



R&R Report
Writer®

For Windows, SQL Edition

Using Report Designer

 **Liveware®
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Version 8.1

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Introduction to Report Designer

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Chapter 1

Using Menus and Dialogs

Introduction

R&R for SQL Report Designer is an information access and reporting tool that enables you to produce custom reports to select, analyze, summarize, and present data from your tables in a variety of ways. After you have developed a custom report, you can display it on screen or print it with any combination of fonts and print styles that your printer supports.

This chapter describes all components of the Report Designer window and explains commands and dialog boxes. This information is presented in the following sections:

- Understanding the Main Window
- Selecting from Menus
- Using Report Designer Dialog Boxes
- Using Command-Line Switches

Understanding the Main Window

When you run Report Designer, the startup dialog displays. After you have selected a report to edit or a starting point for creating a new report, the main window appears. This window contains the following components:

- A Title Bar;
- A Menu Bar containing File, Edit, View, Insert, Format, Options, Database, Calculations, and Help selections;
- A Standard Toolbar of buttons for running Report Designer commands;
- A Formatting Toolbar of buttons and edit boxes for formatting fields and specifying other layout settings;
- A Work Space with horizontal and vertical rulers;
- A Status Bar.

Introduction to Report Designer

In addition, the window includes an *edit cursor*, a blinking vertical line that shows the insertion point for placing objects. Figure 1.1 illustrates a sample window.

You can access all commands from the Menu Bar; the Toolbars give you quick access to commonly used commands. When you position the cursor over each of the Toolbar buttons, a ToolTips help label appears explaining its purpose.

You can display Report Designer in a maximized window or re-size the window as necessary. To re-size the window, follow the procedures in your Windows documentation.

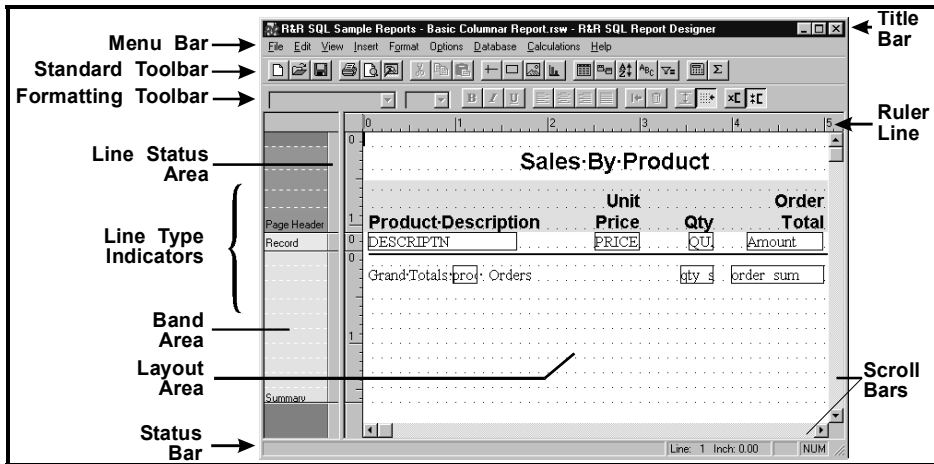


Figure 1.1 Main Window

Using the Menu Bar

The Menu Bar contains the “top-level” commands: File, Edit, View, Insert, Format, Options, Database, Calculations, and Help. You can select a command on this menu in any of the following ways:

- Click on it;
- Type Alt plus the underlined letter in the command;
- Press F10, use the cursor keys to highlight the command, and press Enter.

Selecting any one of these commands displays a menu of additional commands that open dialog boxes or perform specific actions on selected objects or lines. See the **Selecting from Menus** section for a summary of each command menu.

Using the Standard Toolbar

For many commands, you can select a Standard Toolbar button instead of selecting from the Menu Bar (use View ⇒ Toolbars to turn the Standard Toolbar display on or off). Clicking on one of these buttons either executes a command or opens a dialog in which you can select or change various options.

Figure 1.2 identifies the Menu Bar command (and associated shortcut key if applicable) that corresponds to each Standard Toolbar button.




















| Toolbar Button | Menu Bar Command | Shortcut Key |
|---|---------------------------------|---------------------|
|  | File ⇒ New | Ctrl+N |
|  | File ⇒ Open | Ctrl+O |
|  | File ⇒ Save | Ctrl+S |
|  | File ⇒ Print | Ctrl+P |
|  | File ⇒ Print Preview | |
|  | Edit ⇒ Cut | Ctrl+X |
|  | Edit ⇒ Copy | Ctrl+C |
|  | Edit ⇒ Paste | Ctrl+V |
|  | Insert ⇒ Line | |
|  | Insert ⇒ Box | |
|  | Insert ⇒ Picture | |
|  | Insert ⇒ Chart | |
|  | Database ⇒ Master Table | |
|  | Database ⇒ Relations | |
|  | Database ⇒ Sort Order | |
|  | Database ⇒ Group Order | |
|  | Database ⇒ Filter | |
|  | Calculations ⇒ Calculated Field | |
|  | Calculations ⇒ Total Field | |

Figure 1.2 Toolbar Buttons and Corresponding Commands

Using the Formatting Toolbar

The Formatting Toolbar (see Figure 1.3) that optionally displays below the Standard Toolbar provides a quick way of formatting fields and text in your report. After you select one or more items on the report layout, you can specify font, point size, style, and alignment by using the list boxes and buttons on this bar.

In some cases you may want to hide the Formatting Toolbar — for example, if you want to display more of the report layout without having to scroll. You use View ⇒ Toolbars to control display of the Formatting Toolbar. Click the check box next to “Formatting” to turn the bar on (checked) or off (empty).

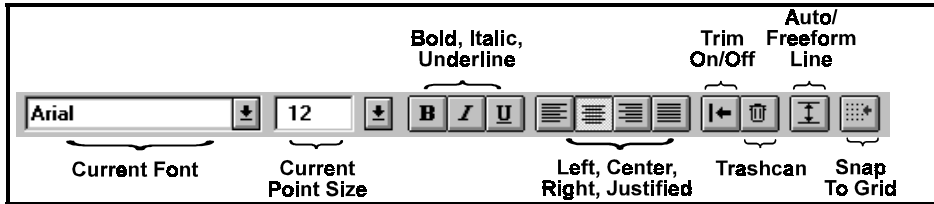


Figure 1.3 Formatting Toolbar

Figure 1.4 briefly explains each item on the Formatting Toolbar.

| Toolbar Item | Purpose |
|----------------------|---|
| Font | Apply a font to one or more selected fields |
| Size | Select or enter a size for the current font |
| Style Buttons | B for Bold , I for <i>Italic</i> , U for <u>Underline</u> |
| Alignment Buttons | Non-word-wrapped fields: Left, Center, Right; word-wrapped fields: Left, Right, Justified |
| Trim Button | Turns automatic trim on or off |
| Trashcan Button | Deletes currently selected item(s) or restores most recently “trashcanned” item(s) |
| Auto/Freeform Button | Toggles between Automatic/Freeform line height (see Chapter 3, “Working with Bands”) |
| Snap-To-Grid Button | Turns snap-to-grid on or off |

Figure 1.4 Formatting Toolbar Items

Using the Bold, Italic, and Underline Buttons

The style and underline buttons (**B**, *I*, and U) serve as toggles that turn each style on or off. For example, to make a selected item bold, click the Bold button. To remove the bold style, click the same button. The item’s representation on the layout changes to indicate the selected style. You can apply more than one style to the same item. (Bold or Italic will print only if available for the currently selected font.)

Using the Alignment Buttons

Report Designer assigns a default alignment to each field when it is inserted on the layout. The default alignment is based on the field's data type:

- Numeric fields are right-aligned;
- Memo fields are word-wrapped, left-aligned;
- All other fields are left-aligned.

To find out the alignment of any field on the layout, select it; on the Formatting Toolbar, the button for the current alignment will be “pressed in.” (Note that for character and memo fields, the first character of the field symbol represents the field's alignment.)

To change field alignment, select the field and click one of the alignment buttons (Align Left, Center, Align Right, or Justify). You can also use the Alignment tab; to access the Alignment tab, select the field and press F9 (or right-click on the field and select Properties); then select the Alignment tab.

See Chapter 4, “Working with Fields,” for more information about alignment and alignment symbols.

Using the Other Formatting Buttons

The remaining items on the Formatting Toolbar provide quick access to common formatting and editing tasks:

- ◆ The Trim button controls automatic trimming of blank space between fields on the same line. You can also control trim using the Alignment tab (select Format ⇒ Properties, then select the Alignment tab).
- ◆ The Trashcan button provides a quick way of clearing selected objects or restoring the most recently “trashcanned” item(s).
- ◆ The Auto/Freeform button toggles between Auto and Freeform line height type for a line or group of lines (see Chapter 3, “Working with Bands,” for an explanation of Automatic and Freeform line height).
- ◆ The Snap-To-Grid button turns snap-to-grid on or off.

Changing Horizontal and Vertical Ruler Settings

Calibrated horizontal and vertical rulers help you place fields, text, and objects at specific positions on the report layout. For example, if you type a left-justified column heading on the layout immediately under the 1 inch position on the horizontal ruler, this column heading will begin printing one inch from the left margin of your report.

The left, right, or center alignment point for a selected item is marked by a location indicator on the horizontal ruler. Vertical position is marked by a darkened band in the Band Area.

The default setting for both the Horizontal and the Vertical Ruler Spacing is 10; you can select a setting from 4 through 30. This setting controls the number of ruler increments per inch on each ruler. Note that the Ruler Spacing settings control only the spacing of the report layout rulers (since the fonts actually applied to fields in the report control the print spacing).

When the grid is turned on, the ruler settings determine the horizontal and vertical grid spacing for Freeform lines. For Automatic lines, the horizontal ruler setting determines the horizontal grid spacing; the vertical grid spacing is determined by the height of the largest font on each line. See Chapter 3, “Working with Bands,” for an explanation of Automatic and Freeform line height.

To change the calibration of the rulers, right-click on either ruler or press F8 to display the Ruler Spacing dialog (see Figure 1.5).

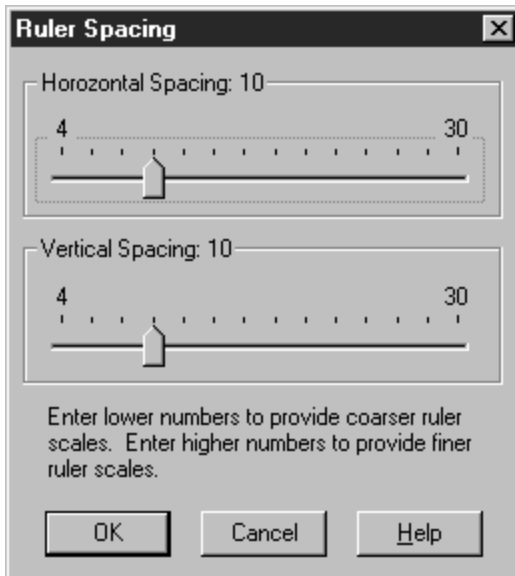




Figure 1.5 Ruler Spacing Dialog Box

Using the Horizontal or Vertical Spacing slider control, select a ruler spacing from 4 through 30 units per inch. Specify a lower number to display a coarser ruler scale; specify a higher number to display a finer ruler scale.

You can use either the mouse or the keyboard to change ruler settings:

-  Click to the left or right of the slide pointer to decrease (left) or increase (right) the setting by 4 units at a time. Drag the slider to change the setting in 1-unit increments.
-  Use the left or right cursor key to decrease (left) or increase (right) the setting by 2 units at a time. Use Page Up or Page Down to decrease (PgUp) or increase (PgDn) the setting by 4 units at a time.

Work Space

The area below the horizontal ruler line is the Work Space in which you create report layouts. The Work Space is divided into two main areas:

- The Band Area — the area to the left of the screen, which identifies the type and status of every band line on the layout.

- ❑ The Layout Area — the large area on the right in which you create a *report layout*, a schematic representation of your report that contains the fields, text, and other objects that will appear on your report.

You can adjust the relative sizes of the Band and Layout areas using the “splitter bar” between them. Click and drag the splitter bar to the right to increase the Band Area and decrease the Layout Area; drag the splitter bar to the left to decrease the Band Area and increase the Layout Area.

Band Area

The Layout Area consists of one or more bands, each with characteristics that define how the data in that band will be presented when the report is run. **As Figure 1.1 on page 4 illustrates, the Band Area contains a band-type indicator for each band in the Layout Area.** Band-type indicators, which Report Designer automatically displays when you create, insert, or move lines, identify whether a line is part of the report’s Title, Page Header, Group Header, Record band, Group Footer, Summary band, or Page Footer. To select one or more lines, click or drag the mouse in the Band Area.

The narrow channel at the right edge of the Band Area is the Line Status Area. This area provides the following information:

- ❑ Up and down arrows in the Line Status Area indicate the top and bottom border of any Freeform line (for a full explanation of Freeform lines, see Chapter 3, “Working with Bands”).
- ❑ A question mark indicates that a logical field has been assigned to control printing of that line. (See Chapter 3, “Working with Bands,” for information about controlling line printing with logical fields.)

Layout Area

The Layout Area typically contains text, which will appear in the report exactly as typed, and data fields, which are represented on the layout either by field symbols such as <xxxxxx (character data) and 99999 (numeric data) or by field names (if the Field Names setting has been enabled on the View menu). This area can also contain lines, boxes, bitmapped graphic images, and other objects.

The Layout Area can be scrolled both vertically and horizontally. You can create report layouts up to a maximum of 256 lines; the maximum layout width is determined by the page layout settings.

See Chapter 4, “Working with Fields,” for information about adding text and fields to a report layout. See Chapter 12, “Adding Lines, Boxes, and Shading,” for information about drawing lines and boxes. For an explanation of inserting and sizing images, see Chapter 13, “Inserting Bitmapped Images.”

Using the Status Bar and Scroll Bars

Immediately below the Work Space is the Status Bar, which displays information about current operations and/or the position of a selected item. At the bottom and right of the main window are the horizontal and vertical scroll bars, which enable you to scroll the Work Space up and down, left and right.

Status Bar

When you are working in the Layout Area, the Status Bar identifies the position of the edit cursor on the layout and indicates whether the “Caps Lock” or “Num Lock” key on your keyboard is on. In addition, the Status Bar may contain descriptions of command options, prompts telling you what action to take, or information about the currently highlighted field.

Scroll Bars

Use the horizontal and vertical scroll bars to scroll the Work Space. Both the Band Area and the Layout Area can be scrolled vertically. However, only the Layout Area can be scrolled horizontally, since the information in the Band Area is relevant to the entire width of the report layout. For information about scrolling an application window, see your Windows documentation.

Selecting from Menus

You execute commands by selecting from menus or clicking buttons and then using dialog boxes to provide additional information required by some commands. Operation of Report Designer menus and dialog boxes follows the Windows conventions explained in the following sections.

The Menu Bar is the main menu, from which you select the command menus you want to use. For example, selecting File in the Menu Bar will display the File menu. You can open a command menu from the Menu Bar in any of the following ways:

- Click on the command name;
- Press F10 (or Alt) and type the accelerator key for the command (the underlined letter in the command name — for example, F for File or E for Edit);
- Press F10, use the cursor keys to highlight a command name, then press Enter.

After opening a command menu, you can select a command from that menu in any of these ways:

- Click on the command name;
- Type the accelerator key for the command;
- Use the cursor keys to highlight a command; then press Enter.

For example, after opening the File menu, you can select “New” by clicking on it, by typing **N**, or by highlighting the command and pressing Enter. Cancel a command selection by clicking outside the menu box or by pressing Esc.

You can also execute some commands directly from the keyboard, without using the Menu Bar, by typing a shortcut key combination. For example, you can execute Format ⇒ Properties by pressing F9.

At some points, one or more commands on the Menu Bar or in the command menus will be dim, indicating that they are not available.

File Menu

Use the File menu to do the following:

- Create, open, close, save, print, or preview a report;
- Enter or edit comments for the current report;
- Define the page setup;
- Manage data source connections;
- Export to a text, database, worksheet, text data, Rich Text Format, HTML, or Word merge file; to an Excel PivotTable or Chart; or to an ActiveX Viewer file;
- Send a report via email;
- Exit Report Designer.

Selecting File displays a menu of choices; selecting a choice either opens a dialog or executes a command. Figure 1.6 summarizes the actions these menu choices perform.

| Command | Purpose |
|-------------------------|--|
| New (Ctrl+N) | Create an Auto-SQL report (Report Designer will dynamically define the SELECT) |
| New User-SQL | Create a User-SQL report (the user directly enters the SELECT) |
| Open (Ctrl+O) | Open or delete report; copy report to another library; select a library |
| Close | Close Report |
| Data Source Connections | Connect and disconnect data sources |
| Save (Ctrl+S) | Save a report |
| Save As | Save a report with a different name or in a different library |
| Properties | Enter comments for current report |
| Page Setup | Specify paper size, margins, orientation |
| Print Preview | Display the current report on the screen |
| Print (Ctrl+P) | Print using the current printer, select a different printer, or change print options |
| Export | Output report data to a plain text, database, worksheet, text data, RTF, or Word merge file or to an Excel 5.0 PivotTable or Chart |
| Send | Send a report via email |
| Exit (Alt+F4) | Leave Report Designer and return to Windows |

Figure 1.6 File Menu Choices

Note that the Page Setup settings for paper size, margins, and orientation apply only to the current report and are saved with it.

Edit Menu

The Edit menu provides choices for modifying reports — cutting and pasting, copying, deleting, moving, and so on. Figure 1.7 summarizes the purpose of each Edit menu choice.

| Command | Purpose |
|-----------------------------|--|
| Undo (Ctrl+Z) | Undo Last Clear (or Last Move) |
| Cut (Ctrl+X) | Remove selected item(s) and save to memory |
| Copy (Ctrl+C) | Copy selected item(s) to memory |
| Paste (Ctrl+V) | Paste item(s) saved to memory |
| Clear | Erase selected object(s) |
| Paste Clipboard Image | Paste graphic image from clipboard |
| Paste Special | Link or embed an object from the clipboard |
| Move Fields (F7) | Move selected field(s) or band line(s) using cursor keys |
| Duplicate Fields (Shift+F7) | Copy selected field(s) for movement using cursor keys |
| Links | Display and modify existing links in a report |
| Object | Modify the selected OLE object |

Figure 1.7 Edit Menu Choices

View Menu

Use the View menu to do the following:

- Turn Standard Toolbar display on or off;
- Turn Formatting Toolbar display on or off;
- Turn ToolTips display on or off;
- Turn horizontal or vertical ruler on or off;
- Turn grid display on or off;
- Display fields either as symbols or as field names.

By default, the Toolbars and rulers are displayed; fields are represented by symbols on the layout; and the grid is shown. To change these settings, select View; then select the item to change.

| Command | Purpose |
|------------------|---|
| Toolbars | Hide or show the Standard and Formatting Toolbars; enable or disable ToolTips display |
| Horizontal Ruler | Hide or show the horizontal ruler |
| Vertical Ruler | Hide or show the vertical ruler |
| Grid | Hide or show the grid |
| Field Names | Display fields as symbols or as names |

Figure 1.8 View Menu Choices

Toolbar and ToolTips Settings

A check mark next to either “Standard” or “Formatting” on the Toolbars dialog means that the item is currently displayed. To turn off display of either, select the appropriate item.

A check mark next to the “ToolTips” item on this dialog means that a help label will display when you position the cursor over one of the toolbar items. To turn off display of these labels, click the box to remove the check mark.

Horizontal and Vertical Rulers

To turn on or off the display of the horizontal or vertical ruler, select Horizontal Ruler or Vertical Ruler. A check mark next to either indicates the ruler is currently visible.

Grid

To help you align objects on the report layout, you can enable a grid consisting of a series of dots. The grid spacing is determined by the settings for the horizontal and vertical rulers. To control the grid display, select View ⇒ Grid; a check mark appears when this setting is on. When the Snap-To-Grid setting is on, items that you insert or move will “snap” to the nearest grid mark. See the **Format Menu** section of this chapter for information about turning the Snap-To-Grid setting on or off.

Field Names

Fields can be represented on the layout either by field names or by symbols (such as >xxxxx) that identify field type and alignment. By default, each field is represented by symbols. To display field names instead, turn on the View ⇒ Field Names setting. As a result, each field's name is shown at the field's location (depending on field width, the entire name may not appear).

Insert Menu

Using the Insert menu choices, you can insert fields from the *composite record structure* (the set of fields available for use in a report, including master and related table fields and any Report Designer total or calculated fields), create and insert new band lines, attach a text file to provide memo fields for the report, and insert lines, boxes, or images. (See Chapter 17, “Creating Form Letter Reports,” for information about preparing, attaching, and using a text memo file.) Figure 1.9 briefly explains the Insert menu commands.

| Command | Purpose |
|--------------------------------|--|
| Field (Ins, F11) | Insert field from composite record structure |
| Band Line (Shift+F11) | Insert line of same type above current line |
| Create Band Line (Ctrl+F11) | Insert one or more lines of any band type |
| Text File | Insert text memo file |
| Line | Draw horizontal or vertical line |
| Box | Draw box or add shading |
| Picture | Insert bitmapped graphic image |
| Chart | Insert chart |
| Object | Insert an OLE object |

Figure 1.9 Insert Menu Commands

Format Menu

The Format menu choices enable you to control the format and alignment of fields and lines, specify record formatting options, change ruler settings, and turn snap-to-grid on or off. Figure 1.10 lists the

commands and explains the purpose of each. See Chapter 4, “Working with Fields,” for more information about these commands.

| Command | Purpose |
|----------------------------|--|
| Font (F5) | Specify typeface, size, and style |
| Properties (F9) | For selected band line(s): Control line height and logical conditions; for selected field(s): Modify format (width, number of integers and decimals, numeric format, etc.), alignment, trim, field comment |
| Band Line Justify | Align all fields on selected lines |
| Record Layout | Specify various record formatting options |
| Rulers (F8) | Change horizontal/vertical ruler spacing |
| Snap To Grid (Shift+F8) | Turn snap-to-grid on and off |

Figure 1.10 Format Menu Choices

The Record Layout dialog provides settings for formatting the Record and Summary bands of a report, including selections for multiple and “snaked” columns, Avery labels, and number of record copies.

Options Menu

The Options menu includes the following choices: Preferences, Default Settings, File Settings, and Data Source (see Figure 1.11).

| Command | Purpose |
|------------------|---|
| Preferences | Turn scroll bars on and off; control result of selecting File ⇒ New; specify display of field names, report dictionary descriptions, or both in field lists |
| Default Settings | Set paper size, margins, font, spacing, logical strings |
| File Settings | Specify default library and image directories; default image and text file extensions; template folder, report dictionary, dictionary index |
| Chart Settings | Specify defaults for Font and Palette for charts |
| Data Source | Specify a default data source and control access to data sources from Report Designer |

Figure 1.11 Options Menu Choices

You use the Preferences dialog box to control the display of horizontal and vertical scroll bars and to specify what action Report Designer will take when you select File ⇒ New. See Chapter 5, “Setting Defaults,” for more information about the Preferences dialog.

The Default Settings dialog controls global settings for paper size, margins, font and point size, font color, ruler spacing, logical strings, and snap-to-grid. These settings apply to all new reports. The Default File Settings dialog enables you to set default data, library, and image directories; specify default file extensions for text memo and image files; and specify a default template folder, report dictionary, and report dictionary index.

Select Options ⇒ Data Source to specify defaults to control access to your data sources. You can change the data source defaults at any time during a Report Designer session.

See Chapter 5, “Setting Defaults,” for more information about changing defaults using these dialogs.

Database Menu

Use the Database menu choices to specify the tables from which data will be drawn for a report, to sort and group that data, to create filters that select specific records, to display the SQL SELECT statement for the current report, and to define a data governor to limit the number of

rows retrieved from the database while you are designing a report. Figure 1.12 summarizes the Database choices for an Auto-SQL report.

| Command | Purpose |
|----------------|---|
| Master Table | Select or change master table (Auto-SQL reports only) |
| Joins | Select, edit, and remove table joins |
| Sort Order | Select fields to control report sort order |
| Group Order | Select fields to group report data |
| Filter | Specify selection conditions to filter records |
| Show SQL | Display SQL SELECT statement; copy SELECT |
| Limit Result | Specify maximum number of rows to retrieve |

Figure 1.12 Database Menu Choices

For User-SQL reports, the Database menu choices differ slightly. See Chapter 6, “Selecting Data,” and Chapter 16, “Creating User-SQL Reports,” for information about Auto-SQL and User-SQL reports.

Calculations Menu

The Calculations menu choices enable you to create and edit calculated fields, total fields, and User-Defined Functions (UDFs), as well as purge a report of any unused total and/or calculated fields.

| Command | Purpose |
|--------------------|---|
| Calculated Field | Create and edit calculated fields |
| Total Field | Create and edit total fields |
| User Function | Create and edit User-Defined functions |
| Auto Total | Create totals for all selected fields |
| Purge Calculations | Remove all unused calculated/total fields |

Figure 1.13 Calculations Menu Choices

You use the Calculated Fields dialog box to create fields whose values are computed as a report is generated, rather than being retrieved from the database. You use the Total Fields dialog to create fields that contain summary information such as a subtotal or grand total figure; Report Designer calculates the value of such a field according to the

total options you select. You can create total and calculated fields, insert them in reports, and manipulate them just as you do data and text fields.

To edit a total or calculated field that has been inserted on the layout, simply select the field and press F2 to display either the Edit Total or Edit Calculation dialog box.

You use the User Function dialog to create UDFs to process data according to an expression or formula that you define. You can create UDFs to perform complex operations and then use those UDFs in calculated field expressions in any report.

The Auto Total dialog enables you to select multiple fields on the layout and have Report Designer automatically create totals for those fields and insert the totals on a new band line.

Use the Purge Calculations command to remove any unused total and/or calculated fields from the report definition. Removing unused total and calculated fields can speed up report generation and reduce the amount of memory required.

Using Report Designer Dialog Boxes

Like other Windows applications, Report Designer uses dialog boxes to request and display information related to a specific command.

Many of the dialog boxes in Report Designer are standard Windows dialog boxes. For example, the File ⇒ New dialog box is like the File New dialog in many Windows applications.

Other dialog boxes are unique to Report Designer, since they request information specific to report generation. For example, the Database ⇒ Filter dialog box requests information that enables Report Designer to construct a filter selecting specified records for a report.

You can move around in a dialog box using either the mouse or the keyboard. Using a mouse, simply click on any option to make it active. Using the keyboard, tab from option to option or press Alt plus the underlined letter in the option you want to select. When an option is active, it is marked by a highlight or dotted rectangle.

List and Edit Boxes

A *list box* is any vertical list from which you select a setting, file, or other item. Many dialog boxes contain *edit boxes* in which you can enter text such as paths, file names, field names, or numeric values. In some cases, an edit box and list box are combined so that you can either select from the list or type your choice in the edit box (such boxes are sometimes referred to as “combo boxes”).

List Boxes

Some list boxes open automatically when you select a command or item; on some dialog boxes, you must first click the scroll arrow next to an item to open a list box containing choices for that item. To select a choice from a list box, either click on the choice or use the cursor keys to highlight it. From the keyboard, you can select a field from a field list box by typing the first letter of the field name until the field is highlighted on the list.

Note that the complete field name (or the report dictionary comment for that field, if there is one) is displayed in the Status Bar when a field is highlighted in the field list box.

Edit Boxes

To enter or modify text in an edit box, move the edit cursor (the vertical bar) to the box either by clicking in the box or tabbing to it. Any characters you type will be inserted at the position of the edit cursor. If the text in a box is currently selected, characters you type will replace that text.

For more information on Windows text editing operations, see your Windows documentation.

Buttons and Check Boxes

Most dialog boxes have *command buttons*: rectangular, labeled boxes that look like three-dimensional buttons on many displays. The most common command buttons are the OK and Cancel buttons you see in dialog boxes to indicate whether the application should accept the information in the dialog box.

Some dialog boxes have *option buttons*: small circles with an option name beside them. These buttons (also referred to in some Windows

applications as “radio buttons”) represent mutually exclusive options, only one of which can be selected at a time. When an option is selected, its circle is black.

Check boxes function as toggles to turn a setting on or off. When there is an X in the box next to an item, that setting is on.

