performs the required operation. 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.

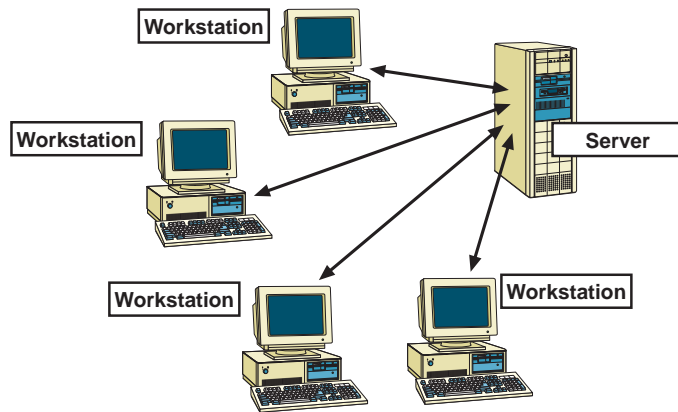


An SQL query is a SQL statement designed specifically to request data from one or more SQL databases. Some SQL applications require that you type in an SQL query directly using a text editor, while others provide graphical user interfaces that lead you through the process of querying an SQL database. 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 latter category of SQL-compliant applications.

## CLIENT/SERVER ARCHITECTURE

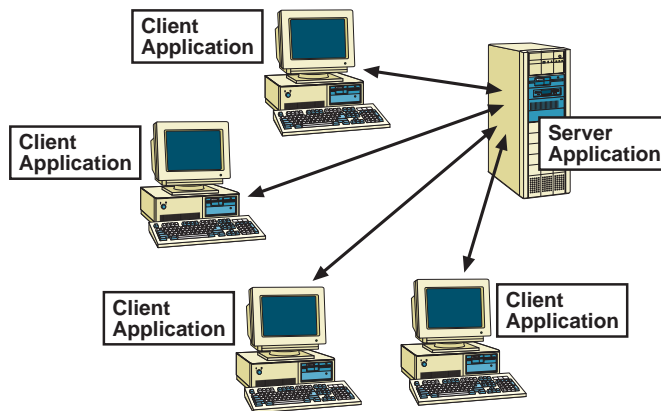
One of the most powerful features of SQL DBMS applications is their ability to efficiently use the client/server architecture of a network.



A simple network structure consists of one or more network servers that provide a common location for all users on the network to 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 computer's power and resources, while the client application provides an easy-to-use user interface designed to help get work done faster and better than it could be done otherwise.



Often, a client/server application will be made available with a certain number of seats, depending on how much is paid for the application. Each seat is a single client workstation, or a single client user, depending on what the software vendors choose, that can be connected to and use the client/server software. Software vendors often sell additional seats for their applications, each seat coming with a complete set of client application software.

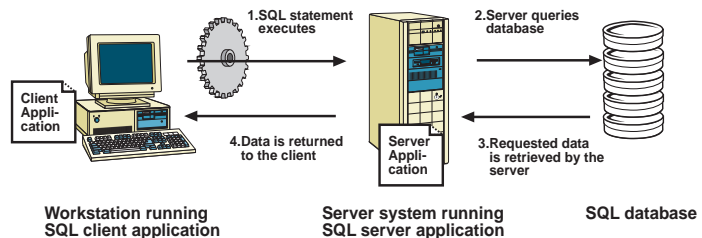
Do not confuse server applications with a network server computer. Both are often referred to as servers. However, a server application resides on a network server, taking advantage of the hardware and operating system capabilities of the server machine. A network server is a physical machine that network clients are connected to by cables or some other connection device.

## THE 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 of 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.

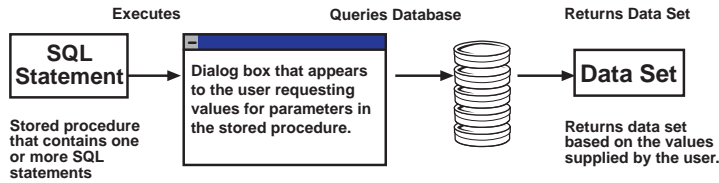
When you execute an SQL statement, the client software passes the statement to the communications layer, which sends the statement over the network to the server software. The SQL server analyzes the statement, performs the requested operation, and returns any data requested to the client software. If the client software receives back any data, it 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 573.

### ***How does Seagate Crystal Reports use SQL?***

When you connect to an SQL database, or 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 designed.

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 your report design into an SQL query, Seagate Crystal Reports can offload much of the report processing onto the server machine. Rather than having to sift through an entire database to find the specific 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 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 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 can be added to an SQL statement just after the SELECT clause. DISTINCT forces the query to retrieve only unique (distinct) sets of data. A row of results will only be retrieved once. The previous SELECT statement can be changed to use the DISTINCT clause:

```
SELECT DISTINCT
    TABLEA. 'CUSTNAME' ,
    TABLEA. 'STATE '
```

### FROM

The FROM clause specifies the sources of the database fields indicated in the SELECT clause. FROM lists actual database tables that contain 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 illustrates the FROM clause 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 using a search condition to use 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 537. 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 indicates that the database records retrieved be sorted according to the values in a specific field. If the ORDER BY clause is not used, records are retrieved in the order that they appear in the original database. If more than one field is specified after the ORDER BY clause, the records are sorted according to the values in the first field specified, then, within that sort, they are sorted 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 according to an SQL aggregate function. Only the summarization information for each group is returned to Seagate Crystal Reports. For example:

```

SELECT
    MYTABLE.'STATE' ,
    MYTABLE.'ZIPCODE' ,
    SUM (MYTABLE.'SALES' )
FROM
    'MYTABLE' MYTABLE
GROUP BY
    MYTABLE.'STATE' ,
    MYTABLE.'ZIPCODE'

```

## HAVING

The HAVING clause creates selection criteria for the summary information produced by the GROUP BY clause. The function of the HAVING clause is similar to the record selection function of the WHERE clause, but HAVING applies to summary data produced by the GROUP BY clause. For this reason, you will always see a GROUP BY clause just before the HAVING clause in any Seagate Crystal Reports SQL statement that produces summary results. This can be seen in the following example:

```
SELECT
    TABLE.'CUSTOMER' ,
    SUM (TABLE.'ORDERAMOUNT' )
FROM
    'TABLE' TABLE
GROUP BY
    TABLE.'CUSTOMER'
HAVING
    SUM (TABLE.'ORDERAMOUNT' ) > 20000.00
```

## For additional information

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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 opening an Access database through the DAO engine (*Microsoft Access, Page 591*), any queries in the database can be automatically read.



- 1 Click the NEW button on the standard toolbar. The Report Gallery appears.



- 2 Click the Custom button.

The Report Gallery expands.



- 3 Click the Custom Report button.

- 4 Click the Data File button.

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 OK. The Design Tab appears in the application window with the Insert Fields dialog box.
- 7 All of the tables and queries 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 in the list. The query expands to display all fields it contains.
- 8 Select any fields you want to use in your report, and add them to the Design Tab.

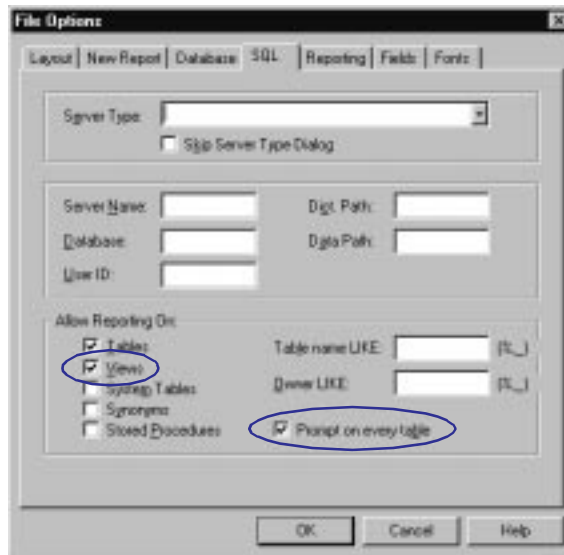
**NOTE:** You can not use Access action queries or update queries in Seagate Crystal Reports. You can use Access select queries and cross-tab queries.

## How to open Access queries through ODBC

---

ODBC gives you more control over what parts of a database you want to 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 File 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.

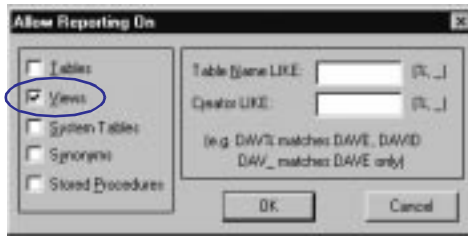
- The **Views** option automatically displays any available queries in your Access database.
- The **Prompt on every table** option displays the Allow Reporting On dialog box every time you log on to an ODBC data source. This dialog box provides the same options as the *Allow Reporting On* section of the File 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. 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 had an owner beginning with the letter C.
- 4 Click *OK* to exit the File 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 will appear. Locate and select the database containing the Access query you want to use, and click *OK*.
- 8 If you selected the *Prompt on every table* check box in the File 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 click OK when finished.

The Choose SQL Table dialog box appears.

10 Highlight your query in this list box, then click OK.



11 The Design Tab appears with the Insert Fields dialog box. Your Access query, and all fields associated with that query, appear on the Database Tab of the Insert Fields dialog box.

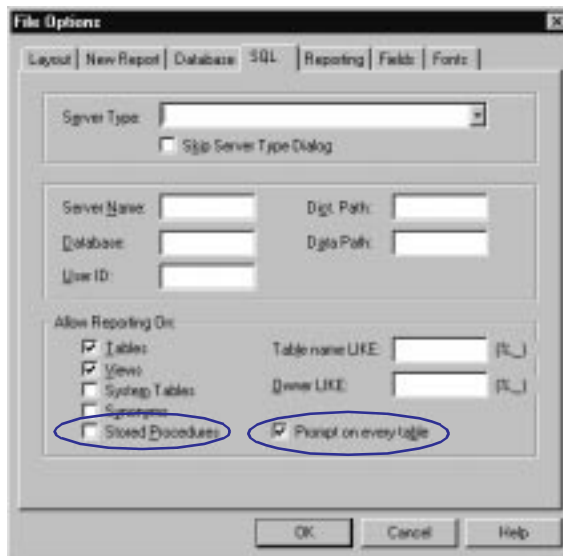
**NOTE:** You can not use Access action queries or update queries in Seagate Crystal Reports. You can use Access select queries and cross-tab queries.

## How to open Access parameter queries

Access parameter queries can only be opened when an Access database is opened 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 562.

**NOTE:** When you design a parameter query in Access, you must provide a prompt for the query and 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 File 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.

- 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.

- 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 of the File 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. 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 had an owner beginning with the letter C.
  - 4 Click *OK* to exit the File 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.

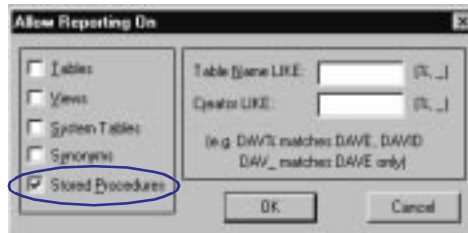


6 Choose the ODBC data source for your Access database, then click *OK*.

- 7 If you did not specify a particular Access database file with your Access ODBC data source, the Select Database dialog box will appear. Locate and highlight the database containing the Access parameter query you want to use, and click *OK*.



- 8 If you selected the *Prompt on every table* check box in the File 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 selected and click OK when finished.