Selecting a Command Button

Using a mouse, select a command button by clicking on it. From the keyboard, tab to the button and press the spacebar. For those commands with an underlined letter, you can type Alt plus the underlined letter. If a command button is dim, it is currently unavailable.

Selecting an Option Button

Using a mouse, select an option button by clicking on it. Using the keyboard, tab to the button that is currently on and press ↑ or ↓ to select a different button. For those options with an underlined letter, you can type Alt plus the underlined letter to turn an option button on or off. If an option button is dim, it is currently unavailable.

Check Boxes

Using a mouse, click on a check box item to turn it on or off. Using the keyboard, tab to a check box and press Spacebar to turn it on or off. For those options with an underlined letter, you can type Alt plus the underlined letter to turn a check box on or off.

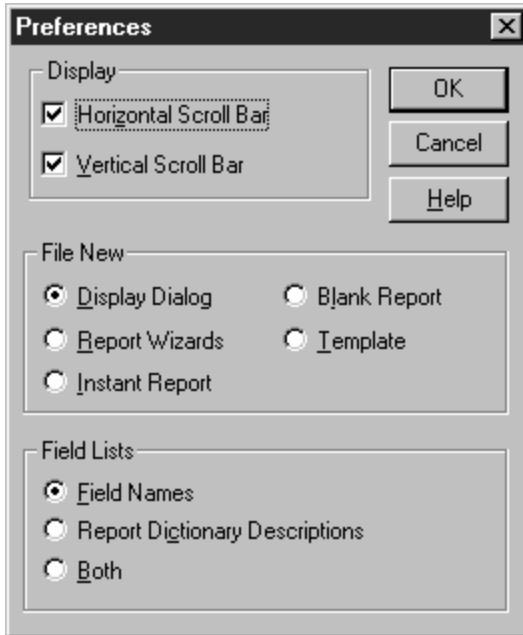


Figure 1.14 Dialog Box with Option Buttons and Check Boxes

Using Command-Line Switches

You can include one or more switches in the command line you use to execute Report Designer. Using command-line switches provides a quick way of opening a specific report, specifying a master table for creation of a blank or instant report, or loading a Dynamic Link Library (DLL) at startup. Figure 1.15 explains the command switches.

| Switch | Purpose |
|------------------|--|
| /L<library file> | Applies only to reports that have been saved in a report library file. Specifies the report library containing the report identified with the /R switch. Substitute the name of the library file for <library file>. |
| /R<report name> | Specifies the report to be opened. Substitute the name of the report you want to open for <report name>. Can be used in conjunction with /L to open a report from a library. |
| /T<table name> | Specifies that Report Designer create a blank report using <table name> as the master table. Substitute the full path and name of the table you want to use for <table name>. |
| /I<table name> | Specifies that Report Designer create an Instant Report using <table name> as the master table. Substitute the full path and name of the table you want to use for <table name>. |
| /G | Prints the report specified with /R to the saved printer or to a disk file (if the report was saved with a “Print to File” destination). |
| /D<DLL name> | Causes Report Designer to load the Dynamic Link Library (DLL) substituted for <DLL name>. |
| /S<script file> | Causes Report Designer to open and process the specified ReportScript file. Note that use of this switch overrides the /L, /R, /T, and /I switches. |

Figure 1.15 Command-Line Switches

Chapter 2

Managing Reports

Introduction

This chapter explains the basic procedures for creating and managing reports, report templates, and report libraries and for documenting reports. This information is presented in the following sections:

- Creating and Modifying Reports
- Using Report Wizards
- Documenting Reports and Templates

Compound Document Files and Report Libraries

When you create a report, you develop a *report definition* that tells Report Designer how to select, analyze, summarize, and present data from the database files you select. After you create and save a report definition, you can open it, modify it, and run it at any time.

By default, Report Designer saves a report definition as a *compound document file*, which is the standard Windows 95 file format. Reports saved as compound document files can have names of up to 250 characters and are given a default extension of **.RSW**. The compound document file has the advantage of being able to store multiple “documents” or object types in a single file — for example, you can embed one or more OLE objects in a report, and they become part of the compound document file when you save the report.

To allow compatibility with reports created using earlier versions of R&R for SQL, Report Designer also allows you to open reports in existing report libraries (the Open Report dialog lists both compound file reports and R&R report library files). Report Designer will also allow you to modify a report and save it back into an existing library.

Note, however, that features that are new to Report Designer will not be available in reports saved to libraries. In particular, OLE objects embedded in a report will not be saved to a report written to a library; these objects will be available only in reports saved as compound files. If you try to save a report that contains OLE objects to a report library,

Report Designer will inform you that the objects will not be saved with the report and give you an opportunity to cancel the operation.

Templates

A *template* is simply a report definition with a specialized purpose: to serve as the common starting point for a series of reports. You can create and modify templates the same way you do reports.

Templates have a default extension of **.RT6**, and you can save your templates in a specific template folder to keep them separate from your reports. As a result, you can easily save, retrieve, manage, and distribute templates. In this chapter, explanations of procedures for managing reports apply also to templates, except as noted.

Instant Reports

If you create a report by selecting Instant Report on the File ⇒ New dialog, Report Designer generates an Instant Report layout for you automatically. The Instant Report layout includes the following items:

- ❑ All fields in the master table (or as many as will fit horizontally on the layout);
- ❑ Calculated fields for date, time, page number, and number of records printed;
- ❑ Grand totals of all numeric fields that have decimal places.

In many cases, you can use the Instant Report layout as a starting point for creating your own layouts.

Auto-SQL and User-SQL Reports

You can create a report in any of the following ways:

- ◆ Build the report definition interactively using Report Designer menus and dialogs to select a master table, specify table joins, specify sorting and grouping, define filters, and so on. These reports, referred to as *Auto-SQL* reports, are explained in Chapter 6, “Selecting Report Data.”
- ◆ Directly enter and modify a SELECT statement that Report Designer then sends to your SQL database software. These reports, referred to as *User-SQL* reports, are explained in Chapter 16, “Creating User-SQL Reports.”

- ◆ From Data Access, either drag and drop a query onto a Report Designer layout or use Send To to start Report Designer and generate an Instant Report from a Data Access query. The resulting report is a type of User-SQL report.

Creating and Modifying Reports

You develop a report by specifying the arrangement and analysis of data from your database. The following sections explain how to create and manage Auto-SQL reports. For instructions on creating and managing User-SQL reports, see Chapter 16, “Creating User-SQL Reports.”

Creating and Saving a Report

The general procedures for creating a saving a report are as follows:

1. Start Report Designer. By default, a dialog appears (see Figure 2.1) offering the following options: Report Wizards, Instant Report, Blank Report, and Template. (Note that you can use Options ⇒ Preferences to specify that Report Designer bypass this dialog and go directly to the option that you choose. See Chapter 5, “Setting Defaults,” for more information.)

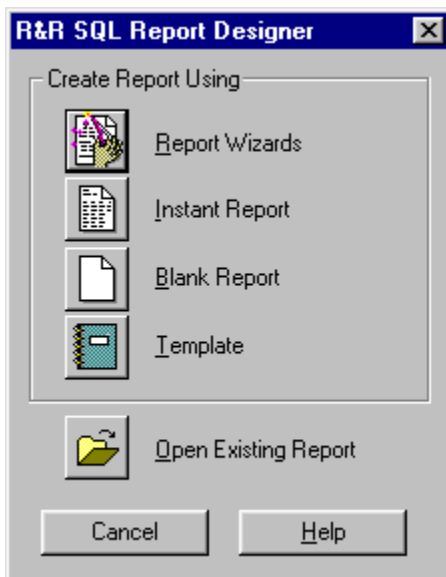


Figure 2.1 Report Designer Startup Dialog

2. To create a report, select Report Wizards, Instant Report, Blank Report, or Template; then select OK. If you select Report Wizards, Report Designer will assist in the step-by-step creation of a Label, Basic Columnar, or Grouped Columnar report.

Selecting Instant Report will display the Master Table dialog.

If you select Blank Report, you can create a report either with or without a master table by turning the “Create Report Without Master Table” setting off (unchecked) or on (checked).

Selecting Report Template enables selection of a Template to use as the starting point for your report.

3. The Data Source Connections dialog appears. Select the appropriate data source; then enter the required log-on information for your database platform and select OK.
4. If prompted to do so, select a master table (a table that will serve as the initial source of data for your report) from a list of tables in the default Data directory (or the startup directory, if no default has been set).
5. Develop the report by specifying table joins, inserting and formatting fields, sorting and grouping, specifying filter conditions, and so on as necessary. Refer to the relevant sections of this documentation for detailed information about developing a report.
6. To save the report, select File ⇒ Save. You can save the report either as a compound document file (the preferred format for Windows 95) or into an existing report library file (save into a report library *only* to maintain compatibility with R&R Report Writer, SQL Edition).

To save the report definition as a template, in the “Save as type” drop-down menu select Template.

7. Enter a name for the report. If you save the report as a compound document file, the name can have up to 250 characters and the default extension is .RSW.

If you save the report into a report library, the report name can have up to 30 characters. Note that you cannot have duplicate report names in a given library.

Using a Template to Create a Report

After you have created and saved a template, you can retrieve it to use as the basis for one or more reports.

To use a template to create a report, do the following:

1. Select File ⇒ New. On the startup dialog, select Template.
2. Report Designer lists the templates in the default template folder, if one has been defined (see Chapter 5, “Setting Defaults,” for information about setting a default template folder). If the template file you want to use is in another location, first select the appropriate folder.
3. Select the template that you want to use as the starting point for your report and select OK.
4. Modify the report definition as necessary. When you are done, select File ⇒ Save to save the report. You can save the report either as a compound document file or into an existing report library.
5. Enter a name for the report. If you save the report as a compound document file, the name can have up to 250 characters and the default extension is **.RSW**.

If you save the report into a report library, the report name can have up to 30 characters. Note that you cannot have duplicate report names in a given library.

Modifying Reports

After you have created and saved a report, you can open it, modify it, and run it at any time. For a report that you have retrieved from a report library, you can also copy the report to a different library or delete the report when you no longer have any need for it.

The following sections explain how to open, copy, and delete reports.

Opening an Existing Report

To open an existing report, do the following:

1. If a layout is currently displayed, save it if necessary. Select File ⇒ Open (or press Ctrl+O). The names of the compound files (default extension RSW) and library files (extension RP6 for report libraries, RT6 for template libraries), if any, in the current location are listed.
2. If necessary, select another folder to display report files in a different location.
3. To open a compound document file, simply highlight the report name in the displayed list and select Open.

To open a report from a library, highlight the library name and select Open. Then highlight the report name and select OK.

The report you selected is opened and displayed. After modifying a report, you can re-save it in the current location or library or select/open another location or library in which to save it.

Copying a Report to a Different Library

To copy a report from the library in which it was originally saved into a different library:

1. Select File ⇒ Open (or press Ctrl+O). Select the library containing the report to be copied and select Open.
2. Select the report to be copied and select Copy Report.
3. Select the destination library (if the library file is not in the current location, select the appropriate location for the file in the “Look in” box) and select Open.
4. The current name is shown in the Destination Report Name box. Either retain the name or enter a new name (you can retain the existing name if no other report or template in the destination library has that name).
5. Select OK.

Deleting a Report from a Library

To delete a report from a library, follow these steps:

1. Select File ⇒ Open. Select the library containing the report you want to delete and select OK.
2. Highlight the name of the report you want to delete (if necessary, select Open Library to choose from a different library) and select Delete Report.
3. Select Yes to permanently erase the report; select No to cancel the delete.

Be careful about deleting reports and templates; once you have confirmed the delete, you can no longer retrieve that report or template.

Using Report Wizards

Report Wizards provide the capability of creating three common types of instant reports (Labels, Basic Columnar, or Grouped Columnar) without having to navigate through Report Designer's menus and dialog boxes. The Wizard dialogs lead you through several simple steps in the preparation of each report type, giving you the opportunity to preview the report output.

To use the Report Wizards, select File ⇒ New and select "Report Wizards" on the New dialog. After you select a data source and a master table, the initial Report Wizard dialog appears (see Figure 2.2). To see sample output for each of the report types, right-click on the appropriate illustration.



Figure 2.2 Initial Report Wizard Dialog

To create a report using Report Wizards, do the following:

1. Click on the illustration of the report type you want to create (or tab to the report type and press Enter).
2. Follow the instructions on the dialog box (or in the on-line help) for each step of developing the report.

To move from one dialog to the next, select the Next button at the bottom; to change selections in a previous dialog, select the Back button.

3. When you are done, select Finish.
4. If you left the “Preview the report when finished” setting on (the default), the report preview window appears; if you turned that setting off, the Report Designer layout window appears. If necessary, you can make additional changes to the report before printing.
5. Save the report.

The Report Wizards make use of the ReportScript mechanism (explained in Chapter 6 of the *Developing Applications* documentation) to pass a user-specified report specification to the main Report Designer executable. Visual Basic source code for the

Report Wizards is available on request from Liveware Publishing Inc.; you can use this code to modify the Report Wizards or to create your own Wizards.

Documenting Reports and Templates

To document the content and layout of a report or template, you can add unique identifying information using the File Properties dialog, as well as display or print a *report specification*, which provides a complete description of the report or template.

Adding File Properties Information

Using File ⇒ Properties, you can add identifying information to a report such as author name, keywords, title, subject, and explanatory comments. This information is saved with the report (note, however, that if you save a report to a library rather than as a compound document file, the comments entry is the only information saved).

To add or edit File Properties entries, do the following:

1. Open the report or template and select File ⇒ Properties. The report name is shown at the top of the File Properties dialog (see Figure 2.3), originator of the current report is shown in the Author box, and the Title entry defaults to the full path and name of the report.

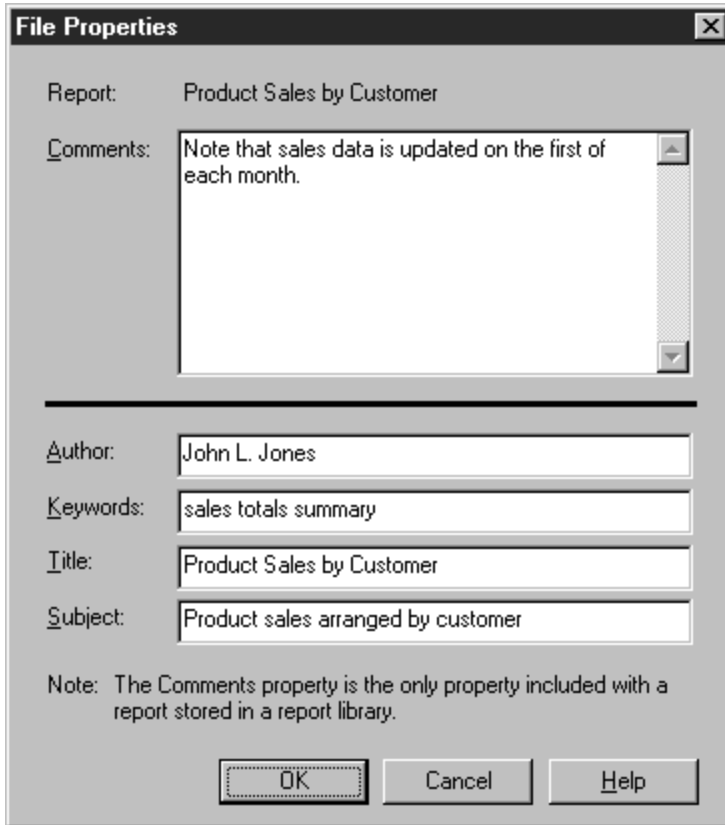


Figure 2.3 File Properties Dialog

2. In the Comments box, enter a text explanation (up to 255 characters) to be attached to the report or template.
3. The Author box shows the name of the current report's author (if you are creating a new report, this defaults to your log-on name). Edit this entry as necessary.
4. In the Keywords box, enter one or more words that could be used with a file browser to locate this report file. Separate multiple keyword entries with spaces.
5. The Title entry defaults to the full path and name of the report; edit this entry as necessary.
6. In the Subject box, enter a subject line identifying report content.
7. Select OK. When you save the report or template, the File Properties information is saved with it.

Printing a Report Specification

To document the content and layout of the current report, you can display or print a complete description of it.

This report specification includes information about:

- Report name and date/time last accessed;
- Name and location of the report library (if applicable);
- Report comment (if any);
- The SQL `SELECT` statement;
- Print, page setup, and record layout settings;
- Names and locations of tables, text memo files, and image files used by the report;
- Filter (if any);
- All fields in the composite record structure;
- Position, width, data type, format, font, trim setting, and color of all fields on the layout;
- Names and sizes of all fonts used in the report;
- Names, locations, sizes, and scaling settings of bitmapped images;
- For vertical and horizontal lines: size, thickness, and color;
- For boxes: size, border thickness and color, foreground and background color, number of included sides, and pattern;
- Names and expressions of all calculated and total fields;
- Any conditional line printing settings;
- Sort/group field selections and settings;
- Windows Regional settings in effect for the current report;
- Database memo editor and default file extensions.

To print or display a detailed report specification:

1. Select **File** ⇒ **Print**. The Print dialog box appears.
2. In the “Print What” list box, select **Report Specification**.
3. Select **Preview** to display the report specification; select **Print** to send it to the currently selected printer (for printed output, Report Designer uses a fixed-pitch font on the current printer).

Creating Report Layouts

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Chapter 3

Working with Bands



Introduction

This chapter explains how to create band areas; insert, move, and copy band lines; and specify and modify band line properties. This information is presented in the following sections:

- Creating Bands and Inserting Band Lines
- Manipulating Band Lines
- Modifying Band Line Characteristics
- Specifying Conditional Line Printing

Selecting Band Lines

To work with one or more band lines, you must first select the line or lines you want to operate on. For example, to apply a particular font to all the fields on several lines, you select the lines and then apply the appropriate font to them as a group. When a line is selected, the line type indicator in the Band Area is highlighted.

-  With the mouse: Click on the appropriate line in the Band Area. To select multiple lines, Ctrl-click on each line. If the lines are contiguous, drag the mouse up or down in the Band Area until all lines are highlighted.
-  From the keyboard: Position the cursor on a line and press Shift+Spacebar to select it. To extend the selection to other lines, press ↑ or ↓. After marking the line(s), press Enter. When you are finished working with the selected lines, press Esc to unmark them.

Displaying the Band Line Properties Dialog

You access most band line settings through the Band Line Properties dialog box. To display this dialog to format a single line, either select the line you want to modify and select Format ⇒ Properties (or press F9) or right-click on the line in the Band Area and select “Properties” from the menu.

If you select multiple lines to modify, you must select Format ⇒ Properties (or press F9), since right-clicking and then selecting “Properties” displays the Band Line Properties dialog for a single line only.

Creating Bands and Inserting Band Lines

Every report has one or more of the following bands that control where data appears on the report:

- ◆ Title
- ◆ Page Header
- ◆ Group Header
- ◆ Record
- ◆ Group Footer
- ◆ Page Footer
- ◆ Summary

Each band contains one or more lines. You can include as few or as many bands as your report requires. The bands you create determine where the text and fields you place in those areas will appear in your report output. Figure 3.1 explains where data placed in each band will appear in the report.

| Band | Location in Report Output |
|--------------|---|
| Title | Prints once per report at beginning of first page or on separate title page |
| Page Header | At top of each page |
| Group Header | Before each group of records (see Chapter 10, “Sorting and Grouping Data,” for more information about grouping) |
| Record | Once per composite record |
| Group Footer | After each group of records (see Chapter 10, “Sorting and Grouping Data”) |
| Page Footer | At the bottom of each page |
| Summary | Once per report at end of last report page or on separate summary page |

Figure 3.1 Band Types

Figure 3.2 shows a sample layout with the bands labeled. Figure 3.3 shows where the data from each band will appear in the report output.

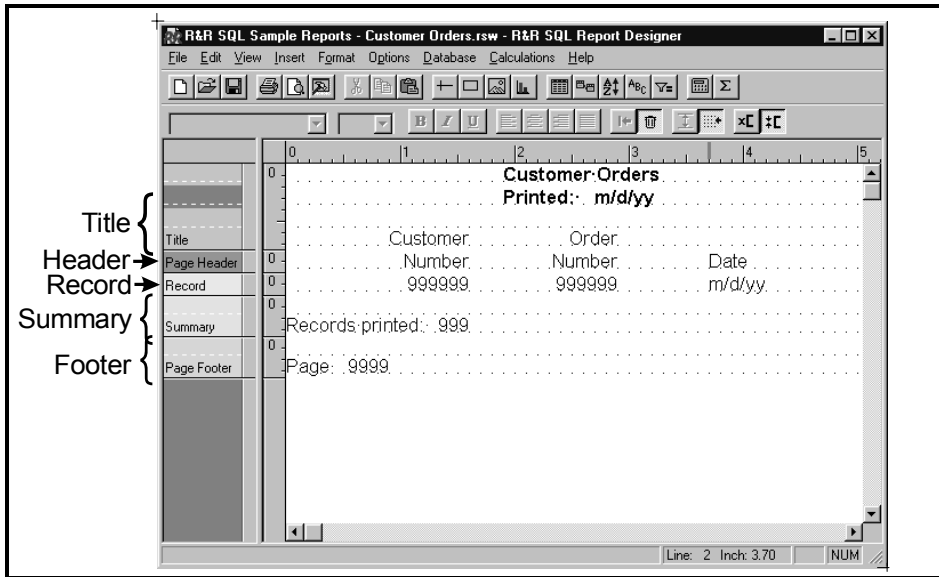


Figure 3.2 Report Layout Showing Bands

| | | | |
|----------------|------------------------------------|---------------------|-------------------|
| Title | Customer Orders As Of: 06/27/96 | | |
| Header | Customer Number | Order Number | Order Date |
| Record | 10001 | 32201 | 02/10/1996 |
| | 10002 | 32209 | 03/06/1996 |
| | 10003 | 32202 | 02/10/1996 |
| | 10004 | 32210 | 03/06/1996 |
| | 10005 | 32211 | 03/08/1996 |
| | 10006 | 32212 | 03/08/1996 |
| | 10011 | 32216 | 03/20/1996 |
| | 10012 | 32203 | 02/16/1996 |
| | 10014 | 32213 | 03/10/1996 |
| | 10015 | 32208 | 03/02/1996 |
| | 10019 | 32204 | 02/16/1996 |
| | 10022 | 32214 | 03/10/1996 |
| | 10025 | 32205 | 02/22/1996 |
| Summary | Records Printed: 13 | | |
| Footer | Page 1 | | |

Figure 3.3 Corresponding Location of Data in Output

Creating a Band

To create a band, select Insert ⇒ Create Band Line, press Ctrl+F11, or double-click in the Band Area to display the Create Band Line dialog (see Figure 3.4). Then do the following:

1. In the “Number to Create” box, enter the number of lines you want to insert in the band area you are creating
2. Choose the “Select Band” option in the Line Placement group box. A list box opens displaying the available band types.

The numbers preceding the GrpHead (Group Header) and GrpFoot (Group Footer) types correspond to the 8 levels of grouping available when you select group fields (see Chapter 10, “Sorting and Grouping Data,” for an explanation of group fields).

3. Select a band type. To determine the appropriate band type based on where you want the data to appear in the report, refer to Figure 3.1.
4. Select OK. Report Designer inserts the line or lines of the specified type in the appropriate place on the layout.

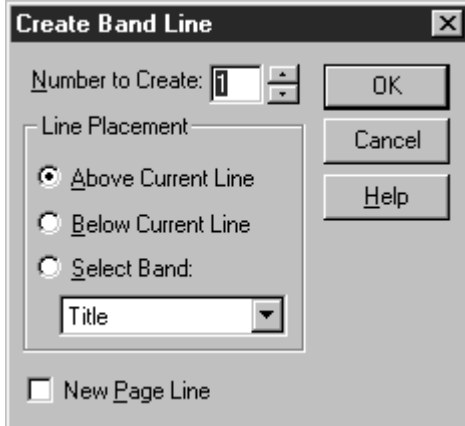


Figure 3.4 Create Band Line Dialog Box

Inserting Single Band Lines

To insert lines one at a time in the current band:

1. Position the edit cursor in the band where you want to add the line(s).

2. Select Insert ⇒ Band Line (or press Shift+F11).

Report Designer inserts a new line of the same band type above the current line. Repeat this procedure to add additional lines to the current band.

Inserting Multiple Band Lines

To insert multiple lines in any band on the layout:

1. To insert the new lines above or below an existing line, position the edit cursor on that line.
2. Select Insert ⇒ Create Band Line (or press Ctrl+F11) to display the Create Band Line dialog (see Figure 3.4).
3. In the “Number to Create” edit box, enter or select the number of new lines you want to insert in a single location.
4. In the “Line Placement” group box, select one of the option buttons to indicate where you want to insert the new lines:

Above Current Line inserts the new line(s) above the current line.

Below Current Line inserts the new line(s) below the current line.

Select Band allows you to select a specific band in which to insert the new line(s), regardless of the current line. Select a band type from the drop-down list.

If you select a band type that currently exists on the layout, Report Designer inserts the new line(s) below the last line in that band.

If you select a band type that does not exist on the layout, Report Designer adds the band to the report and inserts the specified number of lines.

5. Select OK to insert the new line(s).

Report Designer inserts the new line(s) in the location you indicated.

Inserting Page Breaks

To insert page breaks in your report, you use the Create Band Line dialog to place a new-page line where you want the break to occur.

You can place a new-page line anywhere on the layout; note, however, that Report Designer ignores new-page lines in certain bands, such as a Page Header/Footer or a swapped Group Header/Footer (see Chapter 10, “Sorting and Grouping Data,” for information on swapped Headers and Footers).

Figure 3.5 explains where you should insert new-page lines to produce page breaks in the appropriate places.

| Position of New-Page Line on Report Layout | Resulting Page Break in Report |
|---|---------------------------------------|
| Last line in Title band | After title |
| Last line in Group Footer band | After group |
| Last line in Record band | After each record |
| First line in Summary band | Before summary |

Figure 3.5 Common Locations for New-Page Lines

To insert a page break, do the following:

1. Select Insert ⇒ Create Band Line (or press Ctrl+F11).
2. In the Line Placement group box, specify where you want to insert the new-page line (Above Current Line, Below Current Line, or in a selected band area).
3. Turn on the “New Page Line” setting at the bottom of the dialog; an X appears in the box indicating that the line you are inserting is a new-page line.
4. Select OK. Report Designer inserts a dashed line in the specified area of your report layout, indicating a page break.

You can move, copy, or delete a new-page line like any other line on a report layout.

You can also produce conditional page breaks by assigning a logical control field to a new-page line. For example, if some of your purchase orders require an additional page for footnotes and others do not, you can specify that the inserted new-page line will cause a page break only when the control field contains a specified value. For more information on how to use logical control fields, see the section **Specifying Conditional Line Printing** in this chapter.

Manipulating Band Lines

After you have created bands and inserted additional lines as needed, you can copy or move one or more lines (and all fields on those lines) to other locations on the layout; you can also delete band lines.

Copying or Moving Band Lines

To copy or move one or more lines (and all fields currently on those lines), do the following:

1. Select the line or lines to be copied or moved. To copy the lines, select Edit ⇒ Copy or the Copy button (or press Ctrl+C). To move the lines, select Edit ⇒ Cut or the Cut button (or press Ctrl+X).
2. Position the edit cursor where you want to copy or move the lines. Select Edit ⇒ Paste Lines or the Paste button (or press Ctrl+V).

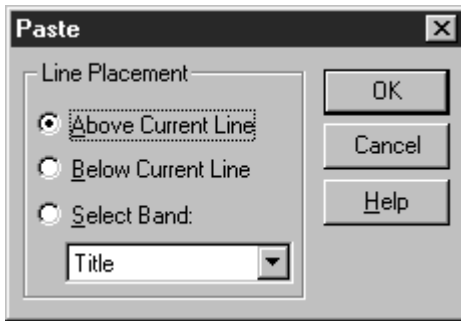


Figure 3.6 Paste Lines Dialog

3. The Paste dialog (see Figure 3.6) presents the following options: Above Current Line, Below Current Line, and Select Band. Selecting Above or Below pastes the line(s) either above or below the current line. The band type of the pasted lines will be the same as that of the current line.

Choosing Select Band lists all available band types. If you select a band type that currently exists on the layout, the pasted lines will be appended to that band. If the band type does not exist, Report Designer will create the band and paste the lines there.