- 10 The Choose SQL Table dialog box appears. Access parameter queries appear in the SQL Tables list box as:

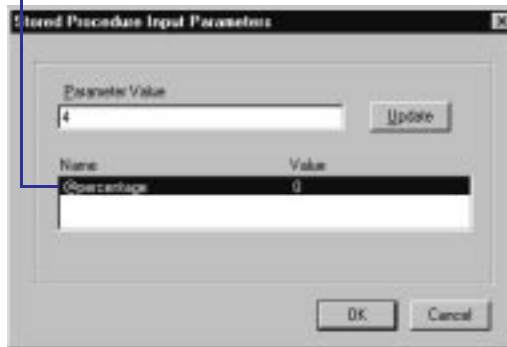
Proc(QueryName)

- 11 Highlight your query in this list box, then click OK.



The Stored Procedure Input Parameters dialog box appears.

12 Highlight a parameter from this list box.



13 Assign a value by typing into the Parameter Value text box and click the Update button.

- 14 The value displayed in the *Name* list box will be updated.
- 15 Repeat Steps 12 and 13 for each parameter in your Access parameter query.
- 16 Click *OK* when finished. You can change parameter values at any time by choosing the **STORED PROCEDURE PARAMETERS** command on the Database menu.
- 17 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. You can use Access select queries and cross-tab queries.

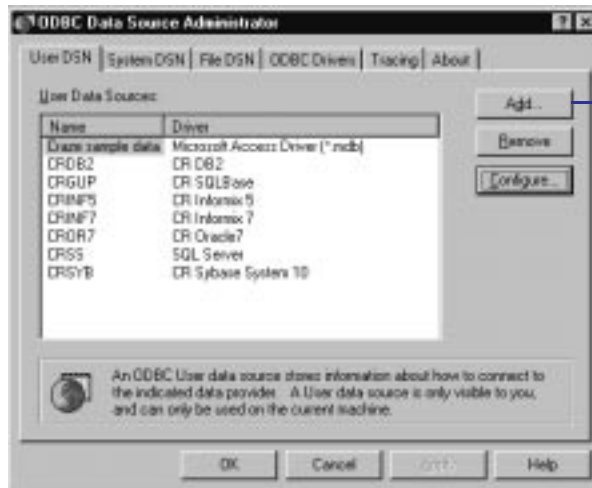
## How to set up an ODBC data source

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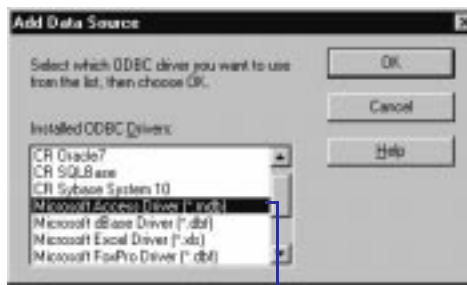
To set up an ODBC data source, you must have an ODBC driver installed for the type of data you want to use. Many DBMS applications automatically install and set up ODBC drivers. If you are not sure whether ODBC drivers have been installed for your data, refer to the documentation that came with your 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.

2 Click the Add button to add a new ODBC data source.



The Add Data Source dialog box appears.



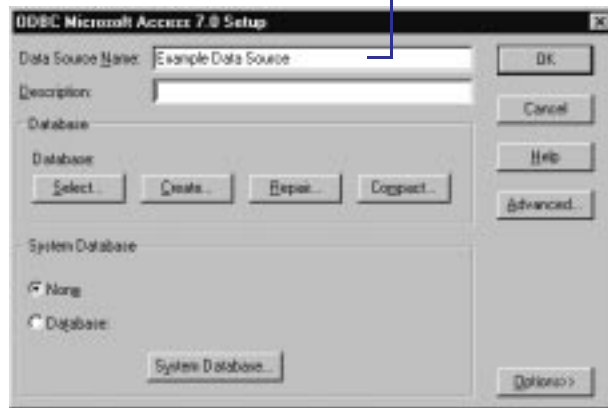
3 Choose the ODBC driver appropriate for your data type from this list.

If a driver does not appear for your data type, an ODBC driver has not been correctly installed. Refer to the documentation for your DBMS application.

- 4 When you click OK. An ODBC Data Source Setup dialog box appears that is specific to the ODBC driver you selected.

**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.

5 Type the name for your new ODBC data source here.



This is the name that you select when you log on to the data source from Seagate Crystal Reports.

**NOTE:** The dialog box that appears may look different than the one shown here, depending on the type of data you are using. This dialog box is specific to the Access 7.0 ODBC driver. For complete information on using the dialog box that appears for your data, click the Help button.

6 Click OK in the ODBC Data Source Setup dialog box when you are finished setting up your data source. The new ODBC data source will appear in the Data Sources dialog box.

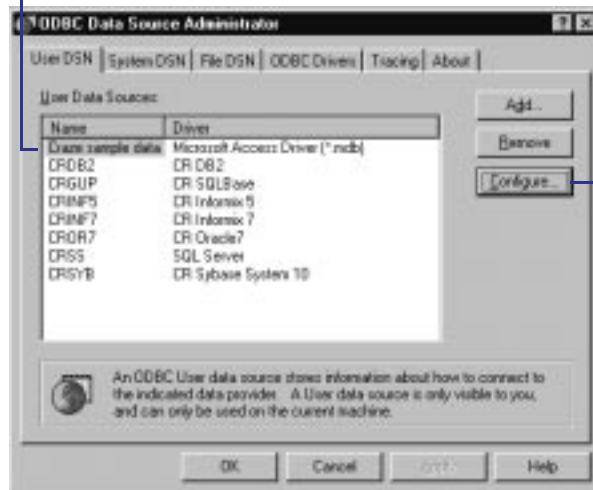


Your new data source will now appear in this list.

## How to check settings for an ODBC data source

---

- 1 From the appropriate program group, or folder in Windows 95, run the ODBC Administrator application. The Data Sources dialog box appears.
- 2 Highlight the appropriate data source from this list.



3 Click Configure.

The ODBC Data Source Setup dialog box appears.



- 4 The ODBC Data Source Setup dialog box 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.

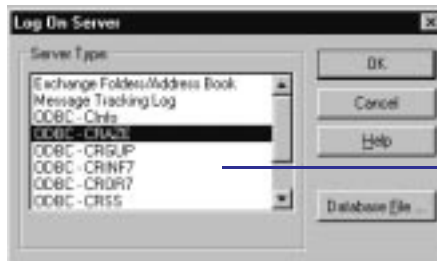
**NOTE:** *The dialog box that appears may look different than the one shown here, depending on the type of data you are using. This dialog box is specific to the Access 7.0 ODBC driver. For complete information on using the dialog box that appears for your data, click the Help button.*

- 5 Make any changes that are necessary, and click OK.
- 6 Close the ODBC Administrator Data Sources 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 appropriate for the database file you want to open and click OK when finished.

- 3 If the data source requires a user name and password, or any other log in information, a login dialog box appears. Type in the 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 highlight the database file, and click OK.
- 4 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.

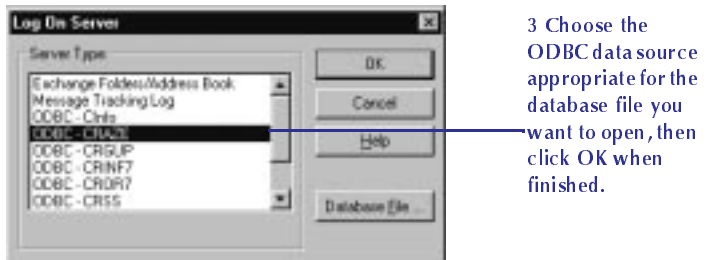
## How to add an ODBC database table to a report

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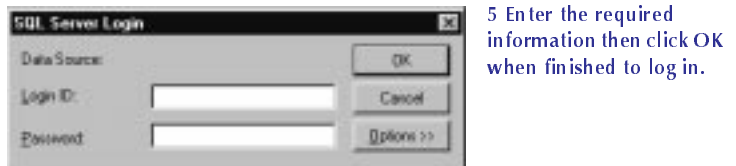
- 1 Choose the ADD DATABASE TO REPORT command from the Database menu. The Choose Database File dialog box appears.



The Log On Server dialog box appears.



- 4 If the data source requires a user name and password, or any other log in information, the SQL Server Login dialog box appears.



- 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.

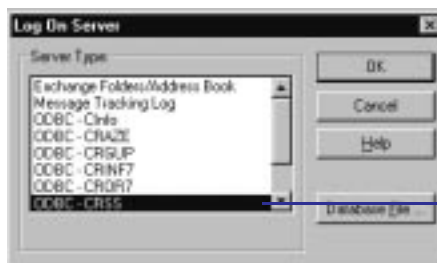
- 7 The Select Database dialog box appears. Use the *Drives*, *Directories*, and *Database Name* controls to select the database file, and click OK.
- 8 The Choose SQL Table dialog box appears.
  - Choose a database table from the *SQL Tables* list and click *OK* to add the table to your report, or
  - 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 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 565.
- 2 From Seagate Crystal Reports, choose the LOG ON SERVER command from the Database menu. The Log On Server dialog box appears.



3 Choose the ODBC - CRSS data source and click OK when finished.

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.





4 Type your MS SQL Server login ID and password.

5 Then, click the Options button.

The Options section of the SQL Server Login dialog box appears.



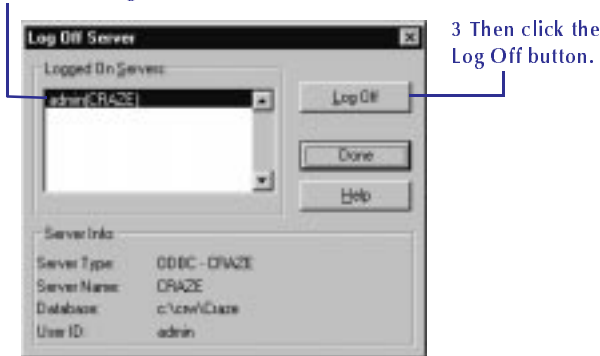
6 Verify the settings for your SQL Server.

- 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 that are necessary.
- 8 Click *OK*, and the Choose SQL Table dialog box appears. Choose a SQL Server database table from the *SQL Tables* list and click *OK* to add the table to your 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.



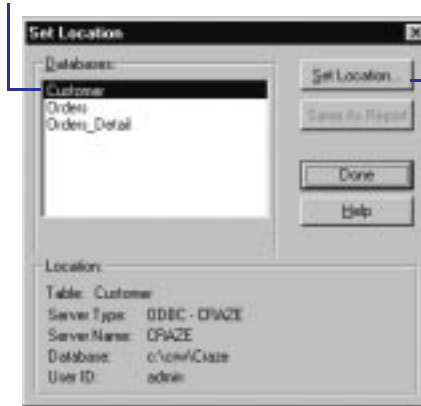
- 3 Then click the Log Off button.
- 4 The ODBC data source is removed from the *Logged On Servers* list.
- 5 Click *Done* when finished.

## 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 in the report displayed. Table location and log on information for the table you highlight will also be displayed below the list of tables. Select the first table in the list and click the *Set Location* button.

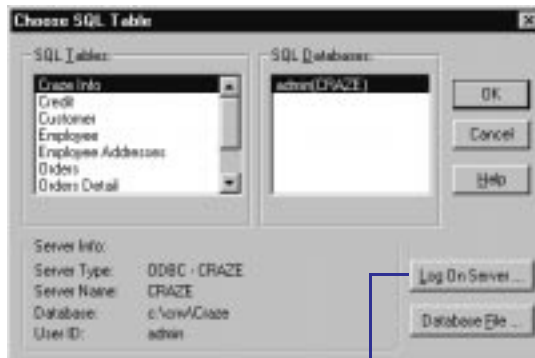
2 Highlight the first table in this list.