Deleting Band Lines

Deleting differs from cutting in that you cannot then Paste the line or lines elsewhere on the report. If you delete lines by mistake, however, you can select Edit ⇒ Undo Last Clear (Ctrl+Z) or select the Trashcan button again to re-insert the lines in their original position.

Use any one of the following methods to delete one or more lines (and all fields on the line or lines):

- Select the lines and select Edit ⇒ Clear;
- Select the lines and select the Trashcan button (🗑️);
- Select the lines and press the Delete key.

Modifying Band Line Characteristics

After you have created and inserted band lines, you can modify the following characteristics of those lines:

- Justify all fields on selected line(s);
- Trim blank space between fields;
- Specify Automatic or Freeform line height.

The following sections explain how to perform these procedures.

Justifying All Fields on One or More Lines

You can position (or *justify*) all the fields on one or more lines as a unit, without changing the spacing between the fields.

To justify all the fields on one or more lines:

1. Select the lines you want to justify. The lines need not be contiguous — for example, you can click on Line 1 and then Control-click Lines 2, 4, and 7 to select them.
2. Select Format ⇒ Band Line Justify to display the Band Line Justify dialog.
3. Select Left, Center, or Right justification and then select OK. Report Designer justifies the fields within the margins of your report.

If any line you justify contains only a single field or a single series of trimmed fields, the format of that field or series of fields will also be set to the specified alignment, so that the data will be appropriately aligned within the field width.

For example, if you select Center to center a line containing a single field, the format of that field will be changed to centered. If you center a line that contains a series of trimmed fields, the format of the first field in this series will be changed to centered. Since the format of the

first field controls the behavior of the entire series of fields, the trimmed data from all the fields will be centered within the fields' collective width.

Note that if more than one record is being printed horizontally across the page, justification of Record lines is based on the record width rather than the right margin. See Chapter 14, "Printing Reports," for information about printing multiple records across the page.

Controlling Automatic Trim

To control whether Report Designer removes or retains blank space between fields on selected lines in your report, select one of the Trim settings on the Alignment tab. To access the Trim settings, select the field and press F9 to display the Properties tabbed dialog; then select the Alignment tab.

When you specify "Print at End of Previous Field," Report Designer removes blank space (other than space inserted in text fields by means of pressing the spacebar) between the beginning of a field and the end of the previous field on that line. When you specify "Print at Field Position," Report Designer retains blank space between the fields. The default value is "Print at Field Position."

To apply automatic trim to one or more fields on a line or to remove it from a field or fields:

1. Select the fields whose trim you want to control.
2. Press F9 (or select Format ⇒ Properties). Select the Alignment tab.
3. In the Trim box, select "Print at Field Position" to retain blank spaces between adjacent fields (the default); select "Print at End of Previous Field" to remove blank spaces between adjacent fields.
4. Select OK.

Auto-Trim Examples

The ability to trim blank space allows you to place fields on the report layout so that they will not be separated by spaces. For example, if you have specified "Print at End of Previous Field" as the trim setting, **PAGE · 999** on a report layout will print as **PAGE 2** instead of **PAGE 2**. Also, when the trim setting is "Print at End of Previous Field," first- and last-name fields on a line will print without space between them.

For example, <xxxxxxxxxxxxxx>·<xxxxxxxxxxxxxx> will print as
William Hickock instead of William Hickock.

Auto-Trim and Field Alignment

When you place a series of fields so that they will trim, these fields become a single field for the purposes of field alignment. The entire series of fields takes on the alignment (that is, left-aligned, centered, or right-aligned) of the first field in the group.

For example, if you have a series of fields on a Title line, the alignment of these fields within their collective field width depends on the alignment of the first field. If it is centered, the trimmed data from all the fields will be centered within the fields' collective width. You can then use the Format ⇒ Band Line Justify “Center” setting to center this series of fields between the margins of the page. The result will be a title that is centered on the report page, no matter what fonts are applied to the fields.

Specifying Band Line Height

Report Designer provides two line height types: Automatic (the default) and Freeform. For any line with an Automatic height setting, Report Designer adjusts line height to accommodate the largest font on the line. For a Freeform line, you can either specify a height on the Band Line Properties dialog or adjust line height as necessary on the layout.

To specify the height of any line(s) in your report, select the line or lines and open the Band Line Properties dialog (see Figure 3.7). Select the appropriate item (Automatic or Freeform) in the Height group box.

Automatic Line Height

When you set line height to Automatic, Report Designer automatically adjusts line height to accommodate the largest font on the line. This choice is the default, since it provides appropriate line spacing in most cases.

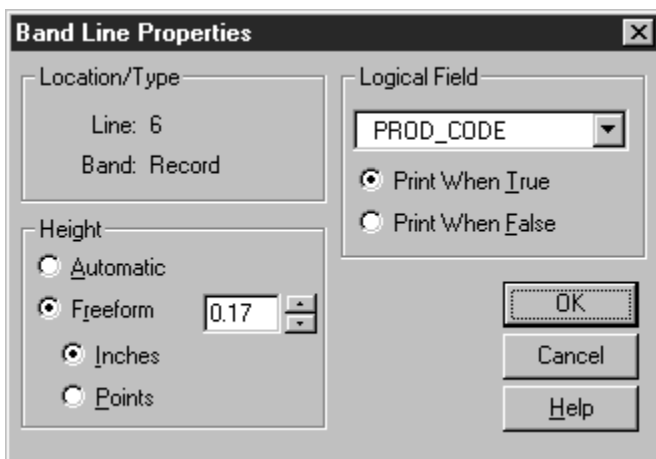


Figure 3.7 Band Line Properties Dialog Box


Freeform Line Height

For any line with a Freeform height setting, you can specify a line height in inches or points on the Band Line Properties dialog. On the layout, a Freeform line is indicated by up and down arrows in the Line Status Area (the narrow channel at the right edge of the Band Area).

Freeform lines are useful for areas of a report where you plan to insert images, since you can adjust the height of the line to accommodate any image you insert on it. (Note that a Freeform line will *not* expand to accommodate an image or a word-wrapped field placed on it; you must specify a Height for the Freeform line that is sufficient for the maximum number of lines that the image or word-wrapped field will occupy in the report output.)

Switching Between Freeform and Automatic

You can change a line's type from Automatic to Freeform or from Freeform to Automatic using either of the following methods.



- ❑ Select one or more lines and select Format ⇒ Properties (or press F9). On the Band Line Properties dialog, select Freeform in the Height group box and enter or select the appropriate line height. Then select OK.
- ❑ Select one or more lines and select the Auto/Freeform Line button on the Formatting Toolbar () . For a single selected line, this button acts as a toggle — a Freeform line becomes Automatic, and an Automatic line becomes Freeform.

If you selected multiple lines, selecting the Auto/Freeform Line button will have one of the following results:

- ◆ If all selected lines are Automatic, they become Freeform.
- ◆ If all selected lines are Freeform, they become Automatic.
- ◆ If the selected lines are a mixture of Automatic and Freeform, they all become Automatic.

Adjusting the Height of a Freeform Line

You can adjust the height of a Freeform line in either of two ways:

- ❑ To size a Freeform line on the layout, click and hold on the top or bottom arrow in the Line Status area; the cursor changes to an arrow (either  or  depending on whether you clicked on the top or bottom of the line). Drag the cursor up or down as necessary to increase or decrease the line height; when the line is the desired height, release the mouse.
- ❑ To size a Freeform line to an exact measurement in inches or points, open the Band Line Properties dialog (either right-click on the line and select Properties or select multiple lines and press F9). In the Band Line Properties dialog, select Inches or Points in the Height box; then select a measurement..

Specifying Conditional Line Printing

To print a line or lines only under certain conditions, select a control field from the Logical Field list box on the Band Line Properties dialog. This setting enables you to use any field in the composite record structure (except a page total) as a control field to trigger line printing. Report Designer places a question mark in the Line Status area to indicate that a logical field has been assigned to control printing.

After selecting a control field, you can turn on either “Print When True” or “Print When False.” If you specify “Print When True,” the line or lines will print only when the control field contains a “true” value (see Figure 3.8). If you specify “Print When False,” the line or lines print only when the control field contains a “false” value.

| Data Type | True Value | False Value |
|------------------|---------------------|--------------------|
| Logical | True | False |
| Character | Not empty | Empty |
| Numeric | Not empty, Non-zero | Empty or zero |
| Date | Not empty | Empty |
| Memo | Not empty | Empty |

Figure 3.8 Print Values for Control Fields

For example, in invoices that subtotal line item amounts before calculating tax, you might not want a subtotal to print if there is only one line item. In this case, you could suppress printing of the Group Footer line containing the SUBTOTAL field by proceeding as follows. First, create a total field called ITEMS, which counts the number of line items for each order. Next, create a logical calculated field called PRINT that controls printing of the subtotal Group Footer line. If the value in this field is true, the line will print. If the value is false, the line will be suppressed. The expression for this field is:

```
ITEMS>1
```

To assign the control field to the Group Footer line, select the line and open the Band Line Properties dialog. Open the Logical Field list box to display the names of all fields that can be used to control printing. Select PRINT; then select OK. When the report prints, the Group Footer line will print only when the value in the PRINT field is true, in other words only when the invoice contains more than one line item. (To specify that the line print only when the control field value is *false*, select “Print When False” on the Band Line Properties dialog.)

Although logical fields are typically used as control fields, you can use character, numeric, date, or memo fields as well. The value that triggers line printing varies depending on the data type of the control field you use, as Figure 3.8 illustrates.

To remove a logical condition, first select the line or lines. Select Format ⇒ Properties (or press F9); the name of the field assigned to control printing of the selected line(s) appears in the Logical Field box. Open the Logical Field list and select “None”; then select OK.

Chapter 4

Working with Fields



Introduction

This chapter explains how to insert, move, copy, and format fields in reports. This information is provided in the following sections:

- Manipulating Fields
- Applying Fonts, Styles, Effects, and Colors
- Formatting and Sizing Fields
- Specifying Alignment
- Controlling Automatic Trim
- Adding Total or Calculated Field Comments

Selecting Fields

In order to modify fields that have been inserted on the layout, you must first select them. Follow these procedures to select a field or group of fields:

-  With the mouse: Click on the field to select it. To select additional fields, Control-click on each. If the fields to be selected are in the same section of the layout, you can also select them by dragging the mouse to form a rectangle that touches each field you want to select. (Note that the rectangle does not have to completely enclose the fields to be selected; as long as part of the rectangle touches a field, the field will be selected.)
-  From the keyboard: Tab to the field and press Spacebar to select it. To select additional fields, tab to each and press Ctrl+Spacebar to select.

Methods of Applying Field Characteristics

After you have selected individual fields or groups of fields on a report layout, you can use either the Font and Properties dialogs or the Formatting Toolbar buttons to control the following characteristics:

- Font and point size;
- Font Style (regular, bold, italic), Effect (strike-out, underline), and Color;
- Field width and format;
- Alignment (left, center, right, justified);
- Automatic trim (“Print at Field Position” or “Print at End of Previous Field”);
- For total and calculated fields, field Comment (a brief annotation attached to the field).

You can access the Font dialog in any of the following ways: select the field and press F5; select the field and select Format ⇒ Font; or right-click on the field and select Font.

Use any of the following methods to access the Properties tabbed dialog, which has tabs for Width/Format, Alignment, and Comment: select the field and press F9; select the field and select Format ⇒ Properties; or right-click on the field and select Properties.

You can quickly apply any font, font style, or alignment (except Word-wrap) using the Formatting Toolbar. Figure 4.1 shows the Formatting Toolbar options and identifies the purpose of each.

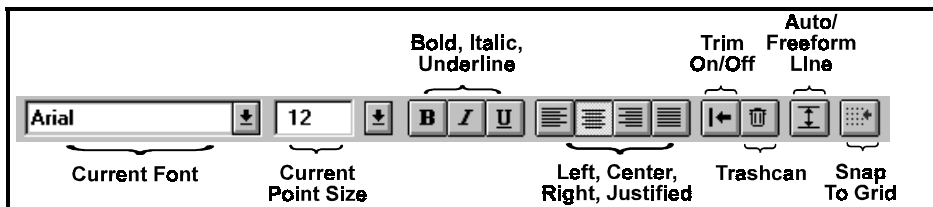


Figure 4.1 Format Options in Formatting Toolbar

Manipulating Fields

After you have created bands by inserting band lines on your layout, you can insert or type fields on those lines. You can then copy or move a field or group of fields anywhere on the layout.

Inserting Fields

To insert a field, you select from the fields listed in the Insert Field dialog box. You can open this dialog box in any of the following ways:

- Position the edit cursor and press F11;
- Position the edit cursor and select Insert ⇒ Field;
- Position the edit cursor and press the Insert key;
- Double-click at the location you want to insert the field.

The Insert Field dialog box (see Figure 4.2) displays all field names from the composite record structure — that is, the names of all fields from the master table and all related tables, all calculated and total fields, and memo fields from any attached text memo file.

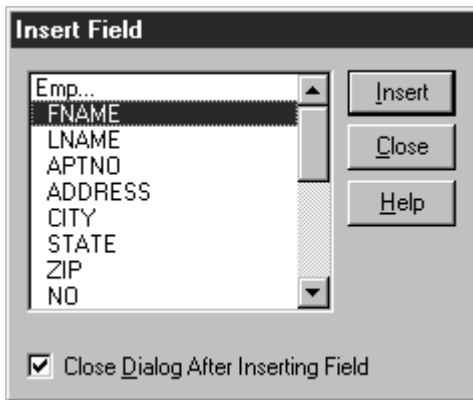


Figure 4.2 Insert Field Dialog Box

In the list box, field names are indented beneath the name of the table they are contained in. Each table name is followed by an ellipsis (...). For multi-table reports, the field list for each table can be “collapsed” so that only the table name appears. Initially, all field names are displayed. To collapse the field list for a table, click on the table name; to expand the list, click the table name again.

You can insert a field from the field list in either of two ways:

- Highlight the field name and select Insert; the field will be inserted at the position of the edit cursor.
- Drag and drop the field in the appropriate position on the layout.

By default, the Insert Field dialog remains open after you have inserted a field to enable selection and insertion of several fields in succession. When you are finished inserting fields, select Close. To specify instead that the Insert Field dialog close after you have inserted a field, click the check box next to “Close Dialog After Inserting Field.” As a result, the Insert Field dialog will close after you select and insert a field.

To include text in a report (for example, to insert column headings), simply position the cursor where you want the text to begin and type it. For large text selections, create a separate text file and attach it to your report as a text memo file (see Chapter 17, “Creating Form Letter Reports,” for information about text memo files).

Copying Fields

You can copy any field and insert the copy in a new position anywhere on the layout. To copy a field:

1. Select the field or fields you want to copy.
2. Select Edit ⇒ Copy or press Ctrl+C.
Report Designer copies and stores the selected fields.
3. To place the field copy, position the edit cursor at the new location.
4. Select Edit ⇒ Paste Objects or press Ctrl+V.

Report Designer pastes the copied fields at the cursor position.

When you copy a field, the original field remains in position. The field copy retains all characteristics (width, format, font, and attribute) of the original. You can change any of these characteristics for the copy without affecting the original.

Moving Fields

You can move any field or group of fields on the layout to another location. If you are moving multiple fields, the fields retain their positions relative to one another when you move them.

To move one or more fields:

1. Select the field or fields you want to move.
2. Move the field(s) in any of these ways:
 - ◆ Drag the field(s) to the new location and release the mouse.
 - ◆ Select Edit ⇒ Move Fields (or press F7). Use the cursor keys to position the field(s) at the new location; then press Enter.
 - ◆ Select Edit ⇒ Cut (or press Ctrl+X). Position the edit cursor where you want to insert the field(s) and select Edit ⇒ Paste Objects (or press Ctrl+V).

Report Designer moves the field or group of fields to the new location. If you used drag-and-drop or Edit ⇒ Move Fields (F7), you can undo the move and return the field(s) to the original position by selecting Edit ⇒ Undo Last Move.

When you paste a group of fields, the alignment of the topmost field in the group determines the starting point of the paste location. If the topmost field is left-aligned, its left edge will be positioned at the edit cursor; if it is center-aligned, it will be centered on the edit cursor position; and if it is right-aligned, its right edge will be positioned at the edit cursor. The other fields in the group will maintain their positions relative to the topmost field.

Note that you may first have to insert additional lines in a band so that you can copy fields to a line or lines of the proper type.

Deleting Fields

To delete one or more fields from the layout:

1. Select the field or fields you want to delete.
2. Delete the fields in any of these ways:
 - ◆ Select Edit ⇒ Clear;
 - ◆ Select the Trashcan button (🗑️);
 - ◆ Press the Delete key.

Deleting differs from cutting in that you cannot then Paste the fields elsewhere on the report. If you delete fields by mistake, however, you can select Edit ⇒ Undo Last Clear (Ctrl+Z) or select the Trashcan button again to re-insert the fields in their original positions.

NOTE Deleting database fields from the layout does not remove them from your database; they are simply erased from the report layout. Deleting calculated and total fields you created in Report Designer does not remove them from the composite record structure. You can use Field ⇒ Insert to replace any database, calculated, or total field you deleted.

Applying Fonts, Styles, Effects, and Colors

When you print a report, the text and data print in a particular type and size of print. This combination of typeface and type size is referred to as a *font*. Depending on the currently selected printer, you can access a range of fonts to vary the style and size of selected areas of your reports. For example, you could use a large font for report titles and a smaller font for record areas.

With many fonts you have the additional option of applying *styles* (bold and italic), *effects* (strikeout and underline), and color to further emphasize specific fields or areas of a report. By combining fonts, styles, effects, and colors, you can enhance the appearance and improve the readability of report output.

Font Characteristics

When you apply fonts to fields in a report, you select fonts by typeface name (such as Times New Roman or Helvetica) and point size. The following characteristics of the fonts you select can affect the placement and alignment of fields in your report output.

Spacing and Pitch

Fonts that have characters of equal widths are called *monospaced* (or fixed-pitch) fonts. The character spacing of a monospaced font is expressed as *pitch*, the number of characters per horizontal inch. You can calculate the pitch of a monospaced font by dividing 120 by the point size. For example, the pitch of a typical 12-point Courier font is 10 (120/12 points = 10 pitch).

Fonts that have characters of different widths are called *proportional* fonts. Since a proportional font does not have a fixed number of characters per inch, it does not have an absolute pitch.

Point Size

A font's *point size* refers to its height measured in points (1 point = 1/72 inch). For example, the body text of this manual is printed in a 12-point font; the distance from the top of the highest character to the bottom of the lowest character is 12 points (12/72 inch). Some fonts (referred to as bitmapped fonts) are available only in predetermined point sizes. Other fonts (often called scalable or outline fonts), such as TrueType fonts, are available in almost any point size.

Specifying Font, Styles, Effects, and Color

The range of fonts available to be applied to report fields depends on the current printer and the fonts installed for that printer. See your Windows documentation for information about selecting printers.

When a field is selected, its current font is identified by typeface name (for example, Times New Roman) in the Formatting Toolbar, and the size is shown in points. You can apply any font that is available on the current printer.

Default Font Assignments

Initially, fields that you insert on the report layout are assigned either a 12-point Arial (TrueType) font or your default font and point size (if defaults have been specified using Options ⇒ Default Settings). If the current printer does not support your default font, Report Designer assigns the first font in the Font list for that printer.

You can use the Options ⇒ Default Settings dialog box to change Report Designer's default font and point size assignments. Refer to Chapter 5, "Setting Defaults," for instructions. If you change the default font after creating a report, only those fields you insert *after* that change will be assigned the new default.

Specifying Font and Point Size

To change the font and point size for one or more fields on the current report layout, do the following:

1. Select the field or fields you want to change.
2. Select Format ⇒ Font. Select a font from the Font menu (see Figure 4.3).
3. Select a point size from the Size list. If the font you selected is scalable and the point size you want is not displayed, enter the desired point size.
4. Select OK.

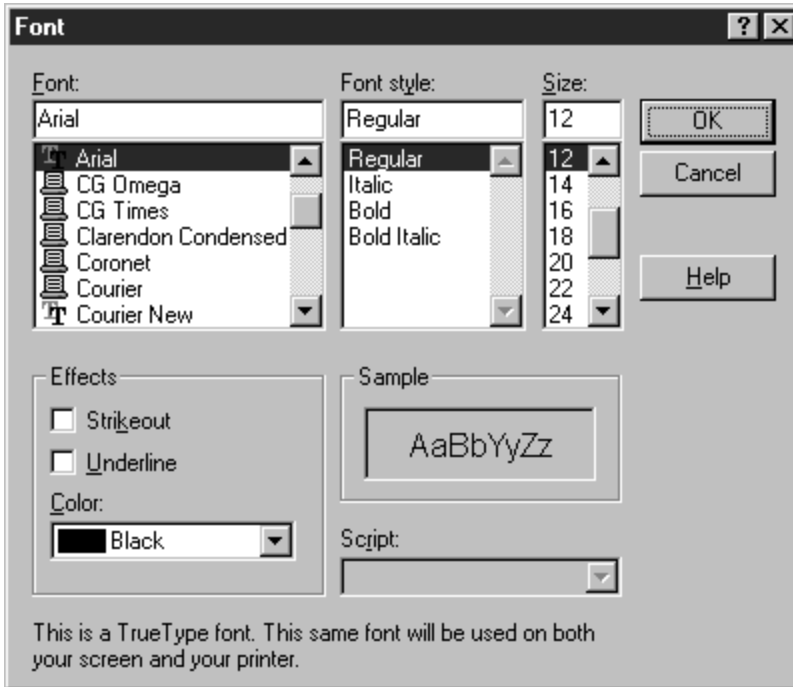


Figure 4.3. Font Dialog

Specifying Styles and Effects

In addition to specifying size, with many fonts you can also apply **bold**, *italic*, ~~strikeout~~, or underline (or a **combination** of these). Bold and italic styles are not available with all fonts; refer to your printer or font documentation for information about styles.

To apply one or more styles or effects, select a field or group of fields and select the B, I, and/or U button. You can also select Format ⇒ Font and choose a style from the Font Style list (Bold, Italic, or Bold Italic for most fonts, and Strikeout or Underline from Effects; then select OK.

Specifying Color

The default color for any inserted field is black. You can specify a different field color either by setting a default color on the Default Settings dialog (accessed by selecting Options ⇒ Default Settings) or by applying a color to a field or group of fields. If you change the default, the new default color will be applied to any fields you add

after making the change; however, fields currently on the layout are not affected.

To specify a color for a selected field or group of fields, do the following:

1. Select the field or fields and select Format ⇒ Font (or press F5).
2. Open the Color list box. Select a color from those listed.
3. Select OK; the color is applied to the selected field(s).

You must have a color printer in order to produce color output. If you apply colors to fields and then print the report on a monochrome printer, the printer will convert those colors either to black or to some level of gray scale (depending on the printer). For example, on most laser printers a field formatted as yellow will print light gray.

Formatting and Sizing Fields

Field format refers to:

- The width of a character, memo, or logical field;
- The numeric format (currency, percentage, and so on) and number of integer and decimal places for numeric fields;
- The format and arrangement of month, day, and year for date fields;
- The format and arrangement of month, day, year, hours, minutes, and seconds for datetime fields.

A field's format is usually displayed in the Status Bar when the field is highlighted. To change field format, use the Width tab (for character, memo, and logical fields) or Format tab (for all other field types) on the Field Properties tabbed dialog (select the field and press F9 to display the Properties tabbed dialog).

Any formats you apply affect only the way a field prints or displays; Report Designer uses unformatted field values in sorting, filters, totals, and calculations. For example, formatting a three-decimal-place numeric field to display only two decimal places will not cause Report Designer to ignore the thousandths value in sorts, filters, totals, and calculations that involve that field. Formatting a date field with an abbreviated format that doesn't show the year will not cause Report Designer to ignore the year value if the field is used in a sort, filter, total, or calculation.

Specifying Character, Memo, or Logical Field Width

When you first insert a character, memo, or logical field on the report layout, Report Designer assigns a field width based on the maximum width of the data in your database. If this field width is not appropriate for one or more fields, you can modify it either by sizing the field(s) directly on the layout or by using the Width tab on the Field Properties tabbed dialog.

Sizing a Field on the Layout

To change the width of a character or memo field directly on the layout, select the field and drag one of the field “handles” either left or right as necessary to increase or decrease field width.

Sizing a Field Using the Width Tab

To change the width of a character or memo field using the Properties tabbed dialog, select the field and press F9. On the Width tab, either select Characters and enter the maximum number of characters for the field data or select Inches (or Centimeters, depending on your Windows configuration) and enter the maximum width for the data.

The unit of measurement that you select — Characters or Inches/Centimeters — determines how the data in the field will print or display.

- If you specify field width in Characters, Report Designer will always print or display all of the data in the field up to the number of characters specified. As a result, the width of the field may vary depending on what font you have applied to it.
- If you specify field width in Inches (or Centimeters), Report Designer will always print or display the field up to that size, regardless of the width of the data itself. Any data that does not fit within the specified field width will be truncated (or wrapped, if word-wrap format has been applied).

Specifying Date Formats

Report Designer provides 24 options for formatting dates. Figure 4.4 lists and gives examples of the basic date format options.

When you insert a date field on a new report layout, it is assigned the current Windows Regional date format. When you insert a date field

on a previously saved report that you have retrieved for editing, the field is assigned the Windows Regional date format that was in effect when the report was saved.

| Format | Meaning | Example |
|---------------|----------------------------------|----------------------------|
| dd-mmm-yy | Day-Month-Year | 07-Mar-96 |
| dd-mmmm-yyyy | Day-Month-Year | 07-March-1996 |
| dd-mmm | Day-Month | 07-Mar |
| mmm-yy | Month-Year | Mar-96 |
| mmm-yyyy | Month-Year | Mar-1996 |
| mmmm d, yyyy | Month Day, Year | March 7, 1996 |
| d mmmm yyyy | Day Month Year | 7 March 1996 |
| mmmm yyyy | Month Year | March 1996 |
| mmmm d | Month Day | March 7 |
| d mmmm | Day Month | 7 March |
| mm/dd/yy | Month/Day/Year | 03/07/96 |
| mm/dd/yyyy | Month/Day/Year | 03/07/1996 |
| dd/mm/yy | Day/Month/Year | 07/03/96 |
| dd/mm/yyyy | Day/Month/Year | 07/03/1996 |
| dd.mm.yy | Day.Month.Year | 07.03.96 |
| dd.mm/yyyy | Day.Month.Year | 07.03.1996 |
| yyyy-mm-dd | Year-Month-Day | 1996-03-07 |
| yy-mm-dd | Year-Month-Day | 96-03-07 |
| mm/dd | Month/Day | 03/07 |
| dd/mm | Day/Month | 07/03 |
| dd.mm | Day.Month | 07.03 |
| mm-dd | Month-Day | 03-07 |
| Long Intn'l | Windows Regional Long Format | Thursday, March 7, 1996 |
| Short Intn'l | Windows Regional Short Format | 3/7/1996 |

Figure 4.4 Date Formats

To change the format of a date field, select the field and press F9. On the Format tab, select from the menu displayed. A sample of the

format you select is shown at the bottom of the dialog box. Select OK or Apply.

Note that display formats do not affect the sort order. Even if you have selected a date format that doesn't show the year, Report Designer still sorts dates chronologically.

Specifying Datetime Formats

Report Designer supports both Datetime and Time data types. For the date portion of a datetime field, the basic date format options listed in Figure 4.4 are available. In addition, you can select one of the time formats listed in Figure 4.5 for the time portion of a datetime field.

| Format | Meaning | Example |
|----------------|---------------------------------|----------------|
| h:mm | Hours (24-hour):minutes | 8:45 |
| hh:mm | Hours (24-hour):minutes | 08:45 |
| h:mm:ss | Hours (24-hour):minutes:seconds | 8:45:30 |
| hh:mm:ss | Hours (24-hour):minutes:seconds | 08:45:30 |
| h:mm am/pm | Hours:minutes am/pm | 8:45 am |
| hh:mm am/pm | Hours:minutes am/pm | 08:45 am |
| h:mm:ss am/pm | Hours:minutes:seconds am/pm | 8:45:30 am |
| hh:mm:ss am/pm | Hours:minutes:seconds am/pm | 08:45:30 am |
| International | Windows Regional Time Format | 08:45:30 am |

Figure 4.5 Time Formats

Specifying Numeric Formats

Report Designer provides six choices for formatting numeric data. Figure 4.6 lists them and gives an example of each. Numeric formats affect only the way in which the number displays on the report. Sorting, filters, and calculations are performed using unformatted field values.

| Format | Meaning | Value | Example |
|---------------|--|--------------|----------------|
| Fixed | Fixed number of decimal places (0 - 15) | 1.23 | 1.23 |
| Scientific | Exponential notation | 1.23 | 1.2E+00 |
| Currency | Currency sign; format determined by Windows International settings | -1.23 | (\$1.23) |
| Comma | Comma and negative value formats determined by Windows Regional settings | -1234 | (1,234) |
| General | Floating decimal | 12.30 | 12.3 |
| Percent | Multiplied by 100, followed by percent | .123 | 12.3% |

Figure 4.6 Numeric Formats

The default characteristics of the Currency and Comma formats are determined by the Windows Regional settings (accessed through the Control Panel), which control currency sign and placement and the format for negative values.