3 Click the Set Location button.

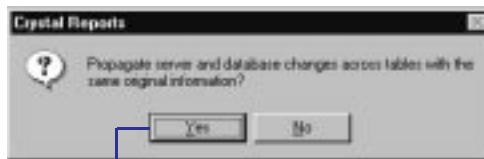
- 4 Log on to the original ODBC data source if you are not logged on already. You must first log on to the old data source before you can change a report to use a new data source. Since you must be logged on to the old data source, the old data source must be available on the local machine.
  - If the 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 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 logging on to the old data source, you will see the Choose SQL Table dialog box with a list of tables in the *SQL Tables* list box and the old data source in the *SQL Databases* list box.



5 Click the Log On Server button to log on to the new data source.

- 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 Click *OK* and you are prompted to change the location of all tables in the report to the location you specified for the first table.



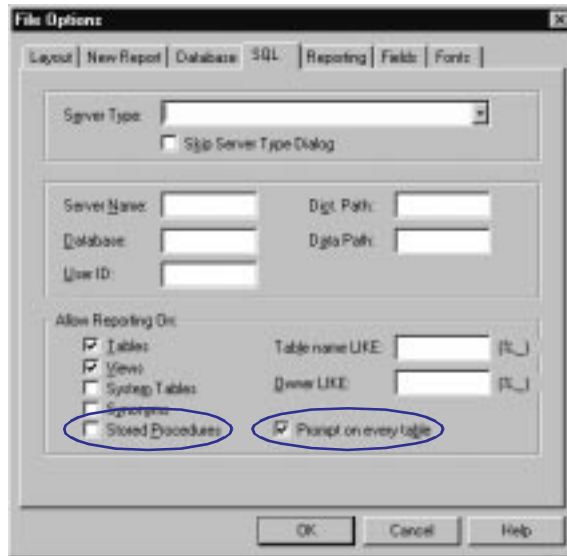
8 Click Yes to set the location of all tables in the report to the same database.

- 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 File Options dialog box appears. Click the **SQL** Tab to activate it.



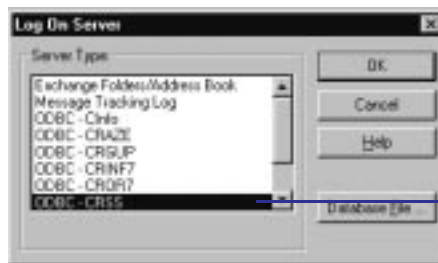
- 2 Make sure either the **Stored Procedures** or the **Prompt on every table** check box is toggled on.

- The *Stored Procedures* option automatically displays any available stored procedures when you log on to an SQL database.
  - 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 of the File 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. 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 had 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 File 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 from this list, then click *OK*.

The SQL Server Login dialog box appears.



7 Enter required information then click OK when finished to log in.

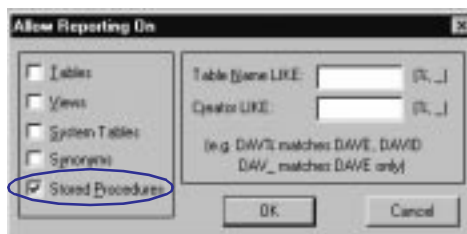
8 Click the Options button.

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 the *Prompt on every table* check box on using the File 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 selected, then click OK.

The Choose SQL Table dialog box appears.

12 Highlight an SQL stored procedure from this list, then click OK.



13 The stored procedure is added to your report, and the Stored Procedure Input Parameters dialog box appears.

14 Highlight a parameter from this list box.



15 Assign a value by typing into the Parameter Value text box and click the Update button.

16 The value displayed in the *Name* list box will be updated.

17 Repeat Steps 14 and 15 for each parameter that appears in the *Name/Value* list box.

18 Click *OK* when finished. You can change parameter values at any time by choosing the **STORED PROCEDURE PARAMETERS** command on 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 \CRW directory, or 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 is expanded.
- 3 Select the type of custom report you wish to create, and click *Data File*. The Choose Database File dialog box appears.
- 4 Locate and highlight the *ORDRCR.MDB* database file and click **OK**.  
The Select Tables dialog box appears.
- 5 Click *Select All* to include all tables and click **OK**.
- 6 The Visual Linking Expert appears.
- 7 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 on linking, search for *Visual Linking Topics Index* in *Seagate Crystal Reports online Help*.

- 8 Select one of the link lines in the Visual Linking Expert, and click *Options*. The Link Options dialog box appears.
- 9 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.
- 10 Click **OK** to return to the Visual Linking Expert. The option you selected affected all links. To make sure, click the link line that you did not select in the last step.

- 11 Click *Options*, and verify the *Look up all of one, then all of others* setting in the Link Options dialog box.
- 12 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 534.

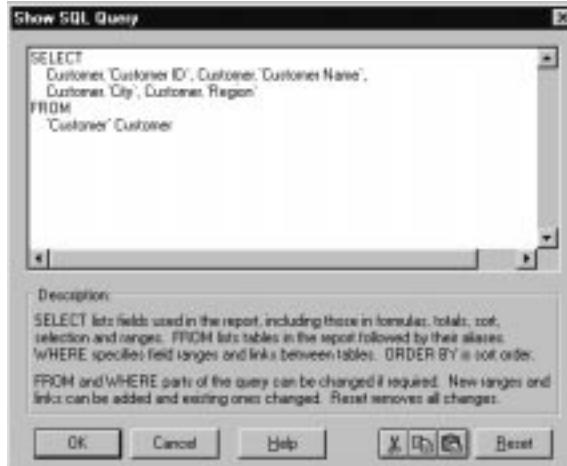
You have now established an A to B, A to C relationship among the three tables.

## How to edit an SQL query

---

**NOTE:** This section is only valid for reports using ODBC data sources. An SQL query is automatically generated by Seagate Crystal Reports when you design a report based on one or more ODBC data sources. This query is sent to ODBC as an instruction to gather 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.

- 4 Cut, copy, or paste any part of the query to or from the Clipboard if needed. See *The SQL language*, Page 551.

## How to use an ACT! database

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ACT! is a powerful Contact Management application that stores all of your contact information in a database format similar to xBASE databases (dBASE, Clipper, and FoxPro). See *ACT!*, Page 601.

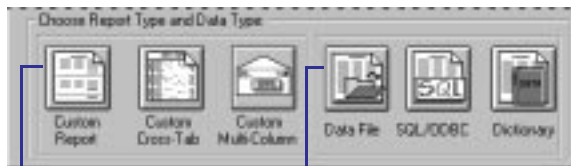


- 1 Click the NEW button on the standard toolbar. The Report Gallery appears.



- 2 Click the Custom button.

The Report Gallery expands.



- 3 Click the Custom Report button.

- 4 Click the Data File button.

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 \CRW directory or 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* when finished, and a new Design Tab appears in the application window. Create your report using fields from your ACT! database.

## How to open the NT Event Log

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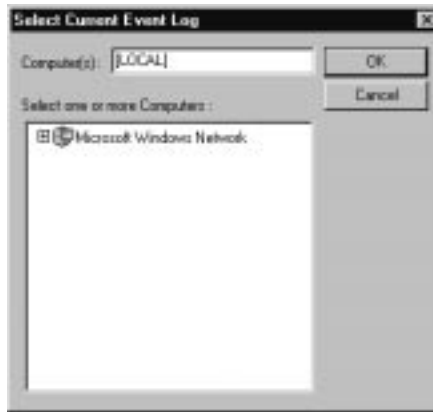
If you are using a Windows NT system, the 32-bit version of Seagate Crystal Reports gives you the ability to generate reports based on the NT Event Log. For your convenience, the program comes with a pre-designed report that you can run using your own Event Log as a data source. The report, EVENTDTL.RPT, is located in the \REPORTS\101\NTEVENT\ directory.



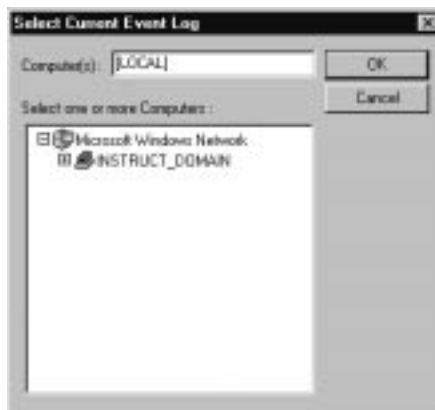
***NOTE: This report is only available with the Professional version of the program and is not available on floppy disks.***



- 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)* box is the computer the sample report is based on. 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 that your computer is connected to. The Select Current Event Log dialog box will now look 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 will now look similar to the following:



- 5 From this point, you simply need to select the NT machine for which you would like an NT Event Log Report. When you select a machine by clicking on it, 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 will appear. This report will contain information for the machine that you selected via the Select Current Event Log dialog box.
- 7 You can now print the report if you wish 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 2-7.

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# 24

## Data Sources

### What you will find in this chapter...

*Introduction, Page 584*

*Four types of data, Page 585*

*Direct access database files, Page 585*

*ODBC data sources, Page 606*

*Crystal Query Designer files, Page 623*

*Crystal Dictionary files, Page 624*

# Introduction

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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 *Queries, Page 467*, and *Dictionaries, Page 491*.

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 network administrator.

## Why you should read this chapter

The principal purpose of Seagate Crystal Reports is simply to access data stored in databases and produce reports on that data. This goal is one of the oldest uses of computers and remains one of the most common and 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 that the program can work with.

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 and anyone providing data access support for a group of users.

Most of the information in this section 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, 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 accessing data through the Crystal Report Engine, or



any of the Crystal Report Engine development tools described in the Technical Reference. For that reason, Seagate Crystal Reports, as used in this section, refers both to 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 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

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The type of data that Seagate Crystal Reports can access falls into four general categories:

1. *Direct access database files, Page 585*
2. *ODBC data sources, Page 606*
3. *Crystal Query Designer files, Page 623*
4. *Crystal Dictionary files, Page 624*

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 turn your data into powerful reports. See *Queries, Page 467*, and *Dictionaries, Page 491*.

**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 built-in capabilities 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 it is installed on your system, you can immediately begin creating reports based on these databases simply by selecting the appropriate file.

## Advantages

Accessing the database directly is the fastest route to reading 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 reads all of the stored data.

## Disadvantages

When you access a database directly from 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.

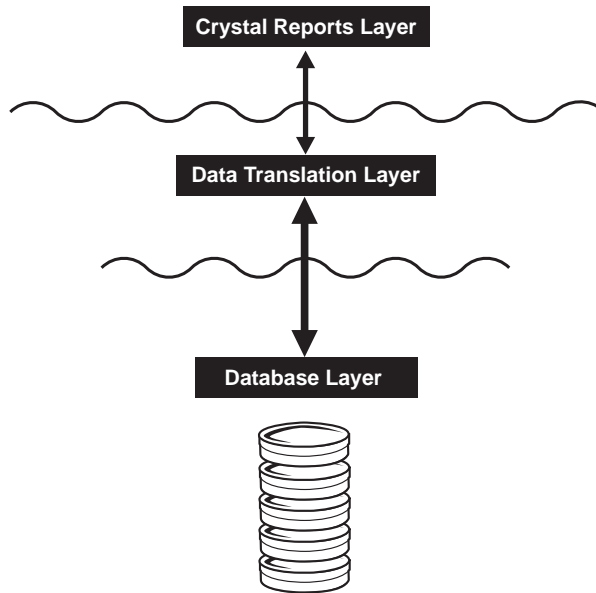
For example, if you design a report based on Btrieve data, you can not change the tables accessed by the report to Paradox data. Seagate Crystal Reports communicates with Btrieve data using a Btrieve specific syntax, a syntax that is not compatible with Paradox data.

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 606.

## Three layers

Direct access of database files from Seagate Crystal Reports requires three layers:

1. *Seagate Crystal Reports*, Page 587,
2. *Data Translation*, Page 587, and
3. *Database*, Page 588.



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 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 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 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, just like table fields. See DAO, Page 594, and Access, Page 612.***

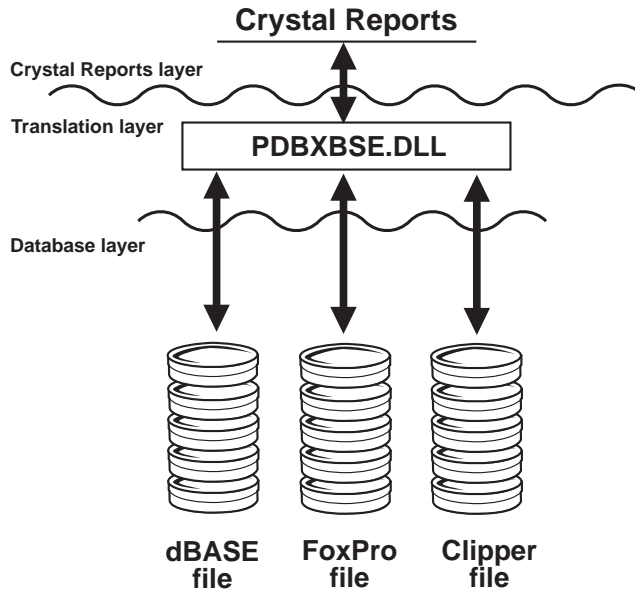
## **Common database formats**

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 (DLL). However, some formats expand the basic three-tiered structure. The following sections cover the system 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 621.



The file PDBXBSE.DLL handles all translation between the Seagate Crystal Reports and the dBASE, FoxPro, or Clipper files. Each database file contains only a single database table, but there is no limit on 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 589. The BDE, however, does not support FoxPro or Clipper data.

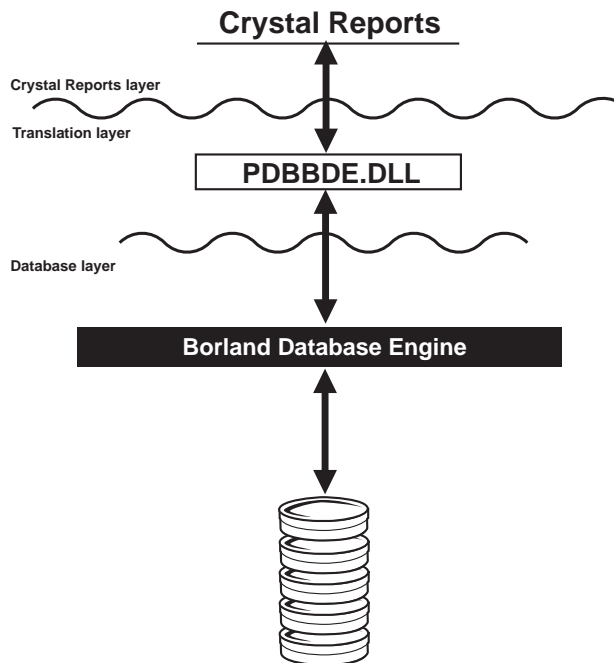
### **Paradox**

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, 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 can 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 612.

*NOTE: You can maintain Access security when opening database files using Seagate Crystal Reports by running SYSDb32.EXE and select the Access SYSTM.MDW file. In this way, 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, 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). On average, this restricts the size of your Access database to about 80 tables (depending on the number of fields in your tables).*

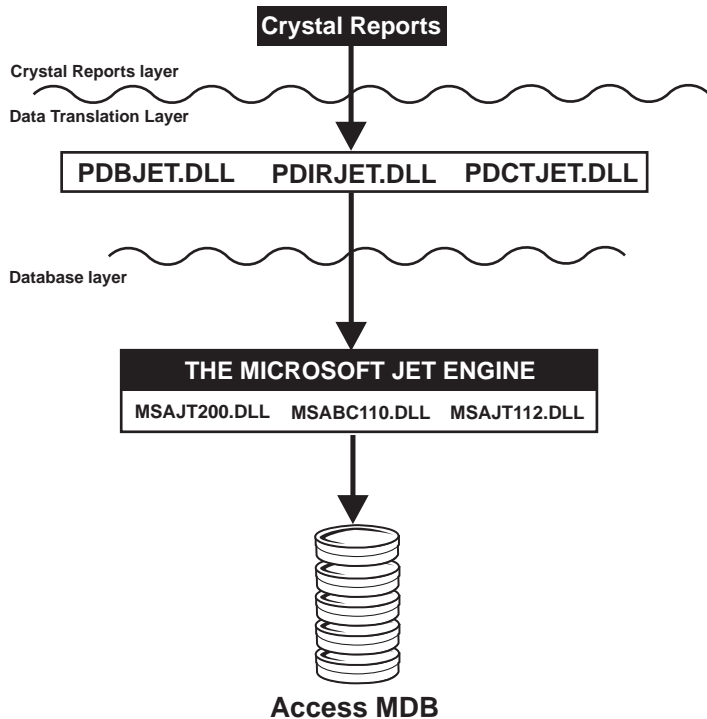
## JET

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, and, therefore, 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 594) or ODBC (Access, Page 612).

**NOTE:** If you toggle the Use Indexes check box on using the Database Tab of the File 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 File Options dialog box in Seagate Crystal Reports online Help.

**NOTE:** Seagate Crystal Reports provides all necessary files for reading Access tables through the Jet engine. For complete information on necessary files, refer to the Runtime File Requirements online Help (RUNTIME.HLP).

## DAO

Microsoft's new Data Access Object (DAO) Engine provides all of 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 and Windows NT) to provide access to Access data through an object-oriented approach.

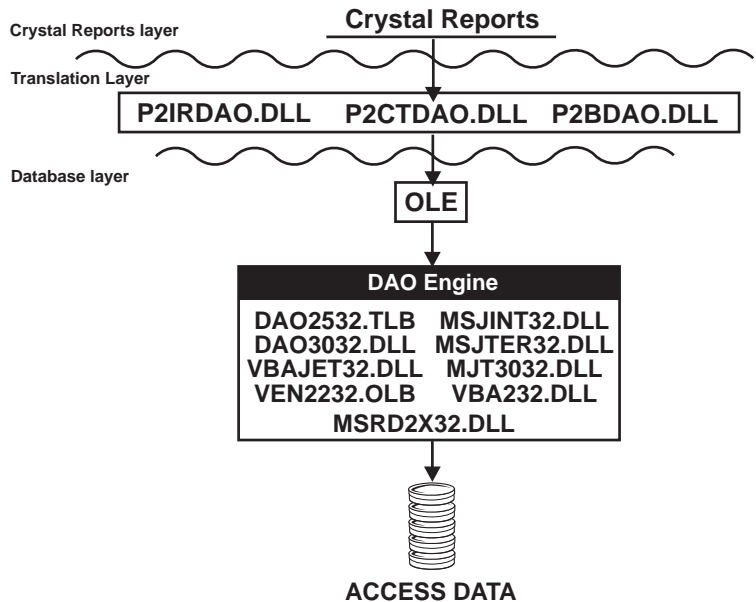
In addition to Access database tables, Seagate Crystal Reports can open and use Access queries through DAO. If you are not familiar with Access queries, refer to your Access documentation. See *How to open Access queries through DAO*, Page 554.

***NOTE: Access Parameter queries and cross-tab queries can only be opened through an ODBC connection. See How to open Access parameter queries, Page 558. 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 File 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, primarily working 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. See *JET*, Page 592.

***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 necessary files 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 621). For complete information on necessary 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 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 to 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)

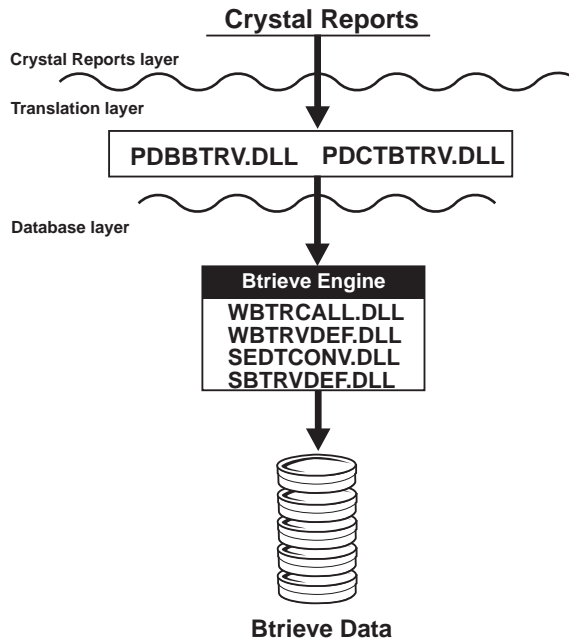
These utilities are installed in the \CRW directory (or directory in which the program resides). Simply run the appropriate utility and point it at the location of the SYSTEM.MDA or SYSTEM.MDW file.

### ***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.

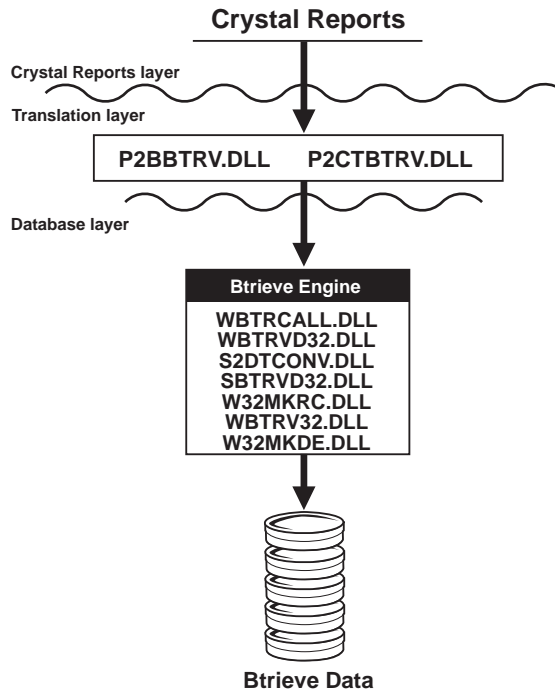


The rest of the Btrieve engine is a complex collection of DLLs and EXEs that are specific to the version of Btrieve you are using. For complete information on different 16-bit Btrieve engine files,

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 upon installation. Seagate Crystal Reports installs the Btrieve files that it requires to read Btrieve data, but you should 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 complete 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*

*tables 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). On average, 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 any of the DDFs is selected when creating a new report, Seagate Crystal Reports immediately adds all the data files defined in the DDFs 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 configuring the Btrieve engine.***