To change a field's numeric format, select the field and press F9. On the Format tab (see Figure 4.7), select a numeric format from the displayed menu. Then enter the maximum number of integers and/or decimal places for the field data.

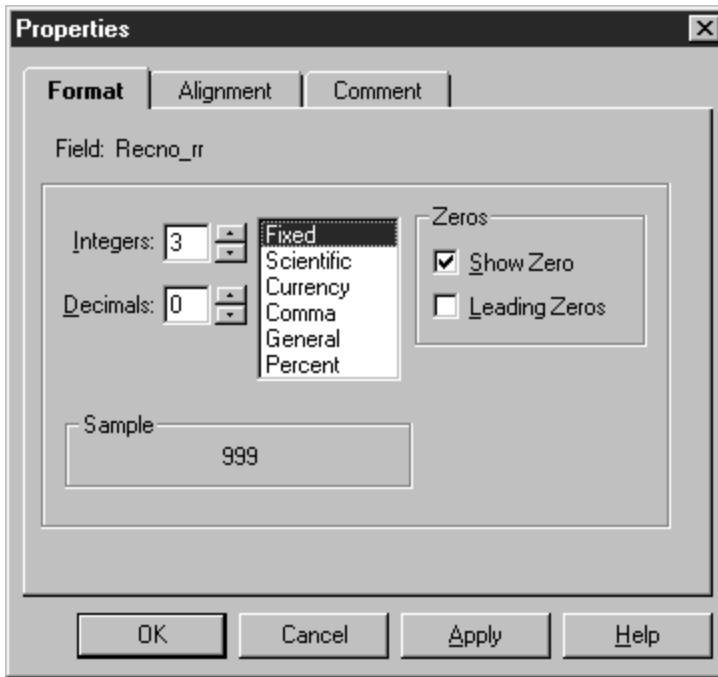


Figure 4.7 Format Tab for Numeric Field

When you select Fixed, Scientific, Currency, Comma, or Percent, you can also specify between 0 and 15 decimal places. Note that the number of integer places plus the number of decimal places cannot exceed 19.

Show Zero Option

For any numeric format, you can turn the “Show Zero” option on or off. To print or display the value in the field, even if it is zero, turn on “Show Zero.” To print or display spaces when a field value is zero, turn off “Show Zero.” If the value in the field is blank, this option has no effect; that is, blank values *always* display and print as blank.

When “Show Zero” is turned off for a field, zero values are not included in counts and averages. Blank fields are never included.

Leading Zeros Option

When you have selected Fixed as the numeric format and 0 as the number of decimal places, you can then turn the “Leading Zeros” option on or off. To display leading spaces, turn “Leading Zeros” off.

For example, if you have 876 in a field of 5 integer places, Report Designer displays the number as 876. To change leading spaces to zeros, turn “Leading Zeros” on. For example, if you have 876 in a field of 5 integer places, Report Designer displays the number as 00876.

Specifying Alignment

The Alignment tab provides four options: Left, Center, Right, and Word-Wrap. These alignment options control the position of field data within the maximum width of the field. (To position fields within the margins of a report, use Format ⇒ Band Line Justify).

To change the alignment of one or more fields using the Alignment tab:

1. Select the fields whose contents you want to align.
2. Select Format ⇒ Properties (or press F9) to display the Properties tabbed dialog.
3. Select the Alignment tab (see Figure 4.8). In the Alignment box, select one of the option buttons:

Left causes the field contents to be left-aligned.

Center causes the contents to be centered on the midpoint of the field width.

Right causes the contents of the field to be right-aligned.

Word Wrap aligns fields whose values wrap to more than one line. Select **Left**, **Right**, or **Justified** below the **Word Wrap** option to align word-wrapped fields.

4. Select OK.

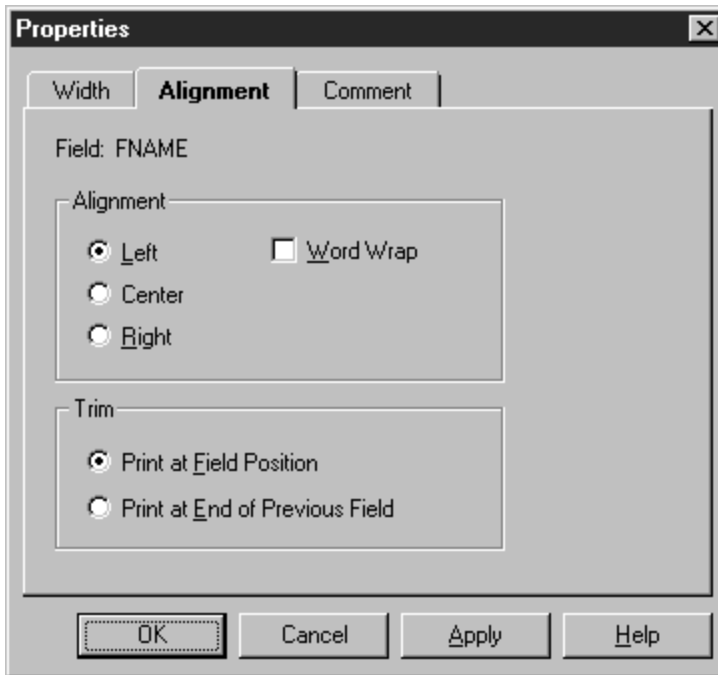


Figure 4.8 Alignment Tab

The alignment is applied to all the selected fields. Each field maintains its alignment even if you move the field to another line. However, the alignment is not applied to any other fields you subsequently move to or insert on the line.

A field's type (text, character, numeric, memo, or logical) determines the range of alignment options available to be applied to that field. The following sections explain the field alignment options and identify which ones are valid for each field type.

Applying Left, Center, or Right Alignment

You can assign Left, Center, or Right alignment to text, date, and numeric fields. The alignment you specify determines how Report Designer calculates the starting or ending position of the field data on the printed report.

To specify alignment for a field, select the field and press F9 to display the Properties tabbed dialog. On the Alignment tab, select Left, Center, or Right; then select OK.

Positioning of Left-Aligned Data

Report Designer starts printing a left-aligned field at the position occupied by the left edge of the field on the layout. For example, if the first letter of a left-aligned text field begins at two inches on the layout, Report Designer will start printing two inches from the left margin. Depending on the font applied, the position of the last character in the field data will vary.

Positioning of Right-Aligned and Centered Data

Report Designer starts printing a right-aligned field so that it *ends* at the position occupied by the right edge of the field on the report layout. For example, if the last letter of a text field is at two inches on your layout, Report Designer will adjust the starting point of the text, depending on the field's font, so that the field ends two inches from the left margin. The position of the first character in the field depends on the font applied to the field. Similarly, the position of data within centered fields is determined by the position of the middle character of the field value.

Applying Word-Wrap Alignment

You can assign Word-wrap alignment to character, text memo, and logical fields. If you select Word-wrap format, data for that field will continue to print on subsequent lines after the data fills the field width on the first line.

To specify word-wrap alignment for a character, memo, or logical field, select the field and press F9. On the Alignment tab, select "Word-wrap" and specify whether the word-wrapped field will be left, right, or fully justified. Then select OK.

After you specify an alignment, the field symbol on the report layout changes to indicate the new alignment. Figure 4.9 lists the available alignment formats and their symbols and gives an example of each.

| Alignment | Symbol | Example |
|-----------------------------|-------------------|---|
| Left | < (Left Angle) | <xxxxxxxxxxxxxxxx New York |
| Center | ^ (Circumflex) | ^xxxxxxxxxxxxxxxx New York |
| Right | > (Right Angle) | >xxxxxxxxxxxxxxxx New York |
| Word-Wrap, Left Justify | « (Left Chevron) | «xxxxxxxxxxxxxxxx New York City is the largest city in the U.S.A. |
| Word Wrap, Right Justify | » (Right Chevron) | »xxxxxxxxxxxxxxxx New York City is the largest city in the U.S.A. |
| Word Wrap, Full Justify | = (Double Line) | =xxxxxxxxxxxxxxxx New York City is the largest city in the U.S.A. |

Figure 4.9 Alignment Options

Word-Wrap Format

Word-wrap is useful for formatting long character fields, which can be wrapped down the page or broken up into separate lines by inserting new-line characters as line terminators. Word wrap is also the default format for text memo fields and long character fields.

Word-wrap is controlled by the following rules:

- ❑ Any field that is on the same line as the word-wrapped field is printed in the column in which it has been placed on the layout. The positions of fields that do not extend beneath the word-wrapped field on subsequent lines are not affected.
- ❑ For word-wrapped fields in Page Header and Page Footer bands, Report Designer truncates the data to fit within the band area. For example, data for a word-wrapped field on line 2 of a 3-line Page Header wraps only for the remaining line. Data for fields placed on line 3 (the line below the word-wrapped field) is not printed, since the Page Header band is fixed in length.
- ❑ For word-wrapped fields in any other band, Report Designer prints all the data, inserting as many additional lines as

necessary. The data continues to wrap from one line to the next within its field width until it is all printed.

Controlling Automatic Trim

By default, Report Designer will print or display a field in the position where it has been inserted on the layout. You can specify that Report Designer remove blank space (other than spaces inserted with the spacebar) between fields, regardless of how far apart those fields are on the line.

If you want two fields to print without intervening space, select the field on the right and press F9 to open the Properties tabbed dialog. In the Trim box at the bottom of the Alignment tab, select the “Print at End of Previous Field” option and select OK. When you print or display the report, the fields will have no space between them, even if they are separated by space on the report layout.

The ability to trim blank spaces enables you to eliminate space between fields whose data varies in width. For example, data from first- and last-name fields on the same line will print with no space between if you have selected “Print at End of Previous Field” for the last-name field.

You can include a single space between fields by inserting a text field consisting of one space and setting the trim for that field to “Print at End of Previous Field.”

Adding Total or Calculated Field Comments

You can enter a brief comment (up to 100 characters) to serve as a “plain English” explanation of a total or calculated field. When a total or calculated field has a comment attached to it, that comment is displayed in the Status Bar when the field is highlighted.

(Note that if there is a report dictionary attached to the report, this tab displays the text of the report dictionary Comment field for any selected *database* field. Display of Comment text for database fields is read-only, however; you must use your database software to edit database field comments.)

To enter or edit a comment for a total or calculated field, select the field and press F9. On the Comment tab, enter or edit the field comment in the Comment box. Then select OK or Apply.

You can also add or edit a comment for a total or calculated field by selecting the Comment button on the Calculated Field or Total Field dialog.

See Chapter 7, “Working with Calculated Fields,” and Chapter 8, Working with Total Fields,” for more information about total and calculated field expressions and comments.

Chapter 5

Setting Defaults

Introduction

This chapter explains how to change default settings — settings that Report Designer uses automatically unless you override them for each report. This chapter includes the following sections:

- Changing Display Preferences
- Changing Layout and Formatting Settings
- Specifying Default Directories and Extensions
- Changing Data Source Defaults
- Changing Regional Settings
- Modifying Report Designer's Case Sensitivity

Changing Display Preferences

You can use the View menu and the Options ⇒ Preferences dialog to modify default display characteristics in any of the following ways:

- ◆ Turn on or off the display of scroll bars, toolbars, rulers, or grid;
- ◆ Specify that fields be represented on the layout as field names rather than symbols;
- ◆ Specify what action Report Designer should take when you select File ⇒ New;
- ◆ Specify whether Report Designer displays field names, report dictionary field descriptions, or both in field lists.

The following sections explain how to make these changes. In each case, the change takes effect for the current session and becomes the default for future sessions.

Changing Settings with the View Menu

You use the View menu command to turn on or off the display of the toolbars and rulers; to turn on or off display of the ruler grid; and to change the representation of fields on the layout.

Figure 5.1 shows the Report Designer window with the Standard Toolbar, Formatting Toolbar, Horizontal and Vertical Ruler, and Field Names settings turned on.

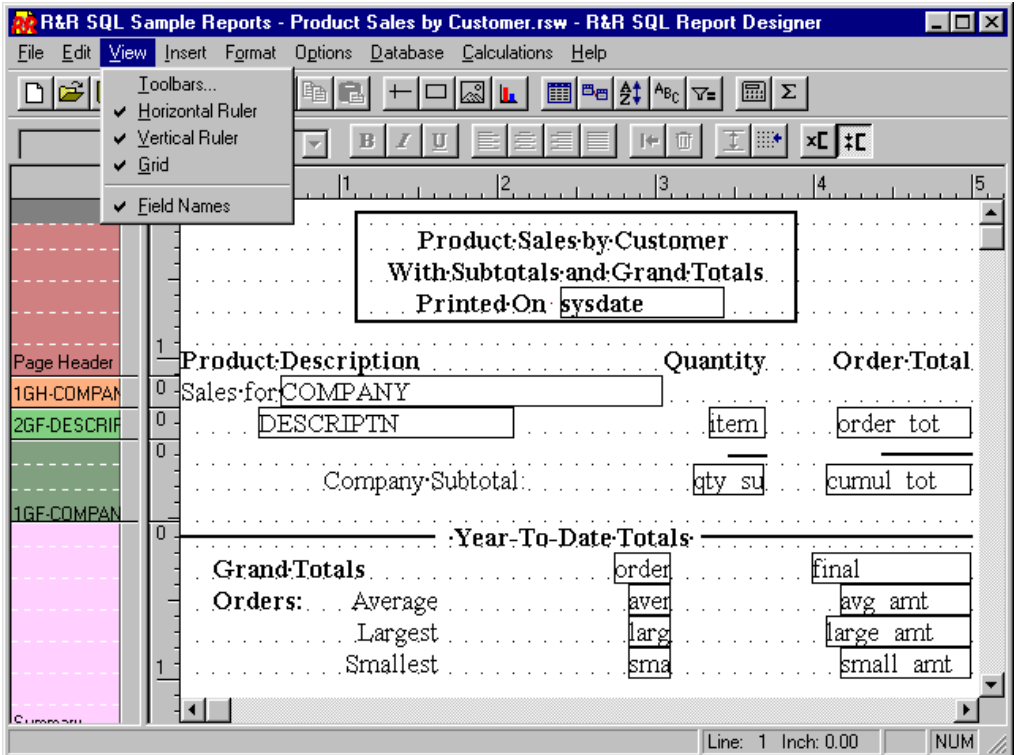


Figure 5.1 Report Designer Window Showing View Menu Choices

Horizontal and Vertical Rulers

You can choose to either show or hide the horizontal and vertical rulers. By default, both rulers are displayed, as indicated by the check marks next to Horizontal Ruler and Vertical Ruler in the View menu. To turn off display of either ruler, select it in the menu; the check mark is removed on the menu and display is then turned off.

Note that you can change ruler spacing by selecting Format ⇒ Rulers, by right-clicking on either ruler, or by selecting F8.

Controlling Grid Display

You can also choose to show or hide the grid, which consists of a series of dots spaced according to the “Units per inch” settings specified for the rulers. You can use the grid to help you more accurately place fields and images. To turn on the grid, select View ⇒ Grid; a check mark appears next to the setting when it is on.

Changing Field Display

The Field Names item in the View menu controls how the fields display in the Layout Area. By default, each field is represented by symbols that indicate the field’s data type and alignment. To display field names, rather than representative symbols, select Field Names. As a result, each field’s name is shown in a box at the field’s location (depending on the field width, the entire field name may not appear).

Changing Preferences Dialog Box Settings

Use the Preferences dialog box (see Figure 5.2) to control display of scroll bars, to specify the starting point for new reports, and to specify the content of Report Designer field lists.

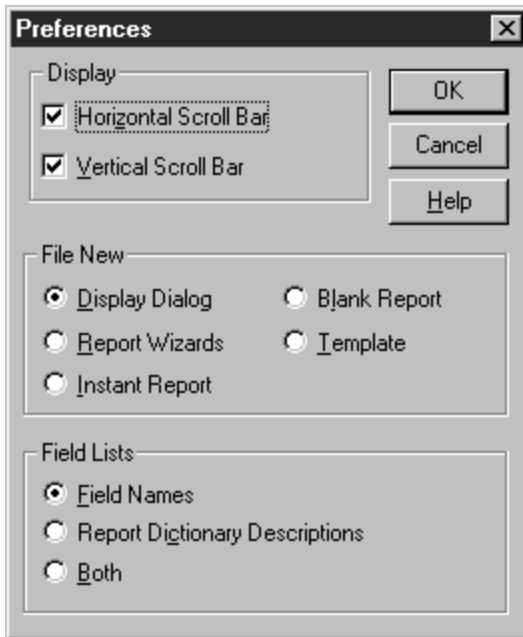


Figure 5.2 Preferences Dialog Box

Changing Scroll Bar Displays

By default, Report Designer displays horizontal and vertical scroll bars. To remove the scroll bars from the display, select Options ⇒ Preferences (see Figure 5.2). In the Display section of the Preferences dialog box, turn off Horizontal or Vertical Scroll Bar. When you are finished making changes, select OK.

Specifying Starting Point for New Report

You use the Options ⇒ Preferences dialog box to specify the starting point for new reports.

The File New group box on this dialog offers the following options:

- Display Dialog
- Report Wizards
- Instant Report
- Blank Report
- Template

With the default setting of “Display Dialog,” each time you select File ⇒ New, Report Designer will display a dialog enabling you to choose the starting point for creating the report (Report Wizards, Instant Report, Blank Report, or Template).

If you select “Report Wizards,” at File ⇒ New Report Designer will execute its Report Wizards tool, which leads you step-by-step through the creation of one of three types of instant report (Labels, Basic Columnar, or Grouped Columnar). See the **Using Report Wizards** section of Chapter 2, “Managing Reports,” for more information.

Selecting “Instant Report” will cause Report Designer to prompt for selection of a master table at File ⇒ New and then create an Instant Columnar report. Report Designer’s Instant Report places all fields from the selected master table (or as many as will fit) on the layout, with column titles inserted for each field. The Instant Report also includes Report Designer calculated fields for date, time, page number, and number of records printed, as well as grand totals of numeric fields that have decimal places.

Selecting “Blank Report” will cause Report Designer to prompt for selection of a master table at File ⇒ New. To create a blank report with *no* master table, simply select OK. To create a blank report *with* a master table, first turn off the “Create Report Without Master Table” setting; then choose a table and select OK. In each case, Report Designer will create a blank report layout consisting of one record line.

Selecting “Template” will cause Report Designer to display a list of report templates in the default template folder. You can then select a template and use it as the starting point for your new report. See the **Using a Template to Create a Report** section of Chapter 2, “Managing Reports,” for more information.

Specifying the Content of Field Lists

For any Xbase platform for which a report dictionary file has been defined, you can specify whether Report Designer displays field names, report dictionary field descriptions, or both in its field lists (for example, the list of fields that displays when you select Insert ⇒ Field). With the default setting of “Field Names” in the Field Lists box on the Preferences dialog, Report Designer will display only field names in its field lists. The other two settings are applicable only if a report dictionary file has been created for your database and if a default for that dictionary file has been defined using Options ⇒ File Settings.

If you select “Report Dictionary Descriptions,” Report Designer will display in its field lists the text of the COMMENT field from the report dictionary for your database. If you select “Both,” Report Designer will display both the field names and the report dictionary descriptions.

Changing Layout and Formatting Settings

To change Report Designer defaults for paper size, margins, logical strings, ruler spacing, font, and snap-to-grid, select Options ⇒ Default Settings.

The changes you make in this dialog box (see Figure 5.3) will then apply globally to all newly created reports.

Paper Size

Default: Letter. Use this setting to specify paper size for printed output.

To select a different size, open the Paper Size list box. Then select the paper size you want from the displayed list (which is based on the current Windows printer).

Some printers allow you to specify a custom paper size (instead of a predefined size). For those printers, you specify the dimensions for the custom size on the Paper tab of the Properties tabbed dialog for the printer (select File ⇒ Print; then select the Properties button). Note that many Windows printer drivers do *not* support custom paper sizes.

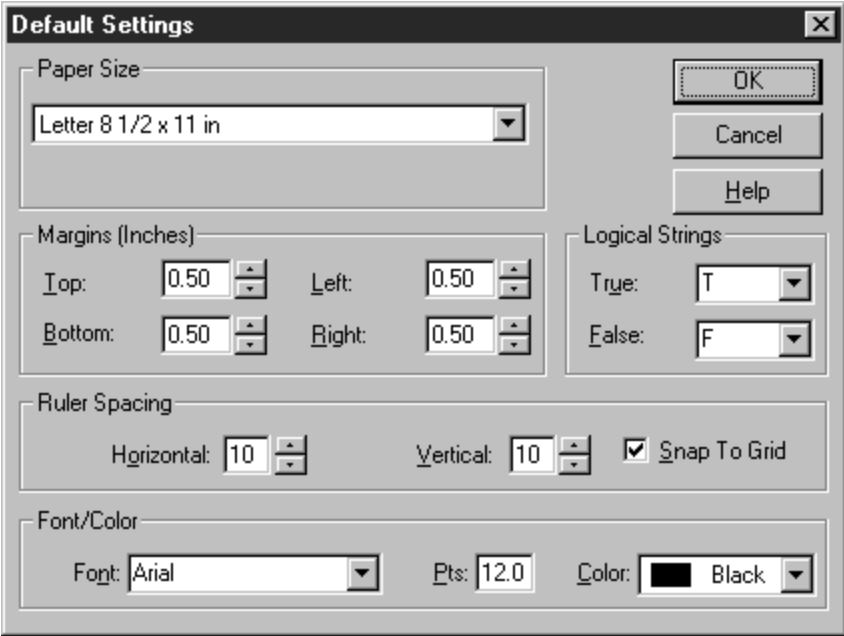


Figure 5.3 Default Settings Dialog Box

Margin Settings

Enter values to specify the amount of space at the top, bottom, left, and right of the report page (default value for each: 0.50 inches). On the layout, the right margin is indicated on the ruler by the letter **R**.

Font, Point Size, and Color

Use this setting to specify a default font, point size, and color that will then be automatically applied to all fields in newly created reports (and to any fields added to the current report after you change the default). To specify a default font, either enter a font name in the Font edit box or open the Font menu and select from the list for the current printer. To change the point size, enter the desired size in the Pts edit box. To change the default color, open the Color list box and select a color.

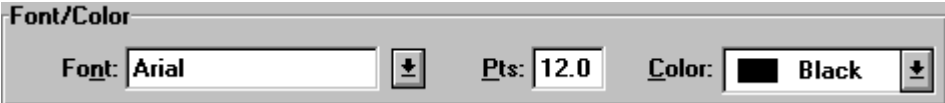


Figure 5.4 Font/Color Group Box

Ruler Spacing and Snap-To-Grid

The default setting for both the Horizontal and the Vertical Ruler Spacing is 10; you can select a setting from 4 through 30. This setting controls the number of ruler increments per inch on each ruler. Note that the Ruler Spacing settings control only the spacing of the report layout rulers (since the fonts actually applied to fields in the report control the print spacing).

For band lines with a Freeform line height, the ruler settings determine the horizontal and vertical spacing of the layout grid. For lines with an Automatic line height, the horizontal spacing of the grid is determined by the ruler setting; the vertical grid spacing is determined by the height of the largest font on each line.

When Snap-To-Grid is on (indicated by an x in the Snap-To-Grid box), objects on the layout will “snap” to the grid marks when inserted, moved, or sized. To turn off this default setting, click the Snap-To-Grid box to remove the x. You can also control this setting for individual reports with the Format ⇒ Snap-To-Grid command (Shift+F8) or the Snap-To-Grid button on the Formatting Toolbar.

Specifying Logical Strings

By default, logical field results will print or display as **T** for True and **F** for False. To specify a different string for either True or False, select Options ⇒ Default Settings. In the Logical Strings box, either open the menu and select a string or enter the string in the data-entry area.

Specifying Default Directories and Extensions

You use the Options ⇒ File Settings dialog to specify the following:

- Folder locations for your report, image, and template files;
- File-name extensions for text memo and image files;
- Defaults for report dictionary and report dictionary index files.

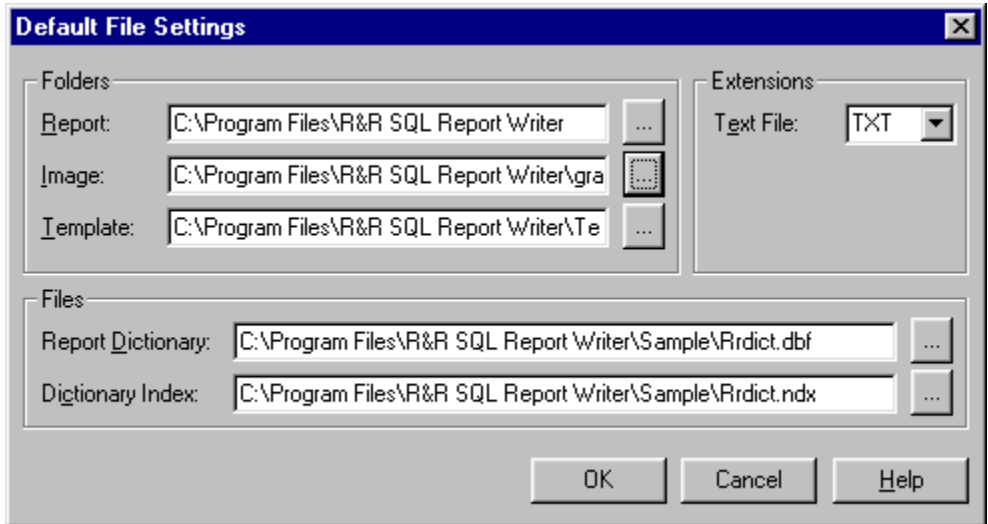


Figure 5.5 Default File Settings Dialog

Changes you make to these settings take effect for the current Report Designer session and all future sessions.

Specifying Report, Image, and Template Folders

Use the Options ⇒ File Settings dialog to specify a default report, image, or template folder. Initially, if no defaults are defined Report Designer looks for all files in the current folder.

You can specify default locations so that Report Designer will search in the following locations for the files it needs:

- Report: Location of report files
- Image: Location of bitmapped image files
- Template: Location of Report Designer templates

To set a default for each of these folders, select Options ⇒ File Settings. Then type the directory path (for example, `c:\arpeggio\images`). Make other changes in the dialog box as necessary; then select OK.

Default Report Folder

To specify a default folder in which Report Designer will search for and store report files, enter the full directory path in the Report Folder

data-entry box. The folder you specify provides the list of library files that displays when you are selecting a report.

Default Image Folder

Specify a folder where Report Designer will initially search for bitmapped image files when you select Insert ⇒ Picture (or the Picture button). If you often use image files of the same type (such as BMP), you can also specify a Default Image File Extension setting.

Default Template Folder

Specify a folder in which Report Designer will look for and save report templates.

Specifying Text and Image File Extensions

You can use the Default File Settings dialog box to specify default file-name extensions for text and image files. As a result of setting defaults for these file extensions, Report Designer will initially search for and display only files with the default extension when you are selecting a text or image file.

Default Text File Extension

The default memo file-name extension you specify controls which files display for selection when you use the Insert ⇒ Text File command to include a text memo file in a report. For example, if the text memo files you will be using in reports have TXT extensions, specifying TXT as the Memo File Extension ensures that Report Designer will initially display files with a TXT extension when you are selecting a text memo file.

Default Image File Extension

The default image file-name extension you specify controls which files display for selection when you use the Insert ⇒ Picture command (or select the Picture button) to place a bitmapped image in a report. For example, if the image files you will be using in reports have PCX extensions, specifying PCX as the Image File Extension ensures that Report Designer will initially display files with a PCX extension when you are selecting an image file.

Specifying Report Dictionary File and Index

For Xbase database platforms, you can create a report dictionary file that provides Report Designer with descriptive information about the database fields used in your reports. You must create the report dictionary file using your database software according to the specifications described in Appendix B, “Creating a Report Dictionary.”

You can use the Default File Settings dialog to specify defaults for report dictionary and report dictionary index files (these settings apply only to Xbase database platforms)..

Enter a file name (optionally including a path) for both the report dictionary file and its associated index file. If you enter a file name without a path, Report Designer will search for the dictionary file in the startup directory.

Changing Data Source Defaults

To specify defaults to control access to your data sources, select Options ⇒ Data Source to open the Data Source dialog (see Figure 5.6). Figure 5.7 explains the data source defaults.

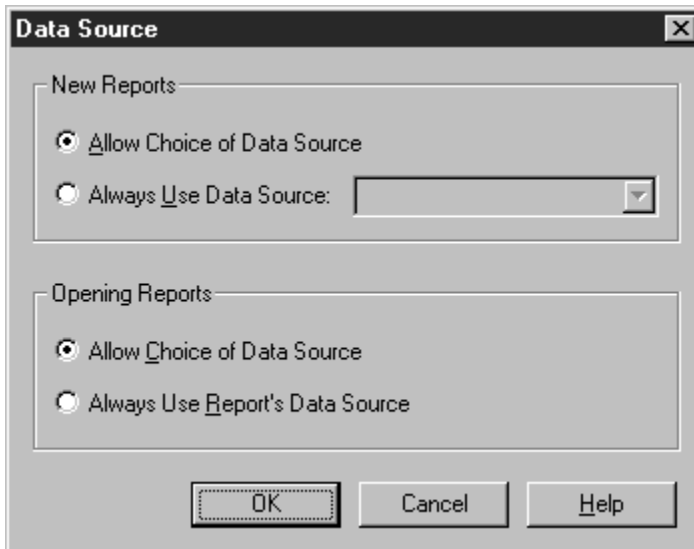


Figure 5.6 Data Source Dialog

Creating Reports

Allow Choice of
Data Source

Allows you to select a data source after selecting
File ⇒ New and add or remove data source
connections using File ⇒ Data Source Connections.

Always Use
Data Source

Specifies a default data source; as a result, you will
not be prompted to choose a data source when you
create a new report.

Opening Reports

Allow Choice of
Data Source

Allows you to change an existing report's data
source when you open the report.

Use Report's
Data Source

Prevents you from changing an existing report's
data source.

Figure 5.7 Data Source Defaults

You can change the data source defaults at any time during a session. Report Designer initially sets the data source defaults to “Allow Choice of Data Source” for Creating Reports and “Use Report's Data Source” for Opening Reports. This allows you to select any available data source when creating a new report, but prohibits you from changing the data source for a saved report.

If you always use a single data source, you can choose “Always Use Data Source” for new reports and specify your standard data source as the default, then select “Use Report's Data Source” as the default for saved reports. This combination provides the greatest restriction on your access to data sources. Report Designer will automatically connect to the default data source when you create or open a report, bypassing the data source selection dialogs. In addition, the File ⇒ Data Source Connections choice will be disabled, preventing you from adding or removing data source connections.

Selecting “Allow Choice of Data Source” as the default for both new and saved reports gives you the greatest flexibility in accessing data sources. You can select any available data source for a new report, change the data source for a saved report, and add and remove data source connections while using Report Designer.

Changing Regional Settings

Report Designer uses the Regional settings currently set in your Windows configuration. These settings include the following:

- Unit of measurement (inches or centimeters);
- Date format;
- Currency format;
- Number format.

Since all Regional settings are controlled by the current Windows configuration, you must use the Regional Settings option on the Control Panel to change any of these settings. See your Windows documentation for instructions.

The following sections explain the effects of Windows Regional settings on Report Designer layout display and field formats.

Unit of Measurement

The unit of measurement used by Report Designer (inches or centimeters) is determined by your Windows configuration. The Windows “Measurement system” setting determines whether the following will display in inches or centimeters:

- Horizontal position indicator in Report Designer Status Bar;
- Margin settings;
- Character field width setting specified with Format ⇒ Field;
- Line height;
- Record width/height.

Date, Currency, and Number Formats

The Windows Regional Date, Currency, and Number format settings determine the initial field formats for date and numeric fields in Report Designer. You can change field formats within Report Designer using Format ⇒ Properties.

Note that the “Position of currency symbol” and “Negative number format settings in the Windows Regional Currency dialog must be consistent — that is, if you select a currency setting that specifies a trailing symbol, you must also select a negative number format that specifies a trailing symbol.

Modifying Report Designer's Case Sensitivity

By default, Report Designer distinguishes between upper- and lower-case letters when sorting or comparing character data in Database ⇒ Sort Order and Group Order operations, filters, and calculations (that is, these operations are *case sensitive*).

To change this default behavior for sorting and comparing character data, use any text editor to edit RSW.SRT, the file that controls Report Designer's case sensitivity. This file is included with Report Designer but is not installed by Setup; copy the file to the System folder of the program directory. Directions for editing the file are contained within the file itself.

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Chapter 6

Selecting Report Data

Introduction

This chapter explains how to create an *Auto-SQL* report by using Report Designer menus and dialogs to select the files that provide data for the report. This information is presented in the following sections:

- Introduction to Database Joins
- Sample Database Joins
- Creating a Database Join
- Creating a Multi-Field Join
- Editing A Join
- Deleting a Join
- Limiting Report Results
- Changing the Master Table

You can create a report in any of the following ways:

- ◆ Build the report definition using Report Designer menus and dialogs to select a master table, specify table joins, specify sorting and grouping, develop filters, and so on. These reports are referred to as *Auto-SQL* reports.
- ◆ Enter and modify a `SELECT` statement that Report Designer then sends to your SQL software. These reports are referred to as *User-SQL* reports.
- ◆ From Data Access, either drag and drop a query onto a Report Designer layout or use Send To to start Report Designer and generate an Instant Report from a Data Access query. The resulting report is a type of User-SQL report.

This chapter explains the procedures for creating an Auto-SQL report. User-SQL reports are explained in Chapter 18.

Introduction to Database Joins

Report Designer produces reports using information stored in your database. All reports include information from at least one table (called a *master table*), which can be either a base table or a virtual table (view). In addition to the master table, reports can also draw

information from up to 99 additional tables called *related tables* that are joined to the master table or to each other. (Note that your database software may place limits on the maximum number of table joins).

To generate a report that uses information from more than one table, you define database joins among the tables you want to use. After you create a join, Report Designer can access data from the related table. For example, if you define a join that links an employee table and a department table, Report Designer can find information about each employee's department by matching the department number in the employee table with the department number in the department table.

In any database join, the table used to initiate the join is called the *controlling table*; the other table is called the *related table*.

Join Fields

To define a database join, you first select a join field from the controlling table. The initial join field you select determines which data from the controlling table will be used to search for matching records in the related table. You can use two types of join fields:

- ❑ A data field from the controlling table that contains the same type of data as the join field from the related table. For example, if your employee table and your benefits table both include fields for social security number, you can use this field as the join field.
- ❑ A calculated field based on the data in the controlling table. The value of this calculated field must also be the same as the value of the join field from the related table. For example, if the controlling table has FIRSTNAME and LASTNAME fields and the related table has a field that contains both first name and last name, you can create a calculated join field whose expression concatenates the first and last name fields in the controlling table.

You can use a calculated field as a join field only when the expression can be evaluated by your database software. A calculated field that is database-evaluatable is marked with an x in the field list. When you define a calculated field you plan to use as a join field, you can use the SQLEXP() function to force Report Designer to send it to your database software for evaluation. For more information about the SQLEXP() function, see Chapter 9, "Using Functions."

The initial join field and the join field in the related table must be the same data type, but the fields do not have to have the same name.

Multi-Field Joins

You can join tables on more than one pair of join field values. For example, suppose you have an EMP table containing FNAME (first name) and LNAME (last name) fields and a BENEFITS table containing FIRST (first name) and LAST (last name) fields. You can join the EMP table and the BENEFITS table using the concatenation of first and last names. You can create up to a maximum of 10 multi-field join pairs.

Composite Record Structure

After you define a database join, Report Designer updates the *composite record structure* that contains all the fields from all the tables used in the report, including any total and calculated fields created in Report Designer.

For example, to create a report that uses a customer table for name and address information and an orders table for order information, you might define a join that links the customer and orders tables, using customer number as the join field. This join results in a composite record structure like the one illustrated in Figure 6.1.

| Fields in CUSTOMER Table | Fields in ORDERS Table | Fields in Composite Record Structure |
|-------------------------------------|-----------------------------------|---|
| CUSTOMER NUMBER | CUSTOMER CODE | CUSTOMER NUMBER |
| COMPANY | ORDER NUMBER | COMPANY |
| ADDRESS | ORDER DATE | ADDRESS |
| CITY | TERMS | CITY |
| STATE | SHIPPING | STATE |
| CODE | | CODE |
| | | CUSTOMER CODE |
| | | ORDER NUMBER |
| | | ORDER DATE |
| | | TERMS |
| | | SHIPPING |

Figure 6.1 Sample Composite Record Structure

Types of Database Joins

The type of join you define controls how Report Designer searches for corresponding records in the related tables. You can define two types of database joins in Report Designer:

- Exact
- Approximate

Exact Joins

In an exact join, Report Designer searches for all the records in the related table that match the join field value in the controlling table. In some cases, this search results in a one-to-one match between records in the two tables. In other cases, Report Designer may find many records in the related table that match the controlling join field value.

Exact joins can be based on any type of field except a logical or text memo field.

Approximate Joins

In an Approximate join, Report Designer searches the related table for the record(s) containing the join field value nearest to the value in the controlling table join field. By selecting High Match or Low Match, you specify that Report Designer should search for the records with either the nearest higher or the nearest lower related value.

Approximate joins can be based on any type of field except a logical or text memo field.

Including Unmatched Records

You can control what action Report Designer should take when there are no matching records in the controlling and related tables. “None” is the default Include Unmatched Records setting; if Report Designer doesn’t find a match between the controlling table join field value and the related table join field value, it eliminates the entire composite record from the report.

You can select from two other alternatives in the Include Unmatched Records group box:

- On Left: Report Designer includes NULL values in the composite record when it finds no records in the related table that match the controlling table join field value. As a result, the

report will contain spaces where data from the related table would ordinarily print.

- ❑ **On Right:** Report Designer includes NULL values in the composite record when it finds no records in the controlling table that match the related table join field value. As a result, the report will contain spaces where data from the controlling table would ordinarily print.

The following sections provide examples of how each Unmatched Records setting might be used.

None

In an invoice report, suppose you defined a join between a customer table and an orders table. You might select “None” as the Include Unmatched Records setting so that Report Designer will print invoices only for those customers who have placed orders. Report Designer simply leaves out any composite record that has no order data.

On Left

Suppose you have an ORDERS table consisting of customer order records and a CUST table containing customer names and addresses. You define a join between ORDERS as the controlling table and CUST as the related table. If you want to include customer information even for those customers who have no entry in the ORDERS table, select “On Left.”

On Right

Suppose you defined a database join between an employee table (the controlling table) and an employee dependents table. For those employees who have no dependents, you still want to print the employee information; therefore, you would select “On Right” as the Include Unmatched Records setting.

Case Sensitivity in Database Joins

If your database software treats character field joins case-sensitively, then by default Report Designer distinguishes between upper and lower case data when joining tables (that is, Report Designer is *case sensitive* when joining tables). For example, Report Designer will not recognize a match between an employee name stored as Smith in an employee table and the same employee name stored as SMITH in a benefits table.

You can change this default case sensitivity behavior by editing RSW.SRT, the file that determines how Report Designer handles case when sorting and comparing character data. Instructions for editing RSW.SRT (a plain text file) are contained within the file itself.

Sample Database Joins

The following sections provide examples of these types of database joins:

- One-to-One Exact Join
- One-to-Many Exact Join
- Approximate Joins

One-to-One Exact Join

Suppose you have an ITEMS table and a PRICES table. The ITEMS table has a field named PROD_CODE that contains the product identification code; the PRICES table has a field named PROD_NO that contains the same value. If you set an Exact join between the tables by selecting PROD_CODE as the controlling join field and PROD_NO as the related join field, the result will be a one-to-one match. Report Designer will match each record from ITEMS with a single corresponding record in PRICES, as illustrated in Figure 6.2.

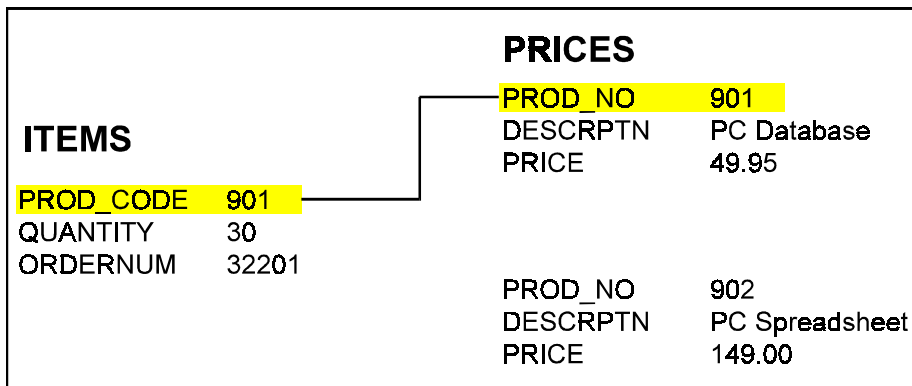


Figure 6.2 Join Relation (one-to-one)

One-to-Many Exact Join

Suppose you have an ORDERS table and an ITEMS table, each with a field (ORDERNUM) that contains an order number value. Since each

order must have a unique number, the ORDERS table contains each order number value only once. In the ITEMS table, on the other hand, a given order number might appear several times, since each order would likely include multiple items.

Therefore, if you set an Exact join based on the order number fields, the result will be a one-to-many match. For each record in ORDERS, Report Designer will use the value of the order number field to find all records in the ITEMS table that have the same value, as illustrated in Figure 6.3.

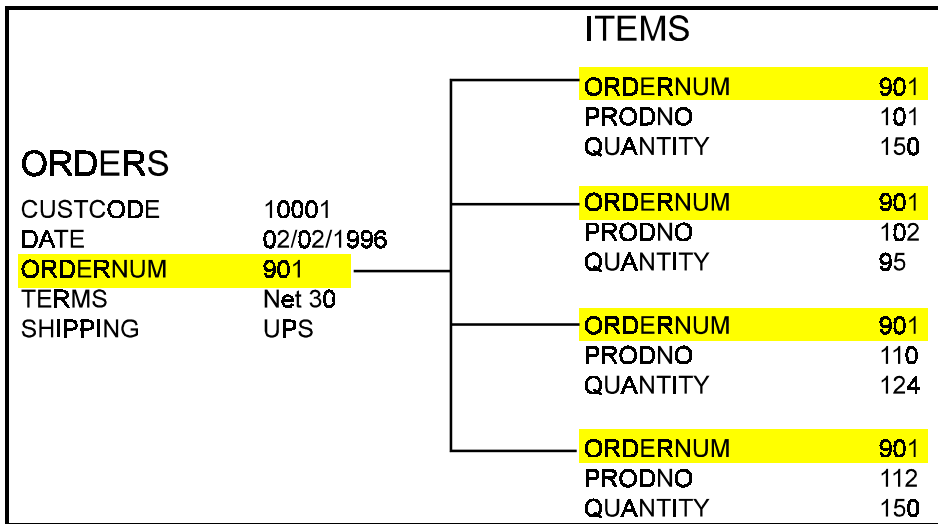


Figure 6.3 Exact Join (one-to-many)

Approximate Joins

As noted previously, in an Approximate join, Report Designer searches the related table for the record(s) containing the join field value nearest to the value in the controlling table join field. You select High Match or Low Match to specify retrieval of records with either the nearest higher or the nearest lower related value.

For example, suppose you have two tables: an ORDERS table containing customer order data and a DISCOUNT table that establishes a discount schedule based on quantity purchased. The ORDERS table includes a QUANTITY field that identifies the total number of items ordered by a given customer.

The DISCOUNT table contains two fields: one for maximum order quantity (MAXQTY) and one for corresponding discount percentages (DISC). These fields contain the following values:

| MAXQTY | DISCOUNT |
|--------|----------|
| 999 | .0 |
| 4999 | .05 |
| 14999 | .10 |
| 99999 | .15 |

These values specify a discount for each quantity range: orders with a quantity of 0 through 999 receive no discount, those with a quantity of 1000 through 4999 receive a 5 percent discount, and so on.

To create an invoice report that calculates the appropriate discount, you would specify an Approximate High-Match join using ORDERS.QUANTITY and DISCOUNT.MAXQTY as join fields. As a result, Report Designer will match each QUANTITY value with the nearest higher MAXQTY value.

For example, if the QUANTITY value is 10,000, Report Designer will match it to the next higher MAXQTY value, 14,999, and therefore assign the 10 percent discount for that record.

Creating a Database Join

Follow these steps to establish a database join for a report:

1. Select Database ⇒ Joins or the Join button.

If no joins have been set for the report, the New Join dialog box appears. If one or more joins have already been defined, the Joins dialog appears; select New to display the New Join dialog.

2. In the “From” area of the dialog, open the Field list box and select a join field from the menu of fields in the current composite record structure. The table that the selected join field belongs to becomes the controlling table for the join.

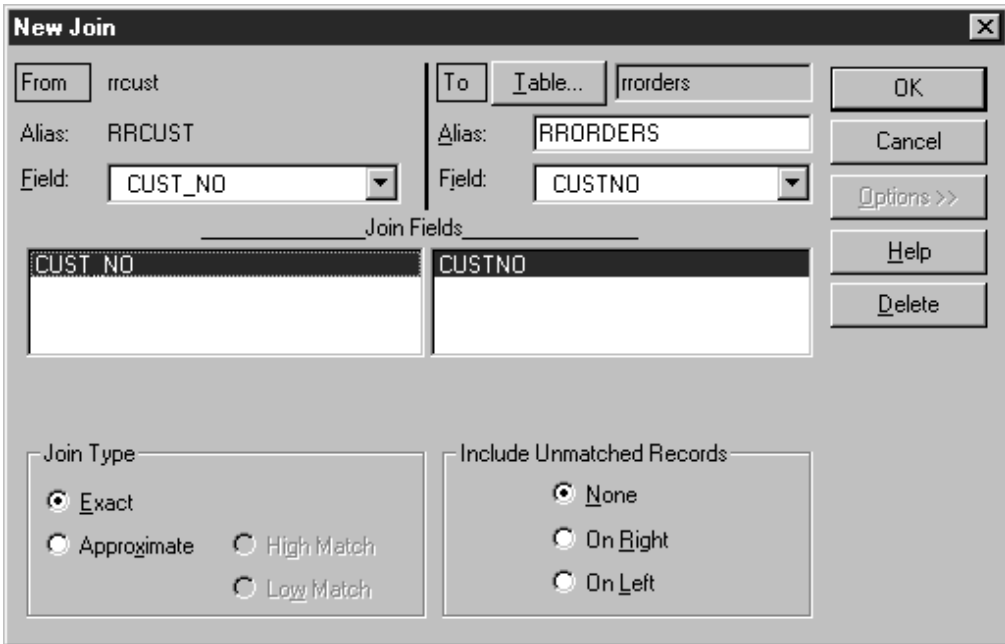


Figure 6.4 New Join Dialog Box (with Options selected)

3. In the “To” area of the dialog, select Table to display the Related Table dialog. Enter or select the name of the table you want to join to the controlling table. Select OK.
4. Assign an alias to the related table or accept the default. Report Designer uses the alias to reference fields from this table.
5. Select a join field from the related table. The value in this field must be the same data type as the value in the controlling table join field. If the related table contains a field with the same name and data type as the controlling table join field, Report Designer automatically selects this field as the related table join field.
6. If necessary, select Options and select a Join Type (Exact or Approximate) and an Include Unmatched Records option (None, On Right, or On Left); in the Join Fields box, you can also add join field pairs for Multi-Field Joins.
7. Select OK. The Joins dialog box appears, which includes a plain English description of the join you set.
8. Select Close.

Creating a Multi-Field Join

You can join tables on more than one pair of join field values. To create a table join based on two pairs of join field values:

1. Select Database ⇒ Joins or the Join button.
If no joins have been set for the report, the New Join dialog box appears. If one or more joins have already been defined, the Joins dialog appears; select New to display the New Join dialog.
2. In the “From” area of the dialog, open the Field list box and select a join field from the menu of fields in the current composite record structure. The table that the selected join field belongs to becomes the controlling table for the join.
3. In the “To” area of the dialog, select Table to display the Related Table dialog. Enter or select the name of the table you want to join to the controlling table. Select OK.
4. Report Designer assigns a default alias to the related table; if necessary, type a different alias.
5. Select a join field from the related table. The value in this field must be the same as the value in the controlling table join field.
6. If necessary, select Options and select a Join Type (Exact or Approximate) and an Include Unmatched Records option (None, On Right, or On Left).
7. In the Join Fields box, click in the area immediately below the join field pair you just set. Select a second pair of join fields from the controlling (“From”) and related (“To”) tables.
8. Select OK. The Joins dialog box appears, which includes a plain English description of the join you set.
9. Select Close.

Editing A Join

To edit an existing database Join:

1. Select Database ⇒ Joins.
The Joins dialog box appears.

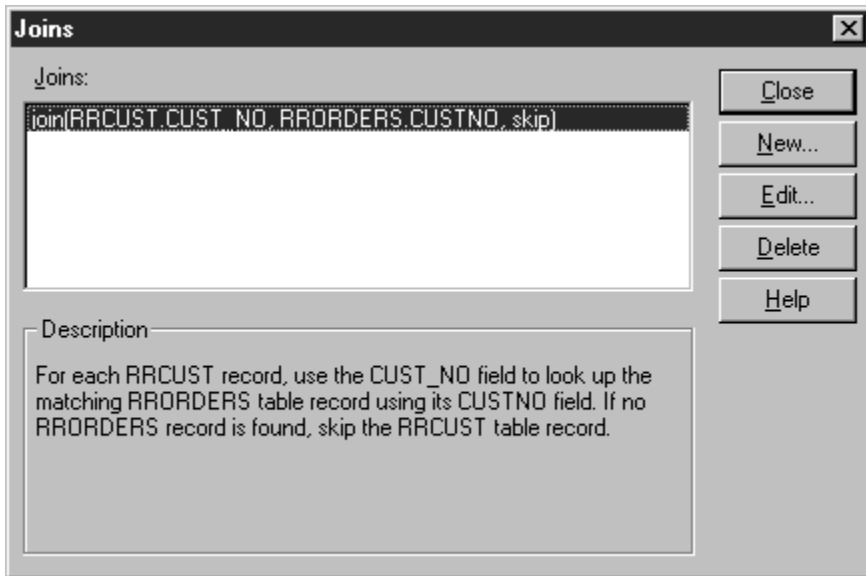


Figure 6.5 Joins Dialog

2. Highlight the join you want to change and select Edit to display the Edit Join dialog.
3. As necessary, change the selections in the From and To areas of the dialog.
4. To change the Join Type and/or Include Unmatched Records settings or to select additional join fields for a Multi-Field Join, select Options (if you are editing a multi-field join, the Options portion of the dialog is already displayed).
5. When you finish making changes, select OK.
6. Select Close.

Deleting a Join

To delete an existing database join:

1. Select Database ⇒ Joins.
The Joins dialog box appears.
2. Highlight the join you want to remove and select Delete.

If the related table controls another join, Report Designer will not allow you to delete the selected join. In this case, you must first delete the secondary join.

3. Select OK; then select Close. Note that calculated and total fields that depend on a join you delete will be removed from the report.

Limiting Report Results

Report Designer provides a Data Governor that enables you to specify a maximum number of rows to be retrieved from the database. Using this feature can dramatically reduce preview and print time while you design and modify reports, particularly if you are working with a large database.

For example, if your database contains a million rows, you can limit the result to 200 rows. You can then use this limited data to check the grouping, page headers and footers, formatting, and other features of the report's design. When you are ready to print the report, you can reset the result to include all the rows in the database.

To limit a report's result set:

1. Select Database ⇒ Limit Result to open the Limit Result dialog (see Figure 6.6).

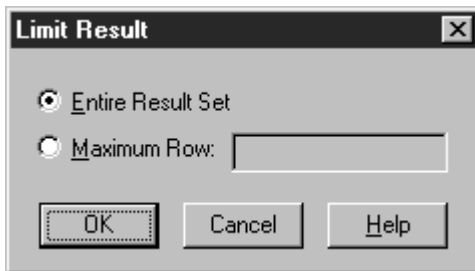


Figure 6.6 Limit Result Dialog

2. To limit the results, select “Maximum Row” and enter a number representing the number of database rows you want Report Designer to include in the result.
3. Select OK.

This feature is intended primarily as an aid to report design; Report Designer does not save maximum row settings with reports. When you save a report, the result limit is always reset to “Entire Result Set.”

Sorting and Filtering on Limited Results

Report Designer always performs sorting locally when a result limit has been set, since otherwise the database software might sort the entire database before returning the limited number of rows, slowing retrieval time. Keep this in mind when you define sort fields. Since Report Designer is sorting on the limited result, the output may not always be what you expect.

For example, you may be reporting on a 50-row table of STATES in which the state names are stored in order alphabetically, from Alabama to Wyoming. If you specify a row limit of 5, Report Designer will retrieve the first 5 rows of the table and then sort them. If you specify descending sort order, you may expect to see Wyoming in the output, but the result will include California through Alabama.

If the report includes a filter, the number of result rows might be further reduced by the filter, since Report Designer applies some filters locally. If the filter is applied locally, the selection conditions will be applied to the limited result set.

Changing the Master Table

The table that serves as the initial source of data for a report is called the *master table*; you select this table when you first create a report. After defining a report, you can select a different master table. The structure of the new master table must match the structure of the master table it is replacing. If fields from the old master table are not in the new master table, those fields will be removed from the report.

NOTE: If your report contains fields from the old master table that do not appear in the new master table, Report Designer lists the fields that will be removed from your report layout and gives you the option of confirming or canceling the change.

To change the master table for a report:

1. Select Database ⇒ Master Table. On the Master Table dialog, the current master table name appears in the Master Table group box.

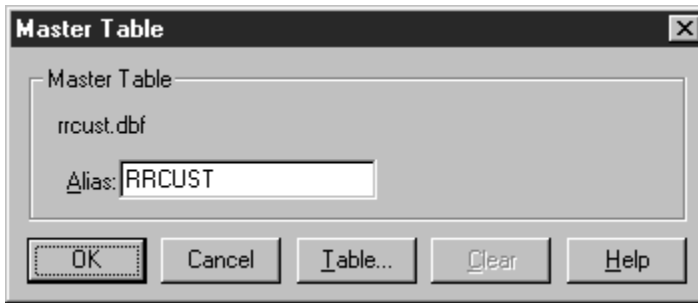


Figure 6.7 Master Table Dialog Box

2. Select Table to display the Master Table file selection dialog.
3. Select a table file from this dialog box, then select OK.

The Master Table dialog box reappears. The new master table name is displayed in the Master Table group box.

4. If necessary, type an alias for the master table in the Alias edit box. Report Designer uses the alias to uniquely identify the master table. You can accept the default value or enter an alternative alias. You are required to use an alternative alias *only* if another table used in the current report has already been assigned the default alias.

By default, Report Designer uses the file name of the master table as its alias. However, if you are using more than one table with the same name, you must specify a unique alias. Report Designer uses the alias whenever it displays a list of fields, so that you can identify the table that contains the field.

5. Select OK. If changing the master table will remove fields from the composite record structure, Report Designer displays a list of those fields. Select OK to change to the table you have selected (the listed fields are removed); select Cancel to retain the former master table.