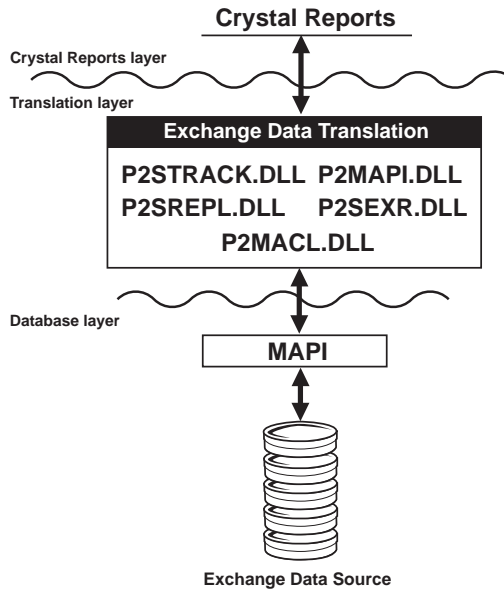
## **Exchange**

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
  - Personal Address Books
  - Global Address Lists
  - Distribution Lists
- Exchange Folder Contents
  - 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

Each Exchange data source can be used like a database table and can be linked to other data sources. For example, the Message Tracking Log may be joined 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 what data source 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
P2SEXR.DLL	Properties of Exchange Mailboxes and Public Folders (32-bit only)
P2SREPL.DLL	Replica Lists of Public Folders (32-bit only)
P2SACL.DLL	Access Control Lists (ACL) of Public Folders (32-bit only)

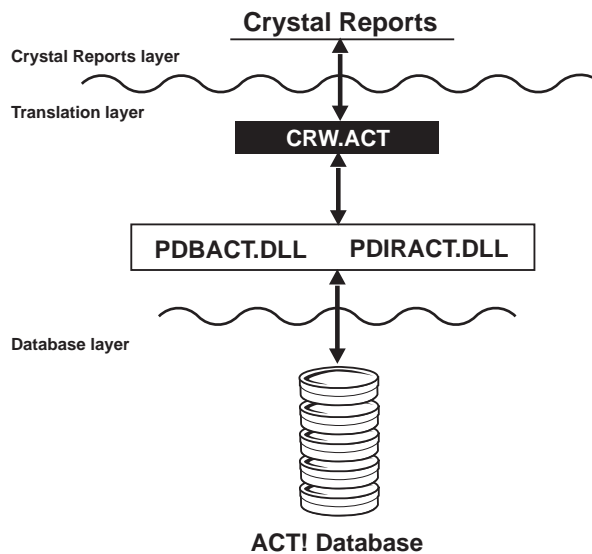
**NOTE:** PDSMAPI.DLL works with 16-bit Seagate Crystal Reports while P2SMAPI.DLL works with 32-bit Seagate Crystal Reports. Also, PDSMAPI.DLL is the only Exchange driver available for 16-bit Seagate Crystal Reports.



Exchange translation files work directly with the Microsoft Messaging API (MAPI). MAPI acts as a database engine for Exchange data.

## **ACT!**

Symantec's ACT! contact management software stores information in a relational database format similar to the xBase format. See *dBASE, FoxPro, Clipper, Page 588*. Seagate Crystal Reports can read this data and let you produce reports based on your contact information.

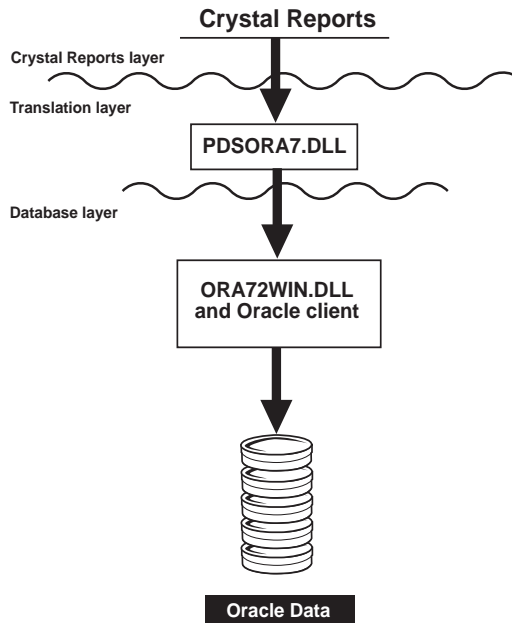


You open ACT! data by selecting the CRW.ACT file from Seagate Crystal Reports when you create a new report. CRW.ACT must be installed in the same directory as the program. This file forces Seagate Crystal Reports to load the PDBACT.DLL and PDCTACT.DLL translation files. This step is important, because 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 579*.

## Oracle 7

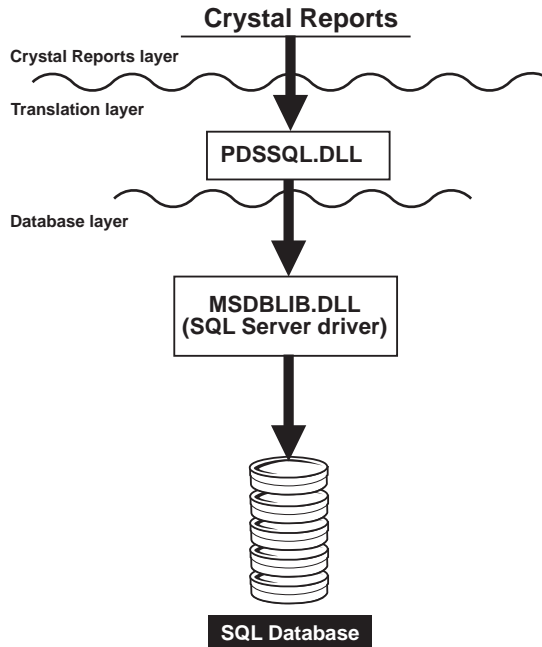
This version of Seagate Crystal Reports supports direct access of Oracle 7 SQL databases. This accessibility is provided by the PDSORA7.DLL translation file (installed with the program). This file can communicate directly with the Oracle 7 database driver ORA72WIN.DLL, which works directly with Oracle databases and clients, retrieving the data you need for your report.

**NOTE:** *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

Databases created by Microsoft's SQL Server, versions 6.0 and 6.5, can be read directly from Seagate Crystal Reports. The PDSSQL.DLL file installed with the program translates requests to the SQL server and returns data from the SQL server. It communicates directly with the Microsoft SQL Server driver MSDBLIB.DLL.

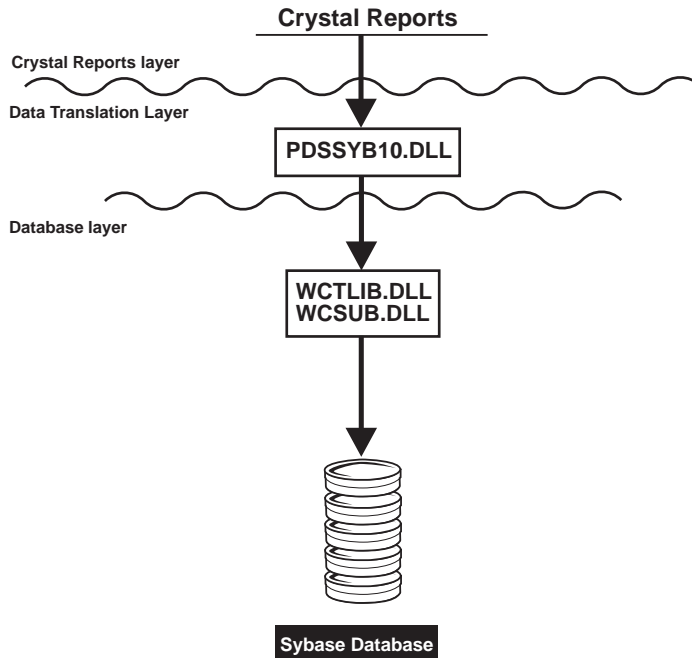


**NOTE:** Network administrators and IS managers who run Microsoft's Systems Management Server for BackOffice can run reports off of Systems Management Server data. Systems Management Server uses SQL Server to store system data, so the files used to access that data are the same files shown here for 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 WCSLIB.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.

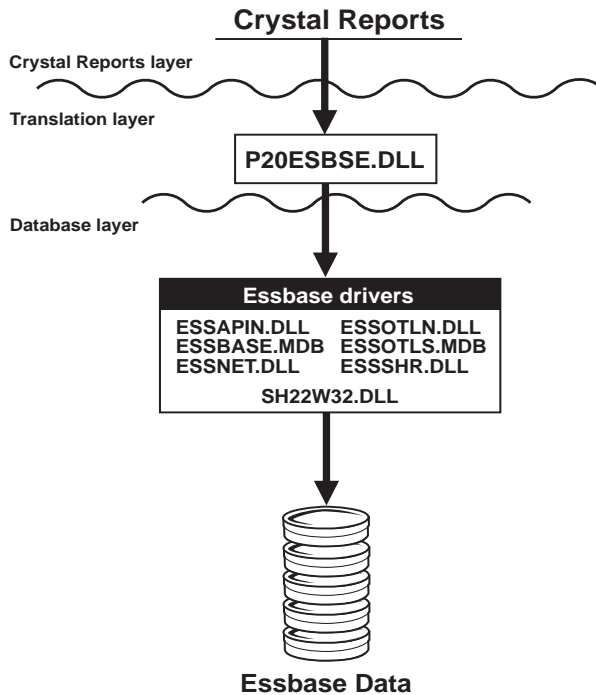
**NOTE:** The 32-bit Sybase drivers are LIBCT.DLL and LIBCS.DLL.



### ***Arbor Essbase***

Essbase is a highly powerful database format designed 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 exactly the 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.

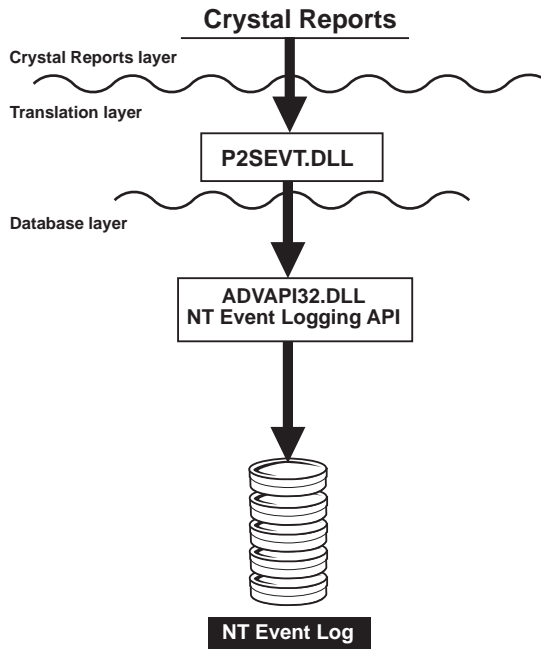


**NOTE:** Essbase data can only be accessed from the 32-bit version of Seagate Crystal Reports.

## 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 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

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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 instantly 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, such as Seagate Crystal Reports, can communicate with ODBC, and instantly have access to any ODBC data source. With ODBC drivers available for most common DBMS products, the possible types of data 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 as well, you can use the same report file with different ODBC data sources. For example, you might design a report using an Oracle data source, then, 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 570.

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 statement that is 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 onto the server system, freeing up local memory and resources for your 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 your more important work.

## Disadvantages

Because of the many layers involved in passing data through ODBC from a database to an application, ODBC data sources can often take more time to return data. First, Seagate Crystal Reports must request some data. The request must be translated by the ODBC translation layer to 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; see *DBMS Translation (ODBC data source) Layer, Page 611*. 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, it can fail at any of several possible levels.

In addition, ODBC data sources must be configured and correctly 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.