Chapter 7

Working with Calculated Fields

Introduction

This chapter explains how to develop and use calculated fields in Report Designer. This information is presented in the following sections:

- Creating a Calculated Field
- Modifying a Calculated Field
- Purging Unused Calculated Fields
- Using Database-Evaluatable Expressions
- Calculated Field Expression Syntax

Report Designer enables you to create fields called *calculated fields* whose values are calculated as a report is generated, rather than being retrieved from the database. After you have defined a calculated field, you can:

- Insert it on a report layout;
- Use it as a join field (if it is evaluatable by the database software);
- Use it as a sort field;
- Include it in a report filter;
- Use it in other calculated or total field expressions.

Here are just a few examples of how you can use calculated fields:

- ◆ In an invoice report, you can create a calculated field that multiplies the value in a PRICE field by the value in a QUANTITY field. You can insert this field in the Record band of the report to provide a line item total.
- ◆ In an accounts receivable report, you can create a calculated field that subtracts the value in a DUE DATE field from the value in a TODAY field. You can use this field in a filter to print a report of all invoices more than 30 days outstanding.
- ◆ In a sales report, you can create a calculated field that computes monthly sales and use that field in creating various total fields to provide summary information for the year.

Creating a Calculated Field

To create a new calculated field:

1. Select Calculations ⇒ Calculated Field or click the Calc button on the Standard Toolbar.

If no calculated fields have been defined for the current report, the New Calculation dialog appears. If one or more calculated fields have already been defined, select New in the Calculated Fields dialog to display the New Calculation dialog (see Figure 7.1).

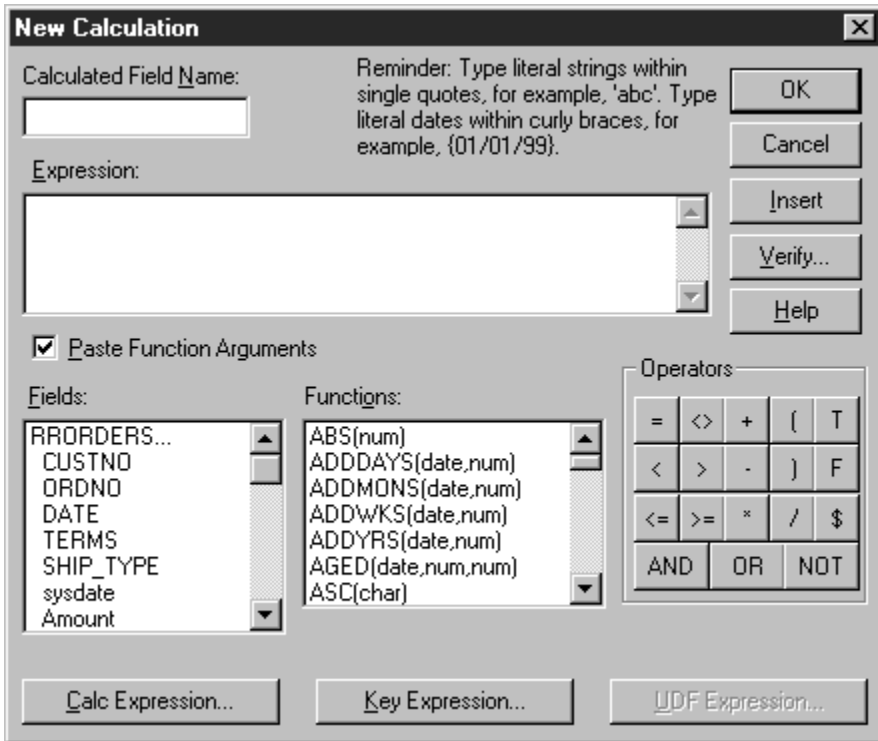


Figure 7.1 New Calculation Dialog Box

2. In the Calculated Field Name edit box, type a unique field name.
3. In the Expression edit box, define the expression using any combination of the following methods:
 - ◆ Type all or part of the expression directly in the Expression edit box.

- ◆ Insert a **field name** by double-clicking on an item in the Fields list.
 - ◆ Insert a **function** by double-clicking on an item in the Functions list.
 - ◆ Insert an **operator** by selecting the Operator buttons.
 - ◆ Insert an **existing calculated field expression** or the **condition expression** for an existing conditional total by selecting the Calc Expression button to display the Calc Expression dialog.
 - ◆ Insert a **user-defined function** formula by selecting the User Function Formula button to display the User Functions dialog.
4. Select the Verify button to determine whether the expression syntax is correct.

Report Designer displays a message box describing what, if any, syntax errors it found in the expression.
 5. When the expression is correct, select OK.

Entering a Field Name

In the “Calculated Field Name” edit box, enter a field name of up to 10 characters. The name can contain letters, numbers, or the underscore character; it must start with a letter. The field name must be unique in this report and cannot contain spaces.

By using a combination of upper and lower case, you can enter calculated field names that are easily distinguishable from the names of table fields.

Entering a Field Expression

Enter the expression for a calculated field using either or both of the following methods:

- Type the expression directly in the Expression edit box.
- Use the list menus and buttons to select from available fields, functions, operators, calculated field expressions, or user-defined function expressions.

The expression for a calculated field is a formula that determines how the field’s value is calculated. For example, the value of a calculated field whose expression is `QUANTITY * PRICE` will be the value in the `QUANTITY` field multiplied by the value in the `PRICE` field.

See the **Calculated Field Expression Syntax** section of this chapter for information about the components and the structure of Report Designer expressions.

The following sections describe techniques you can use to construct calculated field expressions in Report Designer.

Typing the Expression

You can type a calculated field expression by entering the field names, constants, operators, and/or functions that make up the expression directly in the Expression edit box. If the expression contains a predefined or user-defined function, you can type as few as the first four letters of the function (for example, cmon for CMONTH). As you enter the expression, you can format it for better readability by using Ctrl+Tab to indent and Ctrl+Enter to start a new line.

Using the List Menus and Buttons

You can easily create even a complex calculation by selecting your choices from the Fields and Functions list boxes, the Operators group box, and from the list boxes displayed when you select the Calc Expression or UDF Expression button. Using this method reduces the amount of typing required; as a result, you can build expressions more quickly and accurately.

Selecting Fields

To insert a field into the expression, select from the Fields list box, which displays the fields from the currently related tables and currently attached text file (if any), as well as all calculated and total fields created in Report Designer. To place the selected field into the expression, select Insert (or double-click on the name).

Selecting Functions

To insert a function into the expression, select from the Functions list box, which displays a menu containing more than 100 predefined functions, as well as any user-defined functions you have created. Use the Help system if necessary to find the correct syntax for each function.

To place a function in the expression, select it and choose Insert (or double-click on the name). If the function requires one or more arguments, select or enter them as necessary.

Paste Function Arguments

You can use the “Paste Function Arguments” setting as an aid to providing function arguments. When “Paste Function Arguments” is On (the default), Report Designer inserts symbols representing the function’s arguments into the expression. The symbol for the first argument is highlighted; any item you insert or type as an argument (a field or another function, for example) replaces the highlighted argument symbol.

For example, suppose that you have selected the SUBSTR function and inserted it into your calculated field expression. With “Paste Function Arguments” On, the function is inserted as follows:

SUBSTR[char.num,opt num]

In this example, the symbols in parentheses after the function name represent the arguments to SUBSTR: “char” represents a required character argument; “num” a required numeric argument, and “opt num” an optional numeric argument.

If you select a character field as the first argument, the field name replaces “char” in the expression. You can then supply the other function arguments as needed.

When “Paste Function Arguments” is Off, Report Designer inserts function names without supplying argument symbols. Instead, the function name is inserted followed by open/close parentheses — for example, SUBSTR().

Selecting Operators

To insert an operator into the expression, click on the appropriate operator from the Operator group box. See Figures 7.3, 7.4, 7.5, 7.6, and 7.7 in this chapter for explanations of these operators and descriptions of their use in expressions.

Copying Other Calculated Expressions

You can easily copy other calculated field expressions; as a result, in some cases you can simply modify an existing expression rather than starting from scratch. To insert the expression of a calculated field that you have previously defined or the condition expression of a conditional total, select the Calc Expression button. Report Designer displays a list of calculated fields and conditional total fields; as you highlight each field name, the field’s expression is also shown. Select the field whose expression you want to copy and select OK (or double-click on the field name).

Selecting a UDF Expression

To insert the expression of a user-defined function (UDF), select User Function Expression. Report Designer displays a list box of UDF names. As you move the cursor from name to name, each UDF's expression displays. Select the UDF expression you want to insert and select OK (or double-click). For more information on UDFs, see Chapter 9, "Using Functions."

Verifying Expression Syntax

When you have completed your expression, select Verify. If you have entered an expression incorrectly (for example, if you have used an unrecognized field or operator), Report Designer will notify you with an error message. When possible, the cursor will also be positioned to the place in the expression where the error occurred. Edit the existing expression. When the expression is complete and correct, select OK.

Modifying a Calculated Field

You can use either of the following methods to open the Edit Calculation dialog box to modify a calculated field:

- Either right-click on the field and select Expression or select the field and press F2.
- Select Calculations ⇒ Calculated Field and select the field to edit from the list box. Then select Edit.

The Edit Calculation dialog is the same as the New Calculation dialog, except that it shows the selected field's name and displays its expression in the Expression edit box.

1. Select Calculations ⇒ Calculated Field to display the Calculated Fields dialog.
2. In the Fields list, select the name of the calculated field you want to edit.
3. Select the Edit button to display the Edit Calculation dialog.
4. In the Calculated Field Name edit box, edit the field name if you want to change it.
5. In the Expression edit box, position the cursor where you want to make a change. Edit the expression using any combination of the following methods:

- ◆ Edit all or part of the expression by typing your changes directly in the Expression edit box.
 - ◆ Insert a **field name** by double-clicking on an item in the Fields list.
 - ◆ Insert a **function** by double-clicking on an item in the Functions list.
 - ◆ Insert an **operator** by selecting the Operator buttons.
 - ◆ Insert an **existing calculated field expression** or a **condition expression** for an existing conditional total by selecting the Calc Expression button to display the Calc Expression dialog.
 - ◆ Insert a **user-defined function** formula by selecting the User Function Formula button to display the User Functions dialog.
6. Select the Verify button to determine whether the expression syntax is correct. If Report Designer finds a syntax error in the expression, it displays a message box describing the error.
 7. Select OK to confirm the changes or select the Cancel button to close the dialog box without making any changes to the calculated field.

If the calculated field's data type changes as the result of editing and the field is used in another calculated field expression, Report Designer displays a list of calculated fields that will be affected by your change. The fields on this list will either change their data types or become impossible for Report Designer to evaluate as a result of your change.

At this point, you can select Cancel to cancel the change or OK to make the change. Selecting OK will cause the affected fields that Report Designer cannot evaluate to be flagged with question marks in the Field Menu. If the flagged fields are used in your report, you will have to edit their expressions before you can print or view the report.

If the field you are editing is used as a join field, appears in a filter, or is totaled, you will not be allowed to change the data type of its result.

NOTE Report Designer estimates the widths of calculated fields and does not automatically reset a field's width when it has been edited. Therefore, after editing a calculated field, you may need to adjust its width using the Width tab on the Properties tabbed dialog (select the

field and press F9). For instructions on changing field width, see Chapter 4, “Working with Fields.”

Adding a Field Comment

You can enter a brief comment (up to 100 characters) to serve as a “plain English” explanation of a calculated field. To do so, select Calculations ⇒ Calculated Field, highlight the field name, and select Comment to display the Field Comment dialog. Enter the explanation in the Comment box and then select OK. When a calculated field has a comment attached to it, the text of that comment is displayed in the Status Bar when the field is highlighted.

You can also enter or edit a field comment using the Comment tab on the Properties tabbed dialog (select the field and press F9).

Deleting a Calculated Field

To delete a calculated field:

1. Select Calculations ⇒ Calculated Field to display the Calculated Fields dialog.
2. In the Fields list, select the name of the calculated field you want to delete.
3. Select the Delete button.

If the calculated field you selected is used in any total fields or in other calculated fields, these fields will be deleted as well. In this case, Report Designer displays the Delete Calculation dialog box with a list of all the fields that will be deleted. You can confirm or cancel the deletions.

You cannot delete any calculated field that is used as a join field.

4. Select Close.

Purging Unused Calculated Fields

To remove all unused calculated fields from your report definition:

1. Select Calculations ⇒ Purge Calculations.

The Purge Calculations dialog box appears (see Figure 7.2).

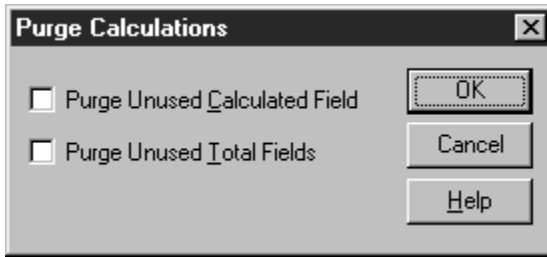


Figure 7.2 Purge Calculations Dialog

2. Click the Purge Unused Calculated Fields check box (an X appears in the box).
3. Select OK.
Report Designer lists the fields that will be removed from the report definition and prompts you to confirm.
4. Select OK to remove the listed fields or Cancel to return to the Purge Calculations dialog without removing the fields.

Using Database-Evaluatable Expressions

Whenever possible, Report Designer will generate a database-evaluatable translation of a calculated field's expression. As a result, the calculations specified by such an expression are performed directly by the database software. A calculated field consisting of a database-evaluatable expression is marked with an x in field lists and in the field's expression as shown on the Status Bar and the Field Properties dialog.

You can select a database-evaluatable calculated field as the controlling table join field when defining a table join. Also, filtering and sorting on database-evaluatable calculated fields is much more efficient than filtering and sorting on calculated fields with expressions that Report Designer cannot translate for evaluation by the database.

Report Designer includes the actual database-evaluatable translations of such calculated fields in the Report Specification (which you can print or preview by selecting "Report Specification" from the Print menu on the Report Designer File ⇒ Print dialog).

Calculated Field Expression Syntax

An expression is a formula that Report Designer uses to compute the value of a calculated field using fields, constants, operators, and functions. For example, the expression `SUBTOTAL*DISCNT` calculates discount by multiplying the value in the subtotal field by the value in the discount rate field.

To take another example, the following expression calculates the number of months between the dates in the `PAYDATE` and `INVDATE` fields:

```
MONSEBTWN (PAYDATE, INVDATE)
```

Calculated field expressions can contain functions, operators, constants, database fields, memo fields, total fields, and other calculated fields. Report Designer provides standard arithmetic, string, relational, logical, and date operators, as well as use of parentheses. In addition, you can define your own user-defined functions (UDFs) that can be saved and used in any report just like predefined functions.

The following sections explain calculated field expressions by:

- Describing the types of expressions;
- Explaining the parts of an expression: fields, constants, operators, and functions;
- Explaining how Report Designer handles errors in evaluating expressions.

Types of Expressions

Expressions are classified by the data type of the results they produce. Based on this categorization, you can develop character, numeric, date, logical, and memo expressions.

Character Expressions

A character expression produces characters or character strings. For example, `"Dear "+FIRSTNAME-" ,"` is a character expression. The character string it produces will be a salutation such as `"Dear John,"`. Note that character strings can also include numbers and punctuation marks.

Numeric Expressions

A numeric expression produces numbers. For example, 3%TOTAL is a numeric expression. The number it produces will be 3 percent of the value of the TOTAL field. Numeric expressions can also be used as logical expressions; a logical expression is considered to be true when it has a non-zero value and false when it has a zero value.

Date Expressions

A date expression produces dates. For example, ORDERDATE+30 is a date expression. The date it produces will be 30 days later than the date in the ORDERDATE field.

Logical Expressions

A logical expression produces a logical value of true or false. For example, BALANCE>100 is a logical expression. The expression produces a true value if the value in the balance field is greater than 100, a false value if the balance is less than or equal to 100. Logical expressions can also be used as numeric expressions. In this case, the true value is one and the false value is zero.

Memo Expressions

A memo expression produces a memo field. Only expressions that contain memo fields can produce memo fields. For example, you can use the IIF() function to return one of two memo fields based on a specified condition.

The following expression means that if the balance equals zero, return the THANKS memo field; otherwise, return the SENDCASH memo field:

```
IIF (BALANCE=0 , THANKS , SENDCASH)
```

Parts of an Expression

Expressions are made up of one or more of the following:

- Fields
- Constants
- Operators
- Functions
- Wildcards

For example, in the expression `SUBTOTAL*DISCNT`, `SUBTOTAL` and `DISCNT` are fields and `*` is the multiplication operator. In the expression `ADDDAYS(INVDATE,30)`, `ADDDAYS` is a function that adds a given number of days to a date, `INVDATE` is a field, and `30` is a constant. Each of these components is explained in more detail in the following sections.

Fields

Expressions can include data fields of any type (character, numeric, logical, date, memo), total fields, and other calculated fields. For example, in the expression `SUBTOTAL*DISCNT`, the `SUBTOTAL` field might be a total field that sums line item totals.

The expression for a calculated field can even contain the calculated field itself. For example, you can create a calculated field called `RUNTOTAL` that keeps a running total of the `AMOUNT` field by using the expression `RUNTOTAL+AMOUNT`. The name of the calculated field is used in the expression that defines it.

Field Names with Table Aliases

If several tables contain fields with the same name, the field name used in an expression must be preceded by a table alias. For example, if your report uses a customer table and a product table that both have a field called `NAME`, the `NAME` field must be preceded by a table alias that identifies the table it belongs to. If `RRCUST` and `RRPROD` are the table aliases, you would enter either `RRCUST.NAME` or `RRPROD.NAME` in the expression.

To ensure that appropriate aliases are used, select field names from the Fields list box (rather than typing the field names).

Field Names with Special Characters

If an expression contains the name of a field that includes one of the special characters listed below, you must precede the character with a backslash to indicate that the character is part of the field name. For example, to include the `EMP#` field in a calculated field expression, you must type `EMP\#`.

Include a backslash before each of the following characters if it appears in a field name:

+ - / * ^ % () , = # < > \$! " ' [(space)

If you insert a field whose name includes any special characters that could be interpreted as operators in the expression (for example `%` or

>), Report Designer will automatically insert a backslash before the special character to indicate that the character is part of the field name.

Constants

A constant is a value you specify as part of an expression. For example, if the expression for a field that calculates interest is balance times interest rate, the figure that represents the interest rate can be a constant. In the expression `BALANCE*.08`, `.08` is the interest rate constant.

Report Designer recognizes four types of constants:

- Numeric constants
- Character constants
- Logical constants
- Date constants

Numeric Constants

A numeric constant is a number that may contain a decimal point and may be preceded by a plus or minus sign. For example, `3.1415927` can be used as a constant in expressions that require the value of pi to seven decimal places.

Character Constants

A character constant is any character or string of characters in the ANSI character set, enclosed in double quotes, single quotes, or square brackets. For example, the expression `"Dear "+FIRSTNAME-`, `"` or `'Dear '+FIRSTNAME-'` will return a value like `"Dear John,"`.

Note that if you use a backslash, question mark, or asterisk in a character value that is the right-hand element in a comparison, you must precede the special character with a backslash to tell Report Designer to treat the character literally. For example, use `FIELD = "*"` to test for records in which `FIELD` contains only an asterisk. Without the backslash, Report Designer will treat an asterisk to the right of the operator as a wildcard character.

Logical Constants

A logical constant is a true or false value; for example, `.T.` for true and `.F.` for false. Upper or lower case may be used. Valid logical constants are `.T.`, `.F.`, `True`, `False`, `On`, `Off`, `Yes`, `No`.

For example, the following expression will return a true value if the value in the CHILDREN field is greater than 0, and a false value if it is less than or equal to 0:

```
IIF(CHILDREN>0, .T. , .F. )
```

Date Constants

You can produce date constants using the following format:

```
{<date-value>}
```

For example, the following expression adds 30 days to the literal date enclosed in curly braces:

```
ADDDAYS ({06/17/1996}, 30)
```

You can also use the CTOD() (character to date) function, which converts character strings into dates, to produce date constants. For example, in the following expression, the CTOD() function turns the two strings in quotation marks into date constants, which are then subtracted to calculate the number of days between the two dates:

```
CTOD ("3/17/96") -CTOD ("1/1/96")
```

For more information on CTOD, refer to Chapter 9, “Using Functions.”

Operators

Operators are symbols that perform operations within an expression. For example, in the expression SUBTOTAL*DISCNT, the asterisk is a symbol that performs the operation of multiplication.

Report Designer provides five types of operators:

- Arithmetic
- Date
- Character (string)
- Relational
- Logical

Arithmetic Operators

Report Designer provides the arithmetic operators shown in Figure 7.3.

| Operator | Description |
|-----------------|--------------------------------|
| + | Addition |
| - | Subtraction |
| / | Division |
| * | Multiplication |
| % | Percentage |
| ^ or ** | Exponentiation |
| (| Open parenthesis for grouping |
|) | Close parenthesis for grouping |

Figure 7.3 Arithmetic Operators

The addition, subtraction, division, and multiplication operators are used in Report Designer expressions just as they are used in algebraic expressions. The percentage operator is used as if it were “percent of,” as in the expression $10 \% 25 = 2.5$. The numbers on either side of the percent sign are multiplied together and divided by 100.

The exponentiation operator, which raises a quantity to a specified power, is placed after the quantity and before the power, as in the following expression for calculating the balance of a compound interest account:

$$\text{BALANCE} * (1 + \text{INTEREST}) ^ \text{PERIODS}$$

The parenthesis operators are used to group operations, indicating the order in which they will be performed or evaluated.

Without parentheses, arithmetic expressions are evaluated by Report Designer in the following order:

1. Unary plus and minus (positive and negative signs)
2. Exponentiation
3. Multiplication, Division, and Percentage
4. Addition and Subtraction

For example, the expression $1 + 4/2$ results in 3 rather than 2.5 because division is performed before addition.

If an expression contains several operators that have the same precedence, the operations are performed left to right. For example, in the expression $1 + 4/2 * 6/3$, the division and multiplication operations are performed left to right before the addition operation is performed. The first operation is $4/2$, resulting in 2; the second operation

multiplies 2 by 6, resulting in 12; the third operation divides 12 by 3, resulting in 4; the last operation adds 1 to 4, resulting in 5.

By using parentheses, you can deviate from the standard order of evaluation. Report Designer performs operations within parentheses first. For example, the result of $1+4/2$ is 3, but the result of $(1+4)/2$ is 2.5 because Report Designer performs the operation in parentheses first.

If parentheses are nested or embedded, as in the expression $3*((1+4)/2)$, the operation in the most deeply embedded parentheses is performed first. In this case, the first operation is $1+4$, the second is $5/2$, and the third is $3*2.5$.

Date Operators

Report Designer provides the date operators shown in Figure 7.4.

| Operator | Description |
|-----------------|---|
| + | Addition of days to a date. For example, ORDERDATE+30 |
| - | Subtraction of days from a date or subtraction of one date from another. For example, DUEDATE-CURDATE |
| (| Open parenthesis for grouping |
|) | Close parenthesis for grouping |

Figure 7.4 Date Operators

These date operators are supplemented by a number of predefined date functions such as `ADDDAYS()`, `ADDMONS()`, and `ADDWKS()` that are explained in Chapter 9, “Using Functions.”

Character Operators

Report Designer provides the string operators shown in Figure 7.5 to be used with character data.

Note that both + and - “add” strings together. The only difference between the two operators is that - removes the trailing spaces from the string that precedes it.

| Operator | Description |
|-----------------|---|
| + | Concatenation, the joining of two character strings into one. For example, FIRSTNAME+LASTNAME |
| - | Concatenation after removing trailing spaces from the string before the operator. For example, FIRSTNAME-" "+LASTNAME |
| (| Open parenthesis for grouping |
|) | Close parenthesis for grouping |

Figure 7.5 Character (String) Operators

For example, if FIRSTNAME is John and LASTNAME is Jones (assuming both fields are 10 characters):

| | | |
|------------------------|---|------------|
| FIRSTNAME+LASTNAME | = | John Jones |
| FIRSTNAME-LASTNAME | = | JohnJones |
| FIRSTNAME-" "+LASTNAME | = | John Jones |

The last expression adds a string consisting of one space to the first name field, after the - operator removes trailing spaces from the first name field.

Relational Operators

Report Designer provides the relational operators shown in Figure 7.6. Use these operators to compare numeric, date, or character data.

| Operator | Description |
|-----------------|---|
| = | Equal to |
| # or <> | Not equal to |
| < | Less than |
| <= | Less than or equal to |
| > | Greater than |
| >= | Greater than or equal to |
| \$ | Substring comparison; returns True if term to the left of the \$ is identical to or contained in term to the right of the \$, or False if not |
| (| Open parenthesis for grouping |
|) | Close parenthesis for grouping |

Figure 7.6 Relational Operators

Logical Operators

Report Designer provides the logical operators shown in Figure 7.7. These operators produce a true or false value.

| Operator | Description |
|-----------------|--------------------------------|
| NOT | Logical not |
| AND | Logical and |
| OR | Logical or |
| (| Open parenthesis for grouping |
|) | Close parenthesis for grouping |

Figure 7.7 Logical Operators

When an expression contains several of the same logical operators, the operations are performed from left to right. When an expression contains mixed logical operators, Report Designer evaluates them in the following order:

1. NOT
2. AND
3. OR

For example, in the following expression the two AND operators are evaluated before the OR operator:

```
ORDERTOT>100 AND CUSTTYPE="NC" OR BALANCE>100 AND DAYSLATE>30
```

This expression is true if ORDERTOT is greater than 100 and CUSTTYPE is NC *or* if BALANCE is greater than 100 and DAYSLATE is greater than 30.

Mixed Operator Types

When you insert more than one type of operator in a calculation, Report Designer performs operations in the following order:

1. Arithmetic, Date, and Character operations
2. Relational operations
3. Logical operations

For example, the expression $3*4<8$ OR $4>3+2$ evaluates to false, because the arithmetic operators ($*$ and $+$) are performed first, the relational operators ($<$ and $>$) are performed second, and the logical

comparison (OR) is performed last. Report Designer evaluates the expression as if it were ((12<8) OR (4>5)).

In the expression BALANCE>100 AND DAYS>30, Report Designer evaluates the relational operators (>) first. Both conditions must be true for the expression to be true; that is, the balance must be greater than 100 and the number of days must be greater than 30.

In the expression CTOD("7/1/96")<DATE+30, Report Designer adds DATE+30 first and then compares the result to the date returned by the CTOD() (character to date) function. Therefore, the expression is true only when DATE+30 results in a date that is later than 7/1/96.

Functions

Functions perform special operations such as converting data from one data type to another, calculating the elapsed time between dates, changing number formats, and conditionally returning values.

A single function can serve as a calculated field expression, or several functions can be included within a single expression. For example, to include the system date in a report, you can create a calculated field called SYSDATE, whose expression is DATE(). Inserting this field on a report layout causes the system date to print or display when the report is generated.

On the other hand, an expression can consist of a number of functions that can be nested or embedded within each other. For example, the expression CMONTH(DATE()) + ", " + STR(YEAR(DATE()), 4) contains four functions. The DATE() function returns the system date in the format 11/04/96. The CMONTH() function returns the name of the month of the date supplied by DATE(). The YEAR() function returns the four-digit year of the date supplied by DATE(). The STR() function converts this numeric year value to a four-character string, so that it can be concatenated with the name of the month string and the character constant “, ”. On 11/04/96, the value returned by the expression is November, 1995.

Report Designer provides you with over 100 predefined functions, as well as the ability to create and save your own user-defined functions. For information on creating your own functions, see Chapter 9, “Using Functions.”

Wildcard Characters

You can use wildcards for pattern matching in calculated field expressions that compare dates. For example, the expression `DATE={01/*/96}` will match any date in January of 1996.

In conjunction with the `LIKE()` function, you can also use wildcards for pattern matching in character strings. For example, the expression `LIKE("Hen*",NAME)` will match any value of `NAME` starting with "Hen", including names such as Henrietta, Henry, and Henderson.

Figure 7.8 lists the wildcard characters used to define patterns in expressions. For more information about wildcards, see Chapter 11, "Creating Filters."

| Character | Meaning |
|----------------------------------|---|
| <code>_</code> or <code>?</code> | In a character expression, matches any single character in the same position in the field. |
| <code>%</code> or <code>*</code> | In a character expression, matches any group of characters (including no characters). |
| <code>*</code> or <code>@</code> | In a date expression, <code>*</code> matches any value in that part of the date (e.g. <code>01/*/96</code>); <code>@</code> matches any value that corresponds to that part of the system date (e.g. <code>@/10/96</code>). |

Figure 7.8 Wildcards in Expressions

You can use date wildcards in calculated fields that use functions (for example, `CTOD("@/*/96")`). In relational expressions, use date wildcards for pattern matching in the right side of the expression; wildcard characters in the left side of the expression are treated as literals.