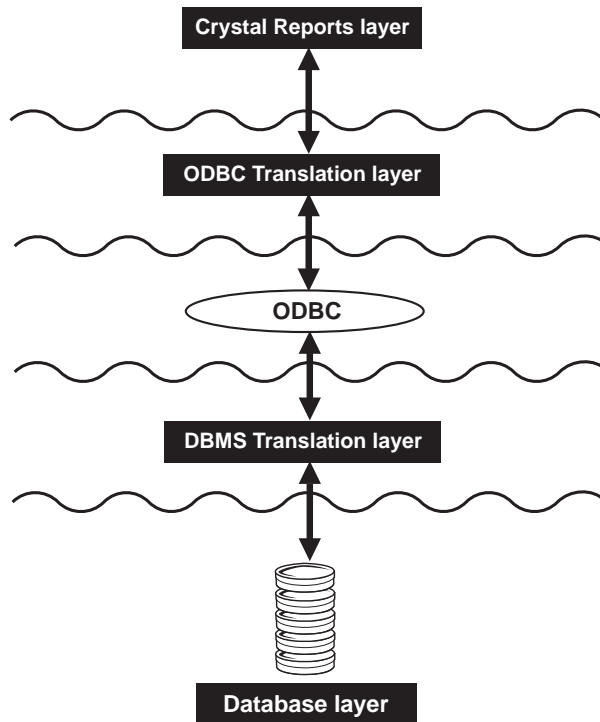
When working with ODBC, you should also be aware that the SQL language used by ODBC is based on the standards set for the SQL language by the American National Standards Institute (ANSI). Some SQL-based DBMS applications, however, provide additional features to the SQL language that are specific to that 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 551*.

## 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 609*
2. *ODBC Translation Layer, Page 610*
3. *ODBC Layer, Page 610*
4. *DBMS Translation (ODBC data source) Layer, Page 611*
5. *The Database Layer, Page 612*





By using the Structured Query Language (SQL) to communicate, 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 578.

## ***ODBC Translation Layer***

Seagate Crystal Reports uses the Dynamic Link Library PDSODBC.DLL to communicate with ODBC. This file is unique to the 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 Dynamic Link Libraries that make up ODBC are:

- ODBC.DLL, and
- ODBCINST.DLL.

Information about an ODBC data source is stored in:

- ODBC.INI, and
- ODBCINST.INI.

ODBC uses these files to get and use information about the data source.

In 32-bit Windows (Windows 95 and Windows NT), the ODBC DLLs are:

- ODBC32.DLL (32-bit version of ODBC.DLL),
- ODBCCP32.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 complete 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 some 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 or not 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 it has been installed on. 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 using the ODBC Setup application. For complete information on 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 certain 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 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 a 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. See *Using SQL and SQL databases, Page 545*.

### ***The Database Layer***

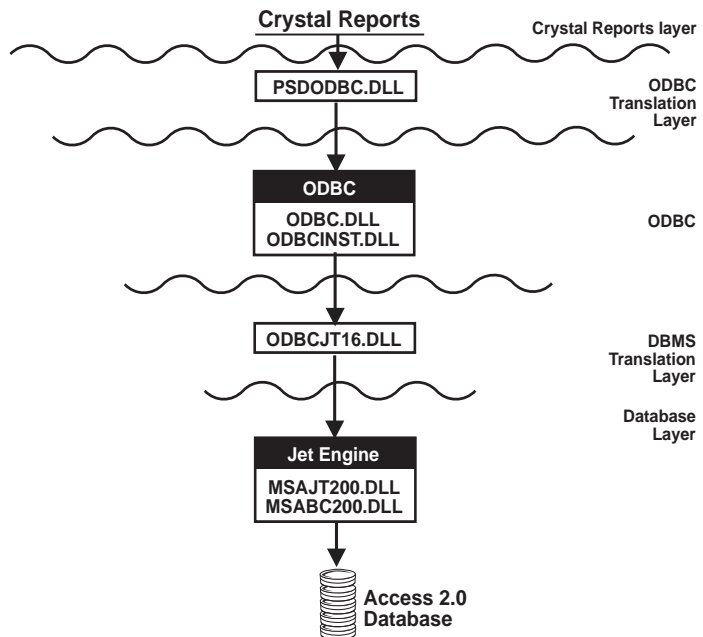
The database file referred to by the ODBC data source can be located anywhere on a system. Once the ODBC data source is set up, Seagate Crystal Reports does not need to know the actual location and format of the data. Thus, the database can have any format and be located anywhere on a network, as long as ODBC can communicate with it through the ODBC data source.

### ***Access***

Although Microsoft Access files can be opened directly by Seagate Crystal Reports (see *Microsoft Access, Page 591*), 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 a 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 a part of the database layer.

**NOTE:** The diagram shown here illustrates the files required by Seagate Crystal Reports to work with databases designed using 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 specific files required to open your Access data.



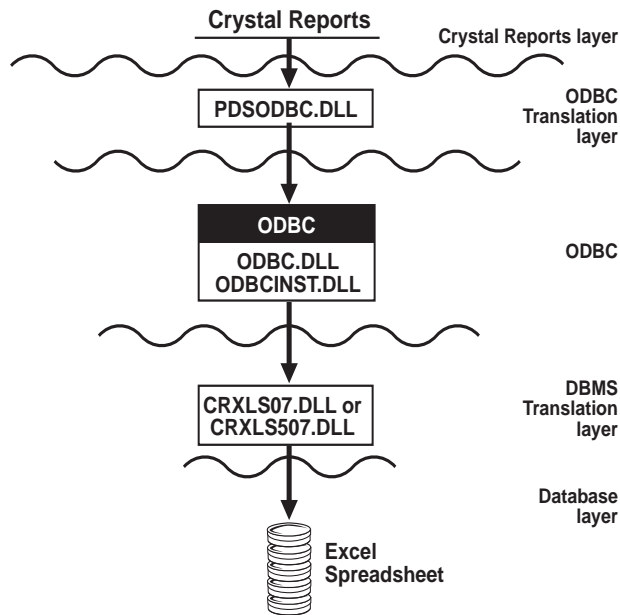
## Excel

Microsoft Excel spreadsheets can be converted 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 menu | Name. 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, then select it from Seagate Crystal Reports.

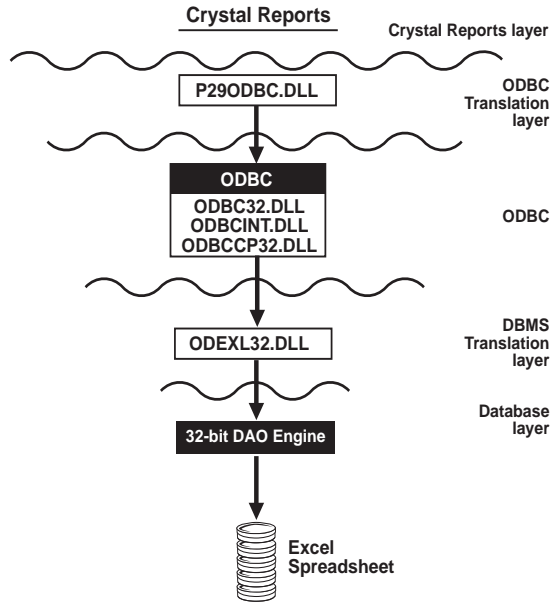
**NOTE:** If you are using Excel 7.0 or later, you can export your spreadsheets as Access database tables, and read them from Seagate Crystal Reports as you would read other Access tables. Refer to your Excel documentation for more information.

Excel databases for 16-bit Windows environments are read through the CRXLS07.DLL translation file, for version 4.0 and earlier of Excel, or through the CRXLS507.DLL for version 5 of Excel.

These drivers are installed by Seagate Crystal Reports. ODBC can communicate with this driver to read the converted Excel spreadsheet.

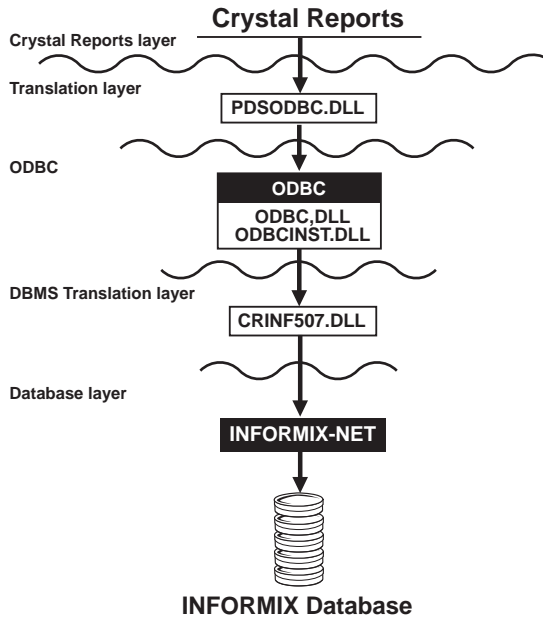


If you are using a 32-bit Windows system, you can set up an ODBC data source for 32-bit Excel spreadsheets using the 32-bit DAO engine. The DAO engine is installed on your system when you install the 32-bit version of Seagate Crystal Reports. You must, however, set up an ODBC data source manually for your Excel spreadsheet. See *How to set up an ODBC data source*, Page 562.



## INFORMIX

Seagate Crystal Reports accesses INFORMIX databases through ODBC. The INFORMIX client, called INFORMIX-NET, must be installed on your machine. Seagate Crystal Reports provides the necessary 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 text files can be read by Seagate Crystal Reports program using ODBC in the same way that many SQL databases are.***

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 it is when installed. Seagate Crystal Reports still communicates with ODBC using the PDSODBC.DLL translation file, but the DataDirect drivers provide ODBC with easy access to the actual databases.

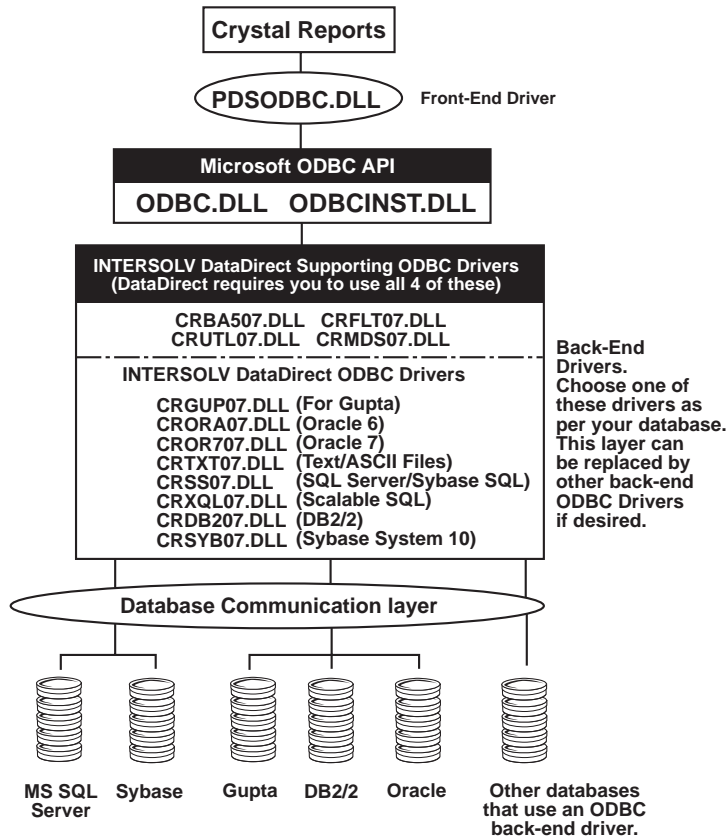
***NOTE: If you are using an SQL database not accessed by the INTERSOLV drivers, refer to your DBMS documentation for complete information on the ODBC drivers required.***

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 545*.

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.***



**32  
BIT**

**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***

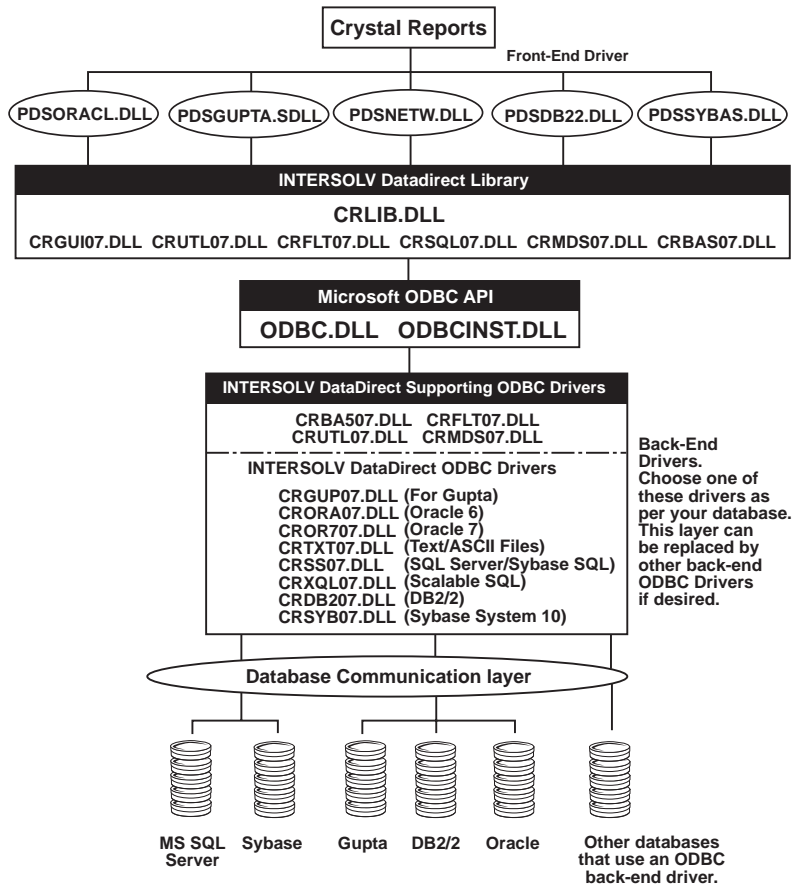
Instead of communicating directly with ODBC through the PDSODBC.DLL file, Seagate Crystal Reports can use the INTERSOLV DataDirect Library that ships with Seagate Crystal Reports. These front-end drivers use the ODBC standard as an underlying layer. However, instead of using PDSODBC.DLL to communicate 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 in 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 able to pass, at times, more precise SQL statements to the server. This way, SQL language features unique to a particular DBMS can be passed from Seagate Crystal Reports. When using ODBC direct, the PDSODBC.DLL is a common DLL that is used for all DBMS types, and 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.



**32  
BIT**

**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.

## INTERSOLV DataDirect Library databases

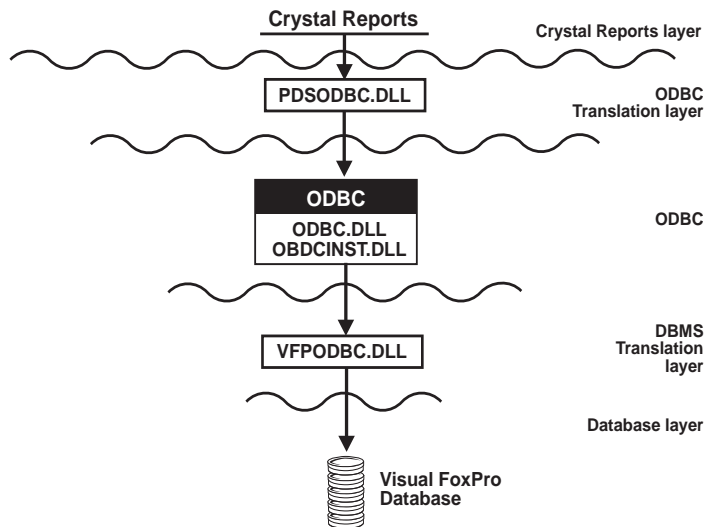
- Oracle
- Sybase SQL Server
- MS SQL Server
- Gupta SQLBase
- Scalable SQL
- DB2/2

**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 used by the data sources that go through ODBC direct.

## Visual FoxPro

Microsoft Visual FoxPro data is accessed through ODBC, whereas 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 588*.

Seagate Crystal Reports provides the ODBC driver VFPODBC.DLL to allow ODBC to work with Visual FoxPro data.



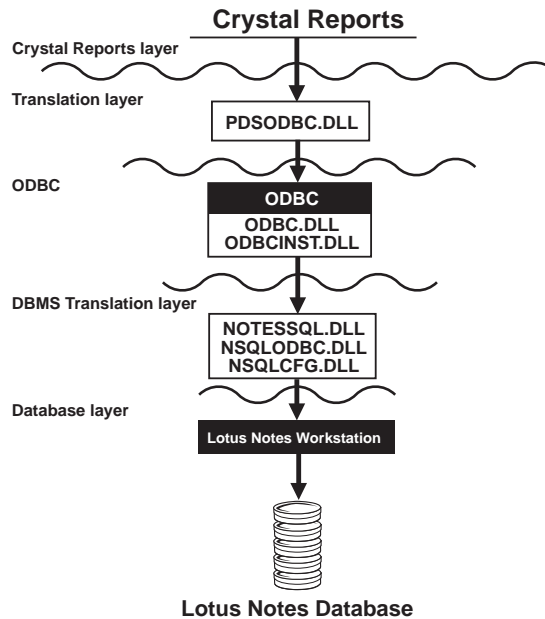
**NOTE:** Because the program supports the latest version of DAO, there is native support for VSFoxPro 5.0 (see DAO, Page 594).

## 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.



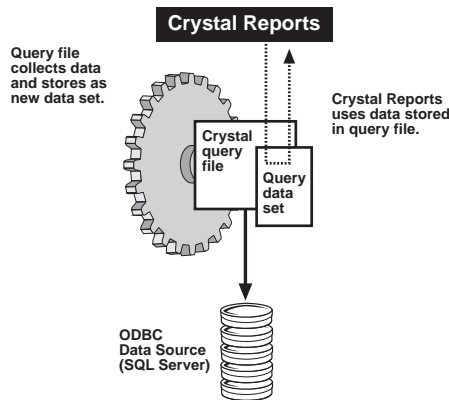
## Crystal Query Designer files

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A query 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 Query Designer file (.QRY). The Crystal Query 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 Query Designer file gathers data from ODBC data sources, such as SQL servers, by means of SQL (Structured Query Language). 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 Query Designer and stored as a query file.

**NOTE:** *If you are not familiar with SQL, see SQL join types (ODBC data sources), Page 537.*



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 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 needs only work with a small set of data, saving you time and trouble. See *How to create a new query*, Page 472.

## Advantages

While there are many reasons for using queries, the primary reason 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. Using this SQL pass-through technique, where data retrieval tasks are passed through to the server, you retrieve your data faster and more efficiently. Anytime 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 551.

## Disadvantages

Since a query represents a complete data set, any records, fields, or tables that were not included when the query was created are not 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 select an additional source of data, 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 some or all 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 data can still be accessed directly from the database by the user. Dictionaries simply provide all the convenience without enforcing restrictions.

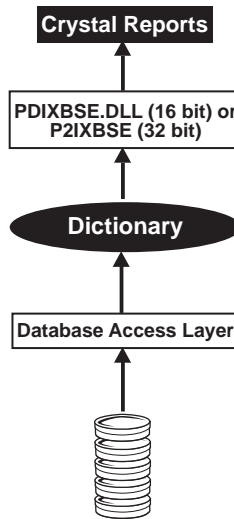
If you choose to use a dictionary to design a report, however, you can only use that dictionary as a source of data for that report. In other words, you can not open both a dictionary and an ODBC data source, a direct access database, or any other source of data from within the same report. This includes other dictionaries. 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 493.

Dictionaries let you:

- 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. Complicated data will not stop end users from creating powerful reports.



Seagate Crystal Reports reads the dictionary file using the PDIXBSE.DLL file (P2IXBSE.DLL for 32-bit). This translation file is based on the xBase engine used to access *dBASE*, *FoxPro*, *Clipper*, *Page 588*, databases, but provides all the flexibility needed to read dictionaries.

***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 through the same routes that Seagate Crystal Reports reads the data. The section on direct access database layers and ODBC data sources that are described throughout this chapter illustrate the files needed for dictionaries to open 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 displays a view that is easily accessible and usable by users.

Finally, dictionaries provide an easy means of changing the original data accessed without changing the view of data seen by users. For example, your original database may contain Price, Quantity, and Cost fields, but 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 also helps 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 dictionaries for company employees. The employees will find only the data they need in each dictionary file, because the original data has been manipulated or customized by the IS manager for varying usage.



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# A

## Report Processing Model

### What you will find in this appendix...

*Multi-pass reporting, Page 630*

*What is a “pass”?, Page 630*

*Pre-pass #1, Page 630*

*Pass #1, Page 630*

*Top/bottom N and group sorting, Page 631*

*Pass #2, Page 631*

## Multi-pass reporting

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### 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. Totalling. 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 totalling 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 TopN/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.

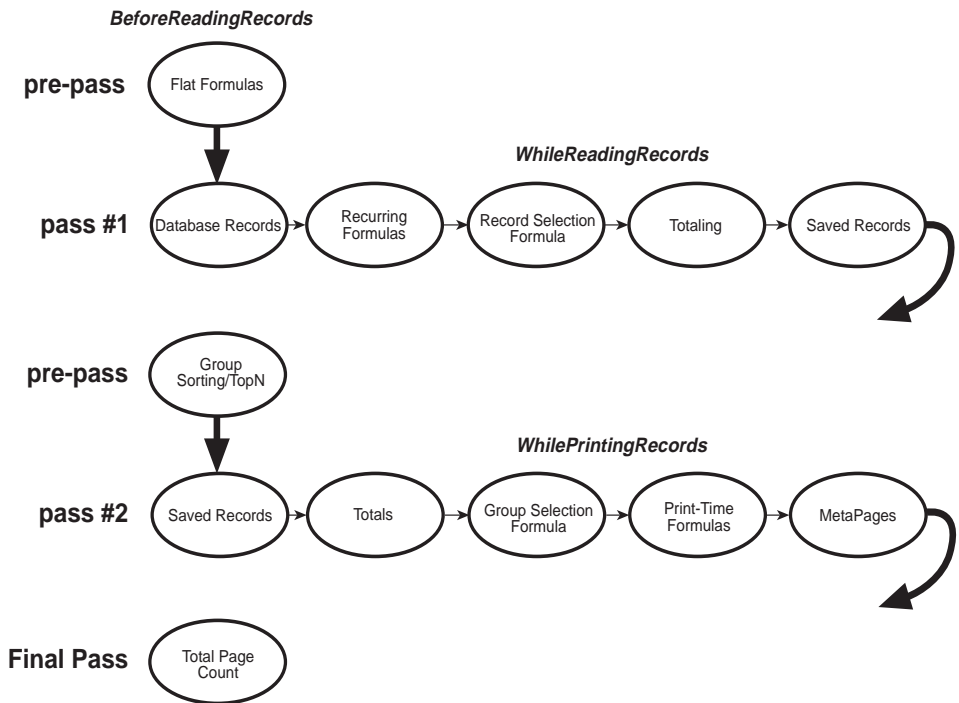
***HINT: The Group Selection Formula Editor can be used for record selection formulas, however it is not recommended. If, for example, you chose to use a typical selection such as:***

`{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. For example, the following diagram is a flow-chart of the multi-pass report process:







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# B

## Product Support

### What you will find in this chapter...

*Product support, Page 636*

*Web support, Page 636*

*E-mail support, Page 636*

*Fax support, Page 637*

*Telephone support, Page 638*

*Extended technical support policy, Page 639*

*Product registration, Page 639*

*Product return policy, Page 641*

*Product replacement policy, Page 641*

## Product support

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Seagate Crystal Reports is a powerful report writer for the Windows environment. Seagate Software IMG, 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 CONTENTS command from the main Help menu. The help system contains all of the information from the User's Guide, as well as in-depth explanations and numerous examples.