You can also use date wildcards in calculated field expressions that use the functions `CASE()` and `INLIST()`. In the following example, the function `INLIST()` uses the first argument as the test value and compares it with each value in the list:

```
INLIST (DATE, {*/10/96}, {3/*/96})
```

When a match is found, `INLIST()` returns the number corresponding to the position of the matching value in the list. If the value of `DATE` is the 10th of any month in 1996, `INLIST()` returns 1; if the value of `DATE` is any day in March of 1996, `INLIST()` returns 2. If no match is found, `INLIST()` returns 0.

Error Conditions in Evaluating Expressions

If Report Designer encounters an error in evaluating a calculated field expression, when you print or preview a report it displays asterisks as the error value in the field and in any fields that reference the calculated field. For example, if Report Designer tries to evaluate a date expression that adds a specified number of days to an empty date field, it will display ****/**/**** as the result, since it cannot produce a proper date.

To take another example, if Report Designer tries to evaluate a numeric expression that requires it to divide by zero, it will display asterisks as the result, since division by zero is an undefined operation. If this calculated field were totaled, the total value would also display as asterisks.

The standard error value sorts as the last value in an ascending sort or the first value in a descending sort.

Customizing Error Values

You can create your own error values for specific expressions by using the IIF and ERROR functions. If you know that an expression may result in an error, you can specify the error value that will display. For example, the expression **(AVERAGE=INVAMT/QUANTITY)**, which divides total invoice amount by quantity ordered, will result in an error when the quantity ordered is 0. To print 0 instead of the standard error value of asterisks, you can use the following expression.

```
IIF (ERROR (AVERAGE) , 0 , AVERAGE)
```

If evaluation of the **AVERAGE** field results in an error, then **ERROR(AVERAGE)** will be true, leading the IIF function to return 0. If evaluation of the **AVERAGE** field does not result in an error, **ERROR(AVERAGE)** will be false, leading the IIF function to return the result of the **AVERAGE** expression.

To print a string instead of a number as an error value, you might use an expression like:

```
IIF (ERROR (AVERAGE) , "N/A" , STR (AVERAGE) )
```

Field Width Errors

Asterisks in a numeric calculated or a total field may also indicate the field width is not large enough to accommodate the result. Report Designer estimates the number of characters required for each calculated and total field based on the fields and functions used in the expression. You may need to adjust this width using the Width tab on the Properties tabbed dialog, especially if you have edited the expression since the initial field width estimate was established. See Chapter 4, “Working with Fields,” for information on changing field width.

Chapter 8

Working with Total Fields

Introduction

Total fields are those fields that contain summary information such as subtotal and total figures. The value of a total field is calculated by Report Designer according to the total options you select. You can create total fields, insert them in reports, and manipulate them just as you do data and text fields.

This chapter explains how to create and use total fields in Report Designer. This information is presented in the following sections:

- Creating and Editing Totals
- Customizing Totals
- Using Total Fields in Reports
- Using Totals in Calculations
- Sorting and Filtering on Totals

Creating and Editing Totals

You can define summary information such as totals and averages for any field (except text memo fields) in the composite record structure. Once you define a total field, you can insert it in your report layout or use it as part of a calculated field or another total field.

You can modify existing total fields by using any of the following methods to open the Edit Total dialog:

- Select the field and press F2;
- Right-click on the field and select Expression;
- Select Calculations ⇒ Total Field (or click the Totals button) and double-click the name of the field to be edited.

Procedures for Creating Totals

Briefly, the procedure you follow to create and use total fields includes these steps:

1. Select Calculations ⇒ Total Field (or click the Totals button).

If no totals have yet been defined for the current report, the New Total dialog appears. If one or more totals have already been defined, select New in the Total Fields dialog to display the New Total dialog (see Figure 8.1).

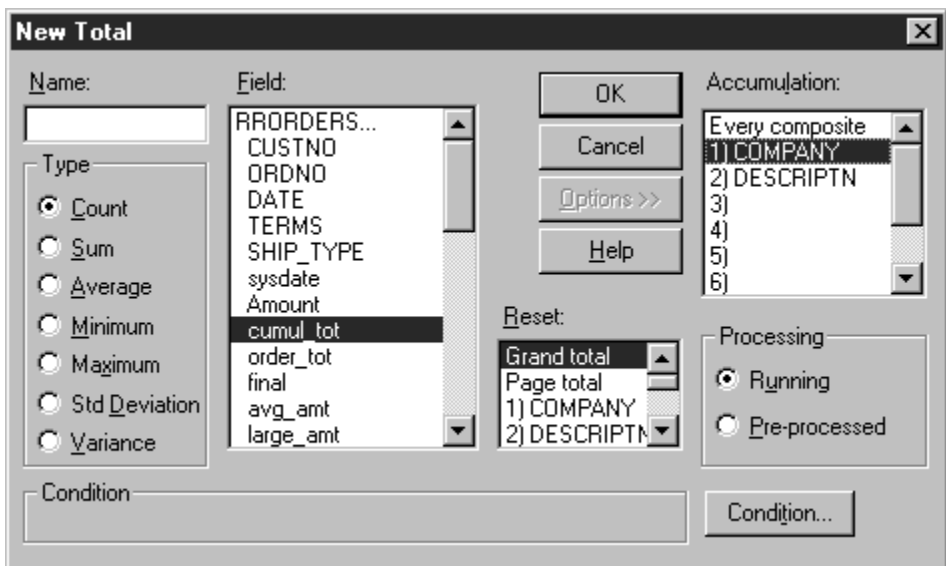


Figure 8.1 New Total Dialog (with Options selected)

2. In the Name box on the New Total dialog, enter a field name of up to 10 characters. The name can contain letters, numbers, or the underscore character; it must start with a letter. The field name must be unique in the current report.
3. Select the type of total from a list that consists of Count, Sum, Average, Minimum, Maximum, Standard Deviation, and Variance. Figure 8.2 explains each of the total types.
4. In the Field list box, select the field to total.

5. Select when to reset the total: at the end of the report (Grand), at the end of each page, or after the last record in a numbered group (for any one of 8 groups).
6. To change the accumulation frequency or processing mode, select the Options button.

The dialog box expands to display the Accumulation and Processing options. Select the options you want. The default accumulation frequency is “Every composite,” and the default processing mode is “Running”; these defaults are appropriate for most totals.

7. Optionally select Condition to make this total a *conditional total*. On the Total Condition dialog enter an expression (referred to as a *condition expression*) that specifies the circumstances in which Report Designer will calculate this total (see the **Entering a Condition Expression** section of this chapter for more information about conditional totals).
8. Select OK. Insert the field on your report or use it in another total or calculated field.

The following sections explain each of these steps in detail.

Selecting a Total Type

Select a total type from the Type group box: Count, Sum, Average, Minimum, Maximum, Standard Deviation, or Variance (see Figure 8.2 for an explanation of these total types).

| Select | To Produce |
|---------------|---|
| Count | Count of the records that contain data in the field. Records that contain no data in the selected field (that is, the field is blank or contains a zero formatted with “Show Zero” turned off) are not included in the count. |
| Sum | Sum of the values in a numeric or logical field for all records containing data. (True = 1; False = 0). |
| Average | Average (mean) of the values in a numeric or logical field for all records that contain data. Records in which the field is blank or contains a zero formatted with “Show Zero” turned off are not included in the average. |
| Minimum | Lowest value for a numeric field, false for a logical field if any records contain false values, earliest date for a date field, first value in alphabetical order for a character field. Only records containing data are considered. |
| Maximum | Highest value for a numeric field, true for a logical field if any records contain true values, latest date for a date field, last value in alphabetical order for a character field. Only records that contain data are considered. |
| Std Deviation | For numeric fields, the square root of the variance. Standard deviation is calculated using the following formula, where n is the total number of values, v_i is the i th value, and avg is the average of all values: $\sqrt{\frac{\sum (v_i - avg)^2}{n}}$ |
| Variance | For numeric fields, the average of $NUMBER^2$ minus (average of $NUMBER$) ² , where $NUMBER$ is a numeric field and the average is computed based on the number of records totaled (not including records with blanks or zeros formatted with “Show Zero” turned off). See the formula illustrated in the explanation of Standard Deviation. Both variance and deviation measure the degree to which individual field values vary from the average of all values totaled. |

Figure 8.2 Total Choices

Selecting a Field to Total

After selecting a total type, select a field to which you can apply the method of totaling you have selected. If you have selected Sum, Average, Deviation, or Variance, Report Designer lists only numeric and logical fields. Figure 8.3 shows the valid total types for each field data type.

| Data Type of Field Being Totaled | Valid Total Types |
|---|--|
| Numeric | Count, Sum, Average, Minimum, Maximum, Deviation, Variance |
| Character | Count, Minimum, Maximum |
| Date | Count, Minimum, Maximum |
| Logical | Count, Sum, Average, Minimum, Maximum, Variance, Deviation |
| Memo | None |

Figure 8.3 Valid Total Types

Selecting a Total Reset Level

Next, select a total reset level (see Figure 8.4). Your choice determines when Report Designer resets the value of the total field to zero. If you reset on a group field, Report Designer produces group subtotals. If you select Page Total, Report Designer produces page subtotals. If you select Grand Total, Report Designer produces grand totals for the entire report.

For example, if STATE is your first group field, you can select 1) STATE to calculate total sales by state. In this case, Report Designer produces a subtotal of sales and resets this subtotal to zero whenever a new state group begins.

| Select | To Produce a |
|----------------------|--|
| Grand Total | Total for the entire report |
| Page Total | Page total for each page in the report |
| Numbered Group Field | Subtotal for each new group |

Figure 8.4 Total Reset Options

Creating Totals for Multiple Fields

You can select multiple fields on the layout and have Report Designer automatically create totals for those fields and insert the totals on a new band line.

To create totals for multiple fields:

1. Highlight all of the fields you want Report Designer to create totals for (Ctrl-click on each field).
2. Select Calculations ⇒ Auto Total to display the Auto Total dialog.
3. On the Auto Total dialog, select a total type and reset level for the totals to be created. Note that only total types valid for all selected fields are available for selection.
4. When you are finished defining the totals, select OK. Report Designer assigns a name to each of the total fields in the batch. The name is in the form **Totalnnnnn**, where *nnnnn* is a number in the range 00001 to 99999 and is incremented by 1 for each total in the batch. (If necessary, you can change the field names individually later using Calculations ⇒ Total Field Edit.)

Report Designer creates the totals and inserts them in a band appropriate for the reset level you specified (Summary band for Grand totals, Page Footer for Page totals, and Group Footer for Group totals).

Editing a Total Field

To edit a total field that has been inserted on the layout, first either select the field and press F2 or right-click on the field and select Expression to display the Edit Total dialog (this dialog is the same as the New Total dialog, except that it shows the name and settings for the total currently being edited).

To edit a total field that is not on the layout, first select Calculations ⇒ Total Field or the Totals button on the Standard Toolbar. On the Total Fields dialog (see Figure 8.5), double-click the name of the field to be edited to display the Edit Total dialog.

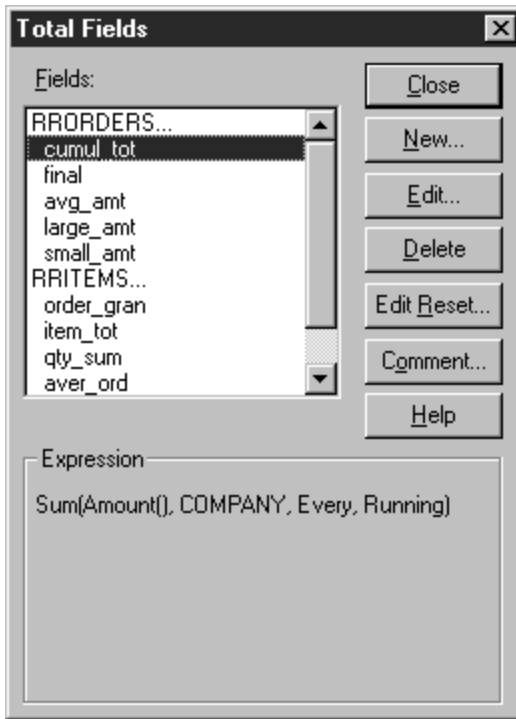


Figure 8.5 Total Fields Dialog Box

After you have opened the Edit Total dialog, follow these steps to edit the total field:

1. Optionally change the name.
2. As necessary, change the field to be totaled, the total type, and the reset level.
3. Select Options to change the accumulation frequency, select a processing option (Running or Pre-processed), or enter a condition expression.
4. When you have made all necessary changes to the total field, select OK on the Edit Total dialog; then select Close.
5. Select OK.

Note that you can select the Edit Reset button on the Total Fields dialog (Figure 8.5) to change the reset level of all fields that reset at a particular level. For example, if you select “Page total” in the Change From box and “DESCRIPTN” in the Change To box on the Edit Reset

dialog, all fields previously defined to reset at the end of each page would instead reset when the value of the DESCRIPTN field changed.

Deleting a Total Field

To delete a total field:

1. Select Calculations ⇒ Total Field to display the Total Fields dialog (Figure 8.5).
2. In the Fields list, select the name of the total field you want to delete.
3. Select Delete.

If the total field you selected is used in any calculated fields or other total fields, these fields will be deleted as well. In this case, Report Designer shows you a list of all the fields that will be deleted and asks you to confirm or cancel the deletions. Note that you cannot delete any total field that is used as a join field.

4. Select Close.

If you delete a total that is used in a filter, you must edit the filter.

Customizing Totals

When you create a total field, Report Designer automatically adopts a default method of accumulating the total value and a default mode of total processing. This default behavior is appropriate for most total values. However, you can select Options on the New/Edit Total dialog to change this default behavior.

The following sections explain how to change Report Designer's total accumulation frequency and total processing.

Specifying a Total Accumulation Frequency

When you create a total field, Report Designer automatically sets the accumulation frequency of the total according to the default rules defined in the next section. This accumulation frequency determines how often Report Designer adds to the total as the report is processed.

The accumulation frequency automatically set by Report Designer is appropriate for most commonly generated totals. However, the Accumulation setting (accessed by selecting Options on the New/Edit

Total dialog) gives you the flexibility to override the automatic frequency to handle special cases.

Changing the Total Accumulation Frequency

Figure 8.6 illustrates a situation in which you might want to change the total accumulation frequency. Suppose you want two different totals: a count of distinct products and a count of sales transactions. Counting the Product field will give you the total sales transactions. With an accumulation frequency of “Every composite,” Report Designer will add to the product count every time it reads a record, resulting in a count of five.

To get the first total, a count of distinct products sold, you can use the Accumulation setting to change the accumulation frequency of the Product count field. If PRODUCT is the first group field, you would set the accumulation frequency to 1)PRODUCT. Using this method of accumulation frequency, Report Designer will add to the product count every time the value in the Product group field changes, resulting in a count of two.

| Product | Quantity | Date |
|-------------|----------|----------|
| PC Com | 10 | 01/02/96 |
| PC Com | 20 | 01/02/96 |
| PC Com | 5 | 01/25/96 |
| PC Graphics | 25 | 01/02/96 |
| PC Graphics | 10 | 01/30/96 |

Figure 8.6 Sample Report

You can change the accumulation frequency to any of the following:

- Every composite — accumulates total once per composite record
- 1 through 8 — accumulates total once per selected group
- Once per page — accumulates total once per page

You can see what accumulation frequency is assigned to any total field inserted on the report by looking at the Expression that displays in the Total Fields dialog box or in the Status Bar when the field is highlighted. For example, the following Expression indicates that the total field provides a grand count of the PRODUCT field accumulated every time the value of the PRODUCT field changes:

`Count (PRODUCT, Grand, PRODUCT, Running)`

Default Accumulation Frequency Rules

When you create a total field, Report Designer automatically sets the accumulation frequency to either once per record or once per group according to the following rules:

- Totals of totals are accumulated when the field being totaled resets. This accumulation frequency also applies to totals of calculated fields that are derived from totals.
- Counts of group fields are accumulated once per group.
- Totals of all other fields are accumulated after each record.

Selecting a Total Processing Option

By default, Report Designer calculates the value of a total progressively as it reads each record that contributes to the total. This default processing enables you to see the running value of the total at any point in the report. For example, you can create an invoice with a running total of line amounts by putting an invoice group total field on a Record line in the report.

However, Report Designer allows you to change this processing mode so that the total value is pre-processed — that is, the value is computed before the report records are output. This pre-processing mode enables you to have access to the final value of the total earlier than it would ordinarily be calculated. As a result, you can place such a total field anywhere in the report, even at the beginning. Any total field except those listed in the **Restrictions on Pre-Processed Totals** section in this chapter can be designated as pre-processed.

In order to change Report Designer's method of total processing for a given total field, select Options from the New/Edit Total dialog and then select a processing method:

- Running — Report Designer's default method of total processing, in which a total is calculated progressively as each record contributing to the total is read.
- Pre-processed — A method of calculating the value of a total field by performing a preliminary read-through of the data to accumulate totals designated as pre-processed.

You can see what processing mode is assigned to any total field by looking at the Expression that displays in the Total Fields dialog box or in the Status Bar when the field is highlighted. For example, the

following Expression indicates that the field provides a pre-processed grand count of the CUST_NO field:

```
Count (CUST_NO, Grand, Every, Pre-processed)
```

When To Use Pre-Processed Totals

You should specify that a total be pre-processed when you want to:

- Place a grand total field in the Title band or a group total in a Group Header band of a report.
- Create a calculated field such as a “percent-of-total” field that compares a value in each record to a final value based on all records in a group or report.
- Use a total field to sort a report.
- Use a total field in a filter.

For example, the report excerpt in Figure 8.7 illustrates the use of pre-processed totals in Group Headers, sorting, and calculated fields. This report contains two total fields that have been designated as pre-processed. The first field, PRODCNT, counts the number of orders for each product. This field is pre-processed so that it can appear in the Group Header (“There are PRODCNT orders for PRODUCT.”).

The second field, PRODSUM, sums the number of units ordered for each product. This field is pre-processed so that it can appear in the Group Header (“A total of PRODSUM units were ordered.”), be used to sort the report in descending order based on total number of units sold, and be used in the calculated field expression that produces the figures in the “Percent of Units Ordered” column on the report.

Note that defining pre-processed totals affects the performance of your report, since Report Designer must read through records twice: once to calculate pre-processed totals and once to perform other calculations (if any) and generate the report. Also, the temporary files that Report Designer creates to generate pre-processed totals can in some instances be quite large.

WEEKLY PRODUCT ORDER SUMMARY

There are 10 orders for PC Database. A total of 315 units were ordered.

| <u>Order Number</u> | <u>Quantity</u> | <u>Percent of Units Ordered</u> |
|---------------------|-----------------|---------------------------------|
| 32205 | 50 | 15.9% |
| 32202 | 50 | 15.9% |
| 32207 | 45 | 14.3% |
| 32210 | 45 | 14.3% |
| 32201 | 30 | 9.5% |
| 32211 | 25 | 7.9% |
| 32216 | 25 | 7.9% |
| 32208 | 20 | 6.3% |
| 32206 | 15 | 4.8% |
| 32214 | 10 | 3.2% |

There are 6 orders for PC Spreadsheet. A total of 90 units were ordered.

| <u>Order Number</u> | <u>Quantity</u> | <u>Percent of Units Ordered</u> |
|---------------------|-----------------|---------------------------------|
| 32205 | 30 | 33.3% |
| 32212 | 15 | 16.7% |
| 32206 | 15 | 16.7% |
| 32210 | 10 | 11.1% |
| 32203 | 10 | 11.1% |
| 32202 | 10 | 11.1% |

Figure 8.7 Sample Report Using Pre-Processed Totals

Restrictions on Pre-Processed Totals

Pre-processed totals are accumulated in a single preliminary pass through the data that, for reasons of performance, does not involve page formatting. For this reason, the following types of total fields *cannot* be designated as pre-processed:

- Pagination-related totals — These totals include page totals, totals whose accumulation frequency has been set to once per page, and totals involving calculated fields that use PAGENO(). This restriction results from the exclusion of page formatting from the preliminary total evaluation process.
- Totals of certain pre-processed totals — These totals include any total-of-total fields where the total-of-total accumulates more frequently than the field being totaled resets (for example, a grand total, accumulating once per composite, of a pre-processed group one subtotal). This restriction results from the fact that pre-processed totals are evaluated in a single extra

pass. For totals such as these to be pre-processed, two extra passes would be required: one for the first pre-processed total and another for the field that totals it.

- ❑ Totals that reset or accumulate on group fields that are themselves pre-processed totals (or calculated fields whose expressions include pre-processed totals). This restriction is also a result of the single pass used to accumulate pre-processed totals. For such fields, two passes would be required.

Entering a Condition Expression

For any total field, you can specify a *condition expression* that controls the circumstances in which Report Designer will calculate that total. To do so, you select Condition on the New/Edit Total dialog and enter a valid expression to control the total field. Syntax for a condition expression is the same as that for calculated field expressions.

To specify a conditional total, follow these steps:

1. On the New/Edit Total dialog, select Condition to display the Total Condition dialog.
2. Enter the condition expression. You can build the expression by selecting from database or calculated fields, operators, expressions, and UDFs (the condition cannot be total-related).
3. When the expression is complete, select Verify to ensure that the syntax is correct; then select OK. The condition expression is displayed at the bottom left of the dialog.

For example, suppose you have a report that summarizes product sales. The report includes a QUANTITY field containing the number of items for each order. You can create a conditional total that provides the total number of items ordered for each product number. To create such a conditional total for items with product number 901, you would first create a total named Tot901 (for example) that is a Grand Sum of the QUANTITY field. You would then select Condition and enter the following condition expression:

```
PRODUCT_NO = "901"
```

You could then place the TOT901 field in the report's Summary area to provide a grand total of items ordered for that product code. You could create similar conditional total fields for all remaining product numbers.

To see whether a condition has been attached to a total field, look at the Expression description that displays in the Status Bar when the field is highlighted. If a condition expression is attached, the description includes “Conditional.”

Adding a Field Comment

You can enter a brief comment (up to 100 characters) to serve as a “plain English” explanation of a total field. To do so, select Calculations ⇒ Total Field, highlight the field name, and select Comment to display the Field Comment dialog. Enter the explanation in the Comment box and then select OK. When a total field has a comment attached to it, that comment is displayed in the Status Bar when the field is highlighted.

You can also enter or edit a field comment using the Comment tab on the Field Properties tabbed dialog (select the field and press F9).

Using Total Fields in Reports

After you define a total field, you can insert it on the report layout just as you insert any other field. Where you place a total field on your layout usually depends on the reset level you have selected.

To insert a total field, double-click on the layout, select Insert Field, or press F11. Select from the list of database, total, and calculated fields.

Since Report Designer calculates totals cumulatively as it reads each record that contributes to the total, the total field’s final value is not available until the last record being totaled has been read (unless you defined the field as a pre-processed total).

For this reason, you typically place total fields on lines that correspond to their reset levels as follows:

- Place a group total on a Group Footer band line of the same level as the total’s reset level (for example, put a total that resets on the ORDER_NO field on a Group Footer band line associated with the ORDER_NO field).
- Place a page total on a Page Footer band line.
- Place a grand total on a Summary band line.

Each of these placement options is explained in more detail in the following sections, along with the option of placing a total field so that you can see the progressive accumulation of its value.

Note that the Processing setting (accessed by selecting Options on the New/Edit Field Total dialog box) enables you to create pre-processed totals that make a field's "final" value available for use earlier than it would ordinarily be calculated.

When a total field is highlighted on the layout, the Status Bar displays a description of the field using the following syntax:

`type (field, reset, accumulation, processing, [conditional])`

In this total description, "type" indicates the total type (for example, Sum); "field" is the name of the field being totaled; "reset" indicates when the total is reset to zero; "accumulation" indicates the frequency with which the total is added to; "processing" indicates when the total value is computed — before records are output (Pre-processed) or progressively as records are read (Running); and "conditional" (if present) indicates that a condition expression has been attached to the total.

Inserting Group Totals

A group total field is typically placed on a Group Footer band line defined at the same level as the field's reset level. For example, if you selected a group field as the reset level for a total, you will usually place the total on a Group Footer band line associated with the same field.

Figure 8.8 shows a report layout that contains a total of the AMOUNT field. The group field selected as the reset level for the total is CUST_ID. Each line marked 1GF-CUST_ID is a Group Footer band line associated with CUST_ID. The second of these lines contains the total field selected to reset each time the value of CUST_ID changes.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|-------------|-------------------|------|-----------------|--------------|---|---|
| Page Header | Customer | Item | Quantity | Amount | | |
| Record | <xxxxxxxxxxxxxxxx | <xx | 999 | (\$999.99) | | |
| | | | | | | |
| | | | Customer-Total: | (\$9,999.99) | | |
| 1GF-CUST_ID | | | | | | |

Level 1
Group Total

Figure 8.8 Report Layout for Group Total

The layout in Figure 8.8 produces the report excerpt in Figure 8.9.

Selecting and Analyzing Data

| <u>Customer</u> | <u>Item</u> | <u>Quantity</u> | <u>Amount</u> |
|-----------------|-------------|-----------------|---------------|
| Joyce Adams | 903 | 36 | \$216.00 |
| | 901 | 24 | \$96.00 |
| Customer Total: | | | \$312.00 |
| Fred Anderson | 910 | 18 | \$162.00 |
| | 902 | 12 | \$60.00 |
| | 901 | 36 | \$144.00 |
| Customer Total: | | | \$366.00 |

Figure 8.9 Report with Group Totals

A total is produced for each new group of records, that is, every time the value of the CUST_ID field changes.

Inserting Page Totals

A page total field is typically placed in the Page Footer band so that it will print at the end of each page of a report. For example, Figure 8.10 shows the placement of the page sum of AMOUNT. Note that page totals of group totals include only groups that end on the page.

| Page Header | 0 | 1 | 2 | 3 | 4 | 5 |
|-------------|---|-------------------|-----|-----------------|--------------|---------------------|
| Record | 0 | <xxxxxxxxxxxxxxxx | <xx | 999 | (\$999.99) | |
| 1GF-CUST_ID | 0 | | | Customer Total: | (\$9,999.99) | |
| Page Footer | 0 | Page- 9999 | | Page Total: | (\$9,999.99) | ← Page Total |

Figure 8.10 Report Layout for Page Total

The layout shown in Figure 8.10 produces the report excerpt shown in Figure 8.11.

| <u>Customer</u> | <u>Item</u> | <u>Quantity</u> | <u>Amount</u> |
|-----------------|-------------|-----------------|---------------|
| Joyce Adams | 903 | 36 | \$216.00 |
| | 901 | 24 | \$96.00 |
| | | • | |
| | | • | |
| | | • | |
| Page 1 | | Page Total: | \$2,135.00 |

Figure 8.11 Report with Page Total

Inserting Grand Totals

A grand total field is typically placed at the end of a report, in the Summary band. For example, Figure 8.12 shows the placement of the grand sum of the AMOUNT field.

| | | | | | |
|-------------|---|------------------|------|--------------------------|---------------|
| Page Header | 0 | Customer | Item | Quantity | Amount |
| Record | 0 | <xxxxxxxxxxxxxxx | <xx | 999 | (\$999.99) |
| 1GF.CUST_ID | 0 | | | Customer-Total: | (\$9,999.99) |
| Summary | 0 | | | Total-for-All-Customers: | (\$99,999.99) |

Figure 8.12 Report Layout for Grand Total

The layout shown in Figure 8.12 produces the report excerpt shown in Figure 8.13.

| Customer | Item | Quantity | Amount |
|--------------------------|------|----------|------------|
| Joyce Adams | 903 | 36 | \$216.00 |
| | 901 | 24 | \$96.00 |
| | | • | |
| | | • | |
| | | • | |
| Wanda Warner | 910 | 18 | \$162.00 |
| | 902 | 12 | \$60.00 |
| | 901 | 36 | \$144.00 |
| Total for All Customers: | | | \$9,366.00 |

Figure 8.13 Report with Grand Total

Displaying Progressive Accumulation

You can also place total fields on lines where they will display the progressive accumulation of the total value as records, groups, or pages are processed. For example, you might create a total field with Grand Total as the reset level and place it on any Group Footer or Record line (placing it on a Record line will give you the maximum amount of detail). For example, Figure 8.14 shows the placement of a Grand Total field that accumulates the amount owed.

| | | | | | |
|-------------|---|-------------------|------------|--------------|---------|
| Page Header | 0 | Customer | Amount Due | Total Owed | |
| Record | 0 | <xxxxxxxxxxxxxxxx | (\$999.99) | (\$9,999.99) | Total ← |

Figure 8.14 Report Layout for Progressive Total

The report layout shown in Figure 8.14 produces the report excerpt shown in Figure 8.15. Note that placing the total field on a Record line displays the progressive accumulation of the Grand Total as each record is evaluated.

| <u>Customer</u> | <u>Amount Due</u> | <u>Total Owed</u> |
|-----------------|-------------------|-------------------|
| Joyce Adams | \$162 | \$162 |
| | \$60 | \$222 |
| | \$144 | \$366 |
| Fred Anderson | \$138 | \$504 |
| | \$117 | \$621 |
| | \$108 | \$729 |
| | • | |

Figure 8.15 Report with Progressive Total

Using Totals in Calculations

After you create a total field, you can use it in calculated field expressions, as well as create other totals based on it. For example, if you created a total field, ORDERTOT, that sums the line items on an invoice, you could create a calculated field to compute a 5 percent sales tax. You could also create a Grand sum of the ORDERTOT field to calculate the value of all invoices generated as the report was run.