*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

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### WEB SITE

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

## E-mail support

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### INTERNET

- **Report Creation and Design**  
tsrcad@img.seagatesoftware.com
- **Delphi/VCL**  
tsvcl@img.seagatesoftware.com
- **dBase and Paradox**  
tsxbse@img.seagatesoftware.com
- **Report Engine API**  
tsrpe@img.seagatesoftware.com

- **Crystal Info Product Support**  
tscinfo@img.seagatesoftware.com
- **Report Engine NewEra Class Library Issues**  
tsnewera@img.seagatesoftware.com
- **Report Engine C++ Class Library Issues**  
tsmfc@img.seagatesoftware.com
- **Miscellaneous Issues**  
tsmisc@img.seagatesoftware.com
- **Operating System Specific Issues**  
tsosplat@img.seagatesoftware.com
- **Visual Basic, VBX, OCX Support**  
tsvbocx@img.seagatesoftware.com
- **PC database connectivity Support**  
tspcdata@img.seagatesoftware.com
- **SQL/ODBC connectivity Support**  
tssql@img.seagatesoftware.com
- **OLE Automation Tools**  
tsole@img.seagatesoftware.com
- **Web Developer Tools**  
  - Web Viewers**
  - ActiveX Viewers**
  - tsweb@img.seagatesoftware.com
- **Holos, Essbase, and other OLAP Products**  
tsolap@img.seagatesoftware.com

## Fax support

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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 the 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**

## Telephone support

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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 5 p.m., P.S.T. Monday through Thursday and 8 a.m. to 4 p.m. P.S.T. on 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.img.seagatesoftware.com](http://www.img.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 SEAGATE CRYSTAL REPORTS 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, 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***

## Extended technical support policy

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Registered user may purchase an extended support policy which entitles the user to unlimited technical support via a toll-free number for a one year period. Support plan members will receive a special toll-free phone number which they can use to get directly through to the Technical Support team, and will receive priority handling in the support queue. Call (604) 681-3435 for (800) 877-2340 for detailed information about this plan.

***NOTE: The extended technical support policy is available in the United States and Canada only.***

## Product registration

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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 web site at:

[www.seagatesoftware.com/crystalreports/register/](http://www.seagatesoftware.com/crystalreports/register/)

You can also go directly to the Registration form by choosing the PRODUCT REGISTRATION command on 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. Fill out the Registration form that is built into the program and then register by modem using the Seagate Crystal Reports communications program. The procedure will register your copy of the program, assign a registration number, and enter that number automatically into your system.
3. 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.
4. 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 (604) 681-5147***



## Product return policy

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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

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If the Seagate Crystal Reports diskettes or documentation are defective, then please contact Seagate Software Information Management Group, 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.***



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# Glossary

<b>Absolute formatting</b>	Formatting that is always applied to an object. See also <i>Conditional Formatting</i> .
<b>Access</b>	To access data means to retrieve data.
<b>Acrobat Reader</b>	Application used to review and print online manuals.
<b>Active database</b>	An active database is a database that has been selected for use in a report. You activate databases via the NEW command on the File menu and the ADD DATABASE TO REPORT command on the Database menu.
<b>Active Server Page</b>	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 Crystal Report 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.
<b>ActiveX Control</b>	Custom Control for Visual Basic 4.0 that incorporates the Object Linking and Embedding (OLE) technology. Formerly known as an OLE Control (OCX).
<b>Aggregate functions</b>	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 like 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, it is the value of the {orders.ORDER AMOUNT} field that is the item 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. For neat looking reports, it is often necessary to resize the fields so 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  $\{\text{orders detail.QUANTITY}\} > 6$  compares the value in the  $\{\text{orders detail.QUANTITY}\}$  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  $\{\text{orders detail.QUANTITY}\} * 6$ . In this case the program returns a number, the value of  $\{\text{orders detail.QUANTITY}\}$  multiplied by 6. All record 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 instead of 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, if you wish, using a calculated data field. To create a calculated data field, you simply create a formula that subtracts {file.COST} from {file.SALES}. The formula calculates a Gross Profit value for each row and prints it wherever you place the formula.

## Case sensitive

Case sensitive means that a program differentiates between uppercase and lowercase letters when evaluating a text string. 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,” “HoUsE,” and similar mixed-case responses. 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. Contrast with Row definition.

## Comments

Comments are blocks of text that accompany formulas to describe their functionality. Seagate Crystal Reports ignores comments when it runs the formula.

## Concatenate

Concatenate means 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 If  $x < 5$  Then  $x$  Else 5, the expression  $x < 5$  is the condition.

## Conditional formatting

The ability to apply formatting to objects and sections only in certain situations. 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**

Performed on an object only if a comparison statement returns True.

**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 If  $x < 5$  Then  $x$  Else 5, the expression Then  $x$  is the consequence.

**Constant**

A constant is a value that is fixed and unchanging as opposed to a variable value which can take on different values depending on the circumstances.

The value 5 is a constant; the value of the Quantity field (which sometimes may be 5, sometimes may be a different number) is a variable value. In the formula for converting pounds to ounces (Ounces = Pounds \* 16) for example, 16 is a constant while Ounces and Pounds are variables. In the formula Today - January 1, 1900, January 1, 1900, is a constant, while Today 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).

**Container document**

A file that contains an embedded or linked OLE object.

**Cross-tab**

A cross-tab is a report that summarizes data and then presents the summaries in a compact row and column format that makes it easy to make comparisons 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).

<b>Data field</b>	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.
<b>Data source</b>	A data source is a database, table, query, dictionary, or stored procedure result set that provides the data for a report.
<b>Data types</b>	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.
<b>Debug</b>	Eliminating errors that occur when you run a formula.
<b>Default</b>	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.
<b>Details area</b>	A collection of one or more Details sections (i.e., Details A, Details B, etc.).
<b>Details section</b>	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.
<b>Dictionary</b>	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 protect you from a system error, the program refuses to print a report which contains a formula that divides a value by zero.

## **Drag**

Drag means different things, depending on the context in which the word is used:

- When referring to moving a field, drag means to click on the field box and, while keeping the button pressed, to move it to a new position using the mouse. You release the mouse button when the field is in the position you want it.
- When referring to resizing a field, drag means to click on one of the field box handles and, while keeping the button pressed, to make the field bigger or smaller using the mouse. You release the button when the field is the size you want it.
- When referring to formatting text, drag means to highlight the text of interest by moving the I-beam cursor across it while the 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 a program 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 at times to describe individual report components such as database fields, formulas, and group fields. The Design Tab uses rectangular boxes to represent fields.

## **Embed, 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.

## Empty date

An empty date [designated as Date (0, 0, 0)] is a date that contains no 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 such 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 printed typically 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 other words, 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 time in the reporting process that a formula gets evaluated. Three evaluation times functions are:

1. BeforeReadingRecords
2. WhileReadingRecords
3. WhilePrintingRecords

For a complete discussion of the Evaluation Times, see *Advanced Formulas, Page 345*.

## Expert

Seagate Crystal Reports offers you several Experts. Experts are tools that 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 to the last step. When you have completed the last step, the Expert will do the rest of the work. Its that easy!

**NOTE:** *The term “expert” in Seagate Crystal Reports is equivalent to the term “wizard” in Microsoft Access.*

## Export

Export means to distribute your report to a disk file or through e-mail. Seagate Crystal Reports enables 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 contain a value. Field data is generally displayed or printed in columns in the Details section of a report.

## Field value

See *Value* definition.

<b>Field width</b>	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 respected fields.
<b>File</b>	A file is a collection of related data stored together under a single name. In Seagate Crystal Reports, each report is stored as a single file.
<b>Fixed properties</b>	Properties that will always be performed on the object.
<b>Flag</b>	A flag is a character or group of characters used to highlight or identify items of interest to call them to the reader's attention. For example, in an accounts receivable report, the words "past due" might be printed as a flag beside every past due account.
<b>Flat formula</b>	A formula that does not reference any database field. For example: 1+1.
<b>Footer</b>	A footer is text that appears at the bottom of a report page. Footer text often includes page numbers and sometimes other information that describes or identifies the report. Seagate Crystal Reports gives you the option of printing the footer on all pages or only on selected pages of your report.
<b>Format bar</b>	The bar that displays buttons you can click to perform many common formatting tasks.
<b>Form letter</b>	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.
<b>Formula</b>	<p>A formula is a symbolic statement of the manipulations you want performed on certain data before it is printed on your report.</p> <p>If your report is to contain a {file.SALES} field and a {file.COST} field, for example, you may want to create a GrossProfit field and designate its value as {file.SALES} - {file.COST}. This is a simple</p>

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.

You can use formulas to calculate numeric values, compare one value to another and select alternative actions based on the comparison, join multiple text strings into a single string, and for a multitude of other purposes. Creating a formula in Seagate Crystal Reports is much like creating one 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 you having to specify each operation 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 File 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 could consist of all those customers living in the same Zip Code, or in the same Region. In a sales report, a group could consist of all the orders placed by the same customer, or all of the orders generated by a specific sales representative. Seagate Crystal Reports offers you a great deal of flexibility in the way you group the data on your 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 lines that are non-printing lines that you can use for aligning, moving, and resizing objects with precision. Guidelines enable you to work in a free form environment (without a grid), yet still have 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 things 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 only on selected pages of your report.

## HTML

The language used by the World Wide Web to publish web pages on the Internet that contain links to other pages.

## **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 the 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.

## **Microsoft Foundation Class (MFC)**

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. Seagate Crystal Reports uses the following kinds of objects:

- field objects
- text objects
- cross-tab objects
- graph objects
- subreport objects
- picture objects
- OLE objects

Each of these objects can be formatted individually, moved, resized, duplicated, and so forth.

## **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, etc.). 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**

Operators are special symbols that describe an operation or an action to take place between two or more values.

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.

## Order of precedence

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.

## Page Footer

A section that prints at the bottom of each page. Page footers are typically used for page numbers, chapter names, and other identifying information.

## Page Header

A section that prints at the top of each page. Page headers are typically used for titles and other identifying information.

## Parameter field

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.

***NOTE: The term “parameter field” in Seagate Crystal Reports is equivalent to the term “parameter queries” in Microsoft Access.***

## Paste

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.

## Perspective Editor

The third party tool to change graphs that are plotted off the summaries in a report. (Also called PG Editor.)

## Population

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 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 your report in the Design Tab. You can place a summary in this section that you want to appear only on the last page of your 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 File 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 option of testing an entire population before forming conclusions based on their tests. In such cases, they use a sample to represent the whole.

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.

## **Scroll bars, scrolling**

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.

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.

## Section

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 your report.

## Select

- 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

A selection formula is a formula that specifies the records, or groups of records, you want included in your report.

## Server document

A file that stores the original OLE object.

## Shortcut menu

A dynamic menu available in the Design and Preview Tabs. Access the shortcut menu by highlighting an object and right-clicking.

## 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 Totalling, Page 271*.

## **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 ( $4 + 5 + 6$ ).

## 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.

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.

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 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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