The sales tax calculation based on the ORDERTOT field would typically be placed in the ORDERNO Group Footer or, if each invoice were a separate page, in a Page Footer line.

Sorting and Filtering on Totals

In many cases, you can sort and filter on total fields. The following sections explain how to use totals in sorting and filtering and identify restrictions that Report Designer imposes in using totals in sorts and filters

Sorting on Totals

You can sort on any total field that has been designated as pre-processed using the Processing setting on the New/Edit Total dialog. For example, to produce a report listing products sorted by total number of orders, you would first create a pre-processed order total field. Then, you would select the Sort button to specify the order total field as the first sort field. (See Figure 8.7 for an example.)

You can also sort on calculated fields whose expressions include pre-processed totals, unless the expressions also include table fields. For example, you can sort on a calculated field whose expression uses a pre-processed customer total field and a pre-processed order total field (e.g. `ORD_TOT/CUST_TOT`). However, due to the nature of Report Designer's total processing, you cannot sort on a calculated field that figures a percent-of-total by dividing a table field by a pre-processed total (e.g. `ITEMCOST/ORD_TOT`). (See Chapter 10, "Sorting and Grouping Data," for more information on sorting on pre-processed totals.)

Filtering on Totals

When you filter on a total field (or on a calculated field whose expression includes a total field), records that do not satisfy the conditions established by the filter will not contribute to the total. For this reason, total field filters might not select the records you expect unless you designate the total fields as pre-processed. For example, to print only those invoices for amounts over \$1,000, make the invoice total pre-processed and define a filter condition that selects all records in which the value of this total field is greater than 1000. (See the section on filter techniques in Chapter 11, "Creating Filters.")

Two restrictions apply to Report Designer's total processing:

- You can filter on a pre-processed total only if no other pre-processed total is defined at a higher (more inclusive) reset level. For example, you cannot filter on a pre-processed group total if the report also contains pre-processed grand totals.
- You cannot filter on running totals if your report contains any pre-processed totals.

Chapter 9

Using Functions

Introduction

Report Designer offers over 100 predefined functions you can use in calculated field expressions. A predefined function is a formula that performs a specified operation such as returning the system date or the current page number. Full explanations of all predefined functions are provided in the **Alphabetical List of Functions** section of this chapter.

You can also define and save your own user-defined functions (UDFs) that can be used in any report just like predefined functions. For information about UDFs, see the **Using User-Defined Functions** section of this chapter.

Alphabetical List of Functions

Figure 9.2 lists and briefly describes the predefined functions, using the abbreviations listed in Figure 9.1 to indicate the input and output data type of each expression. Note that the *N* data type accommodates any numeric value.

| Abbreviation | Refers To |
|---------------------|--|
| A | A table alias |
| C | A character expression |
| D | A date expression |
| DT | A datetime expression |
| I | An item (interval, numeric, character, date, memo, or logical) |
| L | A logical expression |
| N | A numeric expression |
| T | A time expression |

Figure 9.1 Abbreviations for Function Data Types

Brackets around the abbreviation for an input argument (for example [A]) indicate that the argument is optional.

Selecting and Analyzing Data

| Function | Description | Input Data Type | Output Type |
|-----------------|---|------------------------|--------------------|
| ABS | Returns absolute value | N | N |
| ADDDAYS | Adds number of days to date | D,N | D |
| ADDMONS | Adds number of months to date | D, N | D |
| ADDWKS | Adds number of weeks to date | D, N | D |
| ADDYRS | Adds number of years to date | D, N | D |
| AGED | Determines aged status of date | D,N,N | L |
| ASC | Converts character to numeric code | C | N |
| AT | Searches substring | C, C, [L] | N |
| CAPFIRST | Converts first letter to upper case | C,[C] | C |
| CASE | Returns result based on value of item | I,I,[I,...]default | I |
| CDLL | Enables calling of a DLL-based function | C, C, C | C |
| CDOW | Converts day of date to character | D | C |
| CHR | Converts numeric code to character | N | C |
| CMONTH | Converts month of date to character | D | C |
| COPY | Returns number of copy currently printing | none | N |
| CTDT | Converts character value to datetime | C | DT |
| CTOD | Converts character to date | C | D |
| CTOS | Converts character interval to seconds | C | DT |
| CTOT | Converts character value to time | C | DT |
| DATE | Returns system date | none | D |
| DAY | Returns day-of-month number | D | N |
| DAYSBTWN | Calculates number of days between dates | D, D | N |
| DOW | Calculates day-of-week number | D | N |
| DQTR | Calculates date of first day of quarter | D | D |
| DTEADD | Adds specified interval to datetime | I,N,DT | DT |
| DTEDIFF | Calculates difference between datetime values | I,DT,DT | N |
| DTEPART | Returns specified interval as an integer | I,DT | N |
| DTOC | Converts date to character string | D, [N] | C |
| DTTOC | Converts datetime to character string | DT | C |
| ERROR | Returns true if item has error value | I | L |
| EXP | Calculates the value of e**n | N | N |
| FLIP | Swaps words before and after a character | C, C | C |
| FUTURE | Determines whether date is in the future | D, [N] | L |
| HALF | Returns calendar half-year of date | D | N |
| IIF | Selects one of two expressions | I, I, I | I |
| INLIST | Looks up value in list of values | I, [I,...] | N |
| INRANGE | Determines if value is within range | I, I, I | L |
| INT | Discards digits to right of decimal | N | N |
| ISALPHA | Determines if first character is a letter | C | L |

Figure 9.2 Function Descriptions (Continued on Next Page)

| Function | Description | Input Data Type | Output Type |
|-----------------|--|------------------------|--------------------|
| ISLOWER | Determines if first character is lower case | C | L |
| ISNULL | Determines if field contains NULL value | C | L |
| ISUPPER | Determines if first character is upper case | C | L |
| LEFT | Selects substring starting at left | C, N | C |
| LEN | Calculates length of string or field | C | N |
| LIBNAME | Returns full path of current report library | none | C |
| LIKE | Determines if second value matches pattern | C,I | L |
| LOG | Returns natural logarithm | N | N |
| LOWER | Converts upper to lower case | C | C |
| LTRIM | Removes leading blanks | C | C |
| MAX | Returns higher of two values | N, N | N |
| MIN | Returns lower of two values | N, N | N |
| MOD | Returns the remainder of division | N, N | N |
| MONLEN | Returns number of days in month | D | N |
| MONSBTWN | Calculates months between two dates | D, D | N |
| MONTH | Returns month-of-year number | D | N |
| NDOW | Returns date of next specified DOW | D,N | D |
| OVER | Determines whether date is past specified number of days | D,N | L |
| PAGENO | Returns current report page number | none | N |
| PAST | Determines whether date is in the past | D,[N] | L |
| PDOW | Returns date of previous specified DOW | D,N | D |
| PREVIOUS | Returns value in previous composite record | I | I |
| QTR | Calculates calendar quarter of date | D | N |
| QUERY | Returns current filter expression | none | C |
| RECNO | Returns composite record number | [A] | N |
| REPLICATE | Repeats character expression | C, N | C |
| REPNAME | Returns name of current report | [N] | C |
| RIGHT | Selects substring ending at right | C, N | C |
| RIPARAM | Returns value of Viewer parameter | C | C |
| ROUND | Rounds off number | N, N | N |
| RR | Disables calculated field formula translation | I | none |
| RRUNIN | Returns 1 or RI_ID value in Viewer | none | N |
| RTRIM | Removes trailing blanks | C | C |
| SOUNDEX | Returns value of string based on sound | C, [C] | C |
| SPACE | Produces a string of blank spaces | N | C |
| SPELLNUM | Spells a number | N | C |

Figure 9.2 Function Descriptions (Continued)

Selecting and Analyzing Data

| Function | Description | Input Data Type | Output Type |
|-----------------|--|------------------------|--------------------|
| SQLEXP | Convert string to evaluable expression | C | C,N,D, or L |
| SQRT | Calculates square root | N | N |
| STOC | Converts seconds to character string | DT | C |
| STR | Converts number to character | N, [N], [N] | C |
| STRCOUNT | Returns number of occurrences of substring | C,C,[L] | N |
| STRREP | Replaces one substring with another | C,C,C [L] | C |
| STRSEARCH | Returns starting position of nth substring | C,C,N,[L] | N |
| STUFF | Replaces part of string with new string | C, N, N, C | C |
| SUBDAYS | Subtracts number of days from date | D, N | D |
| SUBMONS | Subtracts number of months from date | D, N | D |
| SUBSTR | Selects substring | C, N, [N] | C |
| SUBWKS | Subtracts number of weeks from date | D, N | D |
| SUBYRS | Subtracts number of years from date | D, N | D |
| TIME | Returns system time | none | C |
| TODATE | Converts datetime to date | DT | D |
| TOTIME | Converts datetime to time | DT | T |
| TRANSFORM | Returns formatted character data | C or N, C | C |
| TRIM | Removes trailing blanks | C | C |
| TTOC | Converts time to character | DT or T | C |
| TTOS | Converts a time value to seconds | DT | N |
| UDFNAME | Returns pathname of UDF library | none | C |
| UPPER | Converts lower to upper case | C | C |
| VAL | Converts character string to number | C | N |
| WDCOUNT | Returns number of words in string | C, [C] | N |
| WEEK | Calculates week-of-month for date | D | N |
| WKSBTWN | Calculates weeks between two dates | D, D | N |
| WORD | Returns <i>n</i> th word of a character string | C, N, [C] | C |
| YEAR | Returns year number of date | D | N |
| YRSBTWN | Calculates years between two dates | D, D | N |

Figure 9.2 Function Descriptions (Continued)

ABS Returns the absolute value of a numeric expression. The result is a positive number.

Syntax: ABS(N), where N is any numeric expression.

Example: To calculate the absolute value of the difference between two numeric fields NUM1 and NUM2, create the field:

ABS(NUM1 – NUM2)

If the value of NUM1 is 50 and the value of NUM2 is 100, then the value of ABS(NUM1 – NUM2) is 50.

ADDDAYS Calculates a date by adding a number of days to a date. Note that you can also add dates by using the + operator.

Syntax: ADDDAYS(D,N) where D is a date expression and N is a numeric expression representing a number of days.

Example: To calculate the date a payment is due by adding the payment terms (NET) to the date the product was ordered (ORDERDATE), create the field:

ADDDAYS(ORDERDATE,NET)

If the value of NET is 30 and ORDERDATE is 4-1-96, then the value of ADDDAYS(ORDERDATE,NET) is 5-1-96.

ADDMONS Calculates a date by adding a number of months to date.

Syntax: ADDMONS(D,N) where D is a date expression and N is a numeric expression representing a number of months.

Example: To calculate the date of the final payment of a loan by adding the number of months (TERMS) to the starting date of the loan (LOANINIT), create the field:

ADDMONS(LOANINIT,TERMS)

If the value of LOANINIT is 01/10/92 and the value of TERMS is 48, then ADDMONS returns 01/10/96.

ADDWKS Calculates a date by adding a number of weeks to a date.

Syntax: ADDWKS(D,N) where D is a date expression and N is a numeric expression representing a number of weeks.

Example: To calculate a date for a return visit to the doctor by adding the number of weeks to the current appointment date (CURDATE), create the field:

ADDWKS(CURDATE,6)

If the value of CURDATE is 01/10/96, then ADDWKS returns a value of 02/21/96.

ADDYRS Calculates a date by adding a number of years to a date.

Syntax: ADDYRS(D,N) where **D** is a date expression and **N** is a numeric expression representing a number of years.

Example: To calculate a follow-up date for an inoculation by adding the number of years of immunity (IMMUNYRS) to the most recent inoculation date (INOCDATE), create the field:

ADDYRS(INOCDATE,IMMUNYRS)

If the value of INOCDATE is 04/01/89 and IMMUNYRS is 7, then this calculated field yields 04/01/96.

AGED Returns logical True if date is aged between specified values.

Syntax: AGED(D,N1,N2) where **D** is a date expression and **N1** and **N2** are numeric expressions representing numbers of days.

Example: To print an overdue notice if a payment is between 30 and 60 days after the order date, use the following expression:

IIF(AGED(ORD_DATE,30,60), "Payment is now overdue.
Please remit now to avoid a late penalty.", "")

ASC Converts the first character of a string of characters to its numeric value. This function is the opposite of CHR.

Syntax: ASC(C) where **C** is a character expression.

Example: To convert the first character of a product code (PRODCODE) to its numeric value, create the field:

ASC(PRODCODE)

If the value of PRODCODE is ABC, then ASC returns the numeric value of the letter A, which is 65 (decimal).

AT Searches for a substring within a character expression and returns the number of the starting position of the substring within the expression or 0 if the substring is not found.

Syntax: AT(C1,C2,L) where **C1** is the substring character expression and **C2** is the character expression within which the substring is to be located. The optional logical argument **L** controls the case sensitivity of the function. When **L** is true, the function is case sensitive; when it is false, the function is case insensitive. When this argument is not provided, the function uses the COMPARECASE case sensitivity setting in the RSW.SRT file (see Chapter 5, "Setting Defaults," for information about configuring Report Designer's case sensitivity).

Example: The following expression returns 11 since 'substring' starts at the 11th character in 'this is a substring':

AT('substring','this is a substring')

CAPFIRST Converts the first character of each word in a character string to upper case and any other character to lower case. A word is a group of contiguous characters followed by a space, a hyphen, or any user-designated characters.

Syntax: CAPFIRST(C1,C2) where **C1** is a character expression and **C2** is an optional character expression that specifies the word break character(s), the character(s) marking word separations. If **C2** is absent, Report Designer uses the space and hyphen characters to determine word breaks. If you supply **C2**, Report Designer uses only **C2** to determine word breaks (see WDCOUNT for an example).

Example: The expression: CAPFIRST("tHiS iS aN exAMple.") returns: This Is An Example.

CASE Returns a result based on the value of an item. You can use CASE instead of a nested IIF expression to return results conditionally when there is more than one condition.

Syntax: CASE(I, value-1, result-1,...,value-n, result-n, default) where all values must be of the same data type as **I** (item); and all results must be of the same data type, which may be different from the data type of the item. If **item** is equal to **value-1**, Report Designer returns **result-1**; if equal to **value-n**, Report Designer returns **result-n**, and so on. If **item** is not equal to any listed value, Report Designer returns default. This function selects on the basis of equality. Memo fields may be used as results, but not as test values.

Example: To assign different strings based on the value of PRODCODE, create the field:

```
CASE(PRODCODE, "101", "Desk chair", "102",  
"Printer stand", "103", "File cabinet", "")
```

This CASE expression is simpler than but equivalent to the following nested IIF expression:

```
IIF(PRODCODE = "101", "Desk chair",  
IIF(PRODCODE = "102", "Printer stand",  
IIF(PRODCODE = "103", "File cabinet", "")))
```

CDLL Enables calling of a DLL-based function from within a report. You might use CDLL() when you want to write a DLL-based function to perform an operation that Report Designer's functions don't support, such as a trigonometric operation. CDLL() also gives you access from Report Designer to functions that are used by other elements of your application, since DLLs are available to all parts of a Windows application.

Syntax: CDLL(string1,string2,string3) where **string1** is the name of the DLL that contains the function, **string2** is the name of the function, and **string3** is an argument being passed to the DLL function.

Example: For example, the calculated field expression:

```
CDLL("CONVERTS.DLL","MILES_KILO",STR(DISTANCE))
```

uses the STR function to convert the value of DISTANCE into a character string and passes the string value to the MILES_KILO function in CONVERTS.DLL, which converts the distance in miles to kilometers.

CDLL() expects a boolean return value from the called DLL function: true to indicate the function executed successfully; false to indicate an error. If the DLL returns a false value, CDLL() returns an error string. If the DLL function executes successfully, it should overwrite its input string with the output string to be returned by the Report Designer CDLL() function. Report Designer passes the input and output strings using an 8000-byte buffer. (For more information about CDLL(), see the *Developing Applications* documentation.)

CDOW Returns the name of the day of the week of a given date.

Syntax: CDOW(D) where **D** is a date expression.

Example: To print or display the day of the week for a date field INITDATE, create the field:

CDOW(INITDATE)

If the value of the INITDATE field is 12-7-96, then CDOW yields "Saturday."

CHR Converts a numeric value to one character based on the character set of the font applied to the field; that is, constitutes a change in data type from numeric to character. You can use CHR to print or display a character for which there is no keyboard representation (for example, the bullet character). This function is the opposite of ASC.

Syntax: CHR(N) where **N** is an integer from 1 to 255.

Example: CHR(212) returns the trademark symbol (™) when the Symbol font is applied to the field.

CMONTH Returns the name of the month of a given date.

Syntax: CMONTH(D) where **D** is a date expression.

Example: To print or display the name of the month for a field INITDATE, create the field:

CMONTH(INITDATE)

If the value in the INITDATE field is 4-1-96, then CMONTH yields April.

COPY Returns number of the report copy currently being printed.

Syntax: COPY(), no arguments.

Example: If you are printing 12 copies of a report, you can include the number of each report copy in a Footer line. Create a calculated field that contains the COPY() function and insert the field on the Footer line:

----- Copy ## of 12 -----

For the third copy, this line produces:

----- Copy 3 of 12 -----

CTDT Converts a date or datetime character expression to a datetime value.

Syntax: CTDT(C) where C is a character expression representing a date or datetime. The expression must be entered in the format specified by the Windows International date setting, using spaces, hyphens (-), slashes(/), or periods (.) as separator characters. If a two-digit year is encountered, the current century is assumed. For example, 97 is assumed to be 1997 for a 20th-century report; for a 21st-century report, it would be assumed to be 2097. Report Designer's date range is 03/01/1600 through 12/31/2400.

Example: CTDT("12 20 96") returns a datetime value of 12/20/96 12:00:00am (when the Windows date format is set to "Short").

CTOD Converts a date entered or stored as a character expression to date data type. If applied to an invalid date string, CTOD produces the error value. You can substitute a wildcard of * or @ for the month, day, and/or year. Since wildcard dates are used only for selection purposes (that is, in filters), Report Designer will display them as asterisks if you insert them on the report layout.

Syntax: CTOD(C) where C is a character expression representing a date. The expression must be entered in the format specified by the Windows International date setting, using spaces, hyphens (-), slashes (/), or periods (.) as separator characters. If a two-digit year is encountered, the current century is assumed. For example, 97 is assumed to be 1997 for a 20th-century report; for a 21st-century report, it would be assumed to be 2097. Report Designer's date range is 03/01/1600 through 12/31/2400.

Example: CTOD("12 20 96") returns a date of 12/20/96 (when the Windows date format is set to "Short").

Example: Define a field to use in a filter. Name the field FILTDATE:

CTOD(STR(INVMONTH,2)+"/*/96")

If INVMONTH is 7, the value of FILTDATE is then " 7/*/96" and a filter can be used to select all records for the month of July 96.

CTOS Converts a character expression to a number of seconds using the format specified as the second argument to the function. You can use this function to convert a character field value that represents a time interval (rather than an absolute time) into a number of seconds.

Syntax: CTOS(*C,Keyword*) where **C** is a character expression representing a time interval and **Keyword** specifies how the function will interpret the input value. Valid Keywords are as follows:

| Keyword | Meaning |
|----------------|-----------------------|
| hh | Hours |
| mm | Minutes |
| ss | Seconds |
| hh:mm | Hours:Minutes |
| hh:mm:ss | Hours:Minutes:Seconds |
| mm:ss | Minutes:Seconds |

If no Keyword is specified, the default is hh:mm:ss (hours:minutes:seconds).

Example: Assume that you have a CHARSEC field that contains character values representing a number of seconds. For a CHARSEC value of 30:30, the field CTOS(charsec,mm:ss) would return a numeric value of 1830, since the **mm:ss** keyword tells CTOS to interpret 30:30 as 30 minutes:30 seconds. The field CTOS(charsec,hh:mm:ss) would return a numeric value of 109800, since the hh:mm:ss keyword tells CTOS to interpret 30:30 as 30 hours:30 minutes.

CTOT Converts a character expression representing a time of day to a time field. You can use this function to convert a character field value that represents an absolute time into an appropriately formatted time field.

Syntax: CTOT(*C*) where **C** is a character expression representing a time of day. The character expression must be in either 24-hour format or in 12-hour format with am, pm, or international time suffixes.

Example: Assume that you have a CHARTIME field that contains character values representing a time of day. For a CHARTIME value of "0:20", the field CTOT(chartime) would return a time

value of 12:20:00am. For a CHARTIME value of "8:20pm" the field CTOT(chartime) would return a value of 8:20:00pm.

DATE Returns the system date at the time the report was started. This date is maintained by your computer or entered when you start your computer.

Syntax: DATE() no arguments

Example: To print/display the date in a Header line, create a field SYSDATE where SYSDATE is a calculated field that contains the function DATE(), and then insert the field into a Header line:

----- Date printed: mm/dd/yy -----

This line then produces:

----- Date printed: 4/1/96 -----

DAY Returns the number of the day in the month.

Syntax: DAY(D) where **D** is a date expression.

Example: To print or display the day of the month for each invoice date INV_DATE, create the field:

DAY(INV_DATE)

If the value of INV_DATE is 01/16/96, DAY(INV_DATE) returns 16.

DAYSBTWN Calculates the number of days between two dates. This date difference is derived by subtracting **D2** from **D1**.

Syntax: DAYSBTWN(D1,D2) where **D1** and **D2** are both date expressions.

Example: To calculate the number of days between the date a payment is due (DUEDATE) and the current system date DATE(), create the field:

DAYSBTWN(DATE(),DUEDATE)

Sample Data:

| <u>DATE()</u> | <u>DUEDATE</u> | <u>DAYSBTWN(DATE(),DUEDATE)</u> |
|----------------|----------------|----------------------------------|
| 4/23/96 | 4/13/96 | 10 |
| 4/12/96 | 4/12/96 | 0 |
| 4/13/96 | 4/23/96 | -10 |

DOW Converts the day-of-week of a given date expression to a number from 1 to 7. Sunday is day 1, Monday is day 2, etc.

Syntax: DOW(D) where **D** is a date expression.

Example: To convert the day of the week for a field INVDATA to its numeric form, create the field:

DOW(INVDATA)

Sample data:

| <i>INVDATA</i> | <i>Day #</i> |
|----------------|--------------|
| 01/11/96 | 5 |
| 01/13/96 | 7 |
| 01/15/96 | 2 |

DQTR Returns the date of the first day of the calendar quarter for a given date. (See also the QTR function.)

Syntax: DQTR(D) where **D** is a date expression.

Example: To calculate the first day of the quarter for the date in a date field INITDATE, create the following field:

DQTR(INITDATE)

If the value of INITDATE is 5-4-96, then DQTR(INITDATE) yields 4-1-96, the first day of the second quarter.

DTEADD Adds a specified interval to a datetime.

Syntax: DTEADD(I,N,DT) where **I** specifies the interval to be added, **N** is how many of the specified intervals to add, and **DT** is the datetime expression being added to. The following table lists time periods and corresponding intervals; for this function, y (Day of Year) and w (Weekday) are equivalent to d (Day):

| <i>Interval</i> | <i>Time Period</i> |
|-----------------|--------------------|
| yyyy | Year |
| q | Quarter |
| m | Month |
| y | Day of Year |
| d | Day |
| w | Weekday |
| ww | Week |
| h | Hour |
| n | Minute |
| s | Second |

Example: To add 5 weeks to the value of the datetime field DTEND, create a calculated field with the following expression:

DTEADD(ww,5,DTEND)

DTEDIFF Calculates the difference between two datetime values.

Syntax: DTEDIFF(I,DT1,DT2) where **I** is the interval used to calculate the difference between **DT1** and **DT2**. Valid interval values are the same as those for the DTEADD function.

Example: To calculate the difference in days between the values of the datetime fields DTSTART and DTEND, create a calculated field DAYDIF with the following expression:

DTEDIFF(d,DTSTART,DTEND)

This expression yields the following sample results:

| <u>DTSTART</u> | <u>DTEND</u> | <u>DAYDIF</u> |
|----------------|--------------|---------------|
| 01/10/96 | 03/14/96 | 64 |
| 04/13/96 | 06/20/96 | 68 |

DTEPART Returns as an integer the specified part of a given datetime expression. Valid interval values are the same as those for the DTEADD function.

Syntax: DTEPART(I,DT) where **I** is the interval and **DT** is the datetime expression.

Example: If the date portion of a datetime field named DTEND is 04/06/96, the expression DTEPART(ww,DTEND) produces a value of 14, indicating the 14th week of the year.

DTOC Converts a date expression to a character expression in the format specified by the Windows Regional date setting. When the optional numeric argument is 1, DTOC returns a character string in the format yyyyymmdd (useful for sorting by date).

Syntax: DTOC(D,N) where **D** is a date expression and **N** is an optional numeric expression.

Example: The expression DTOC(DATE) yields the following sample results when the Windows date format is “Short” and Day and Month leading zeros are specified:

| DATE | Character Conversion |
|-------------|-----------------------------|
| 01/10/96 | "01/10/96" |
| 01/13/96 | "01/13/96" |

The expression DTOC(DATE,1) yields the following sample results:

| DATE | Character Conversion |
|-------------|-----------------------------|
| 01/10/96 | "19960110" |
| 01/13/96 | "19960113" |

By using 1 as the numeric argument, you can use a simple DTOC expression like DTOC(DATE,1) to replace expressions like the following:

`STR(YEAR(DATE))+STR(MONTH(DATE))+STR(DAY(DATE))`

DTTOC Converts a datetime expression to a character string.

Syntax: DTTOC(DT) where **DT** is a datetime expression.

Example: To convert the date and time values of a datetime field named DTEND to character strings, create a calculated field with the expression DTTOC(DTEND).

ERROR Returns logical true if the input item has the "error value" or logical false if not. Report Designer represents an error value as asterisks. This function allows you to define and use your own error return value. For example, you may want to print "You have an error" instead of a string of asterisks.

Syntax: ERROR(I) where **I** can be any data type.

Example: To print 0 instead of * as the error value for the numeric field AMOUNT, create the following field:

`IIF(ERROR(AMOUNT),0,AMOUNT)`

Use this calculated field instead of AMOUNT.

EXP Calculates the value of e^{**n} where **e** is the base of natural logarithms.

Syntax: EXP(N) where **N** is a numeric expression.

Example: To determine the value of $e^{**2.000}$, create the following field:

`EXP(2.000)`

The result is 7.3891

FLIP Exchanges the data before a specified character with the data following the character. Commonly used to flip last name with first name based on a comma between the two parts of the name. See examples.

Syntax: FLIP(C1,C2) where **C1** and **C2** are character expressions. **C1** is the character expression to flip and **C2** is the “flip character,” often a comma.

When **C2** is a comma, FLIP eliminates the leading and trailing spaces for the part following the comma and puts a space between the flipped parts. See examples.

C2 may also include an asterisk before or after the flip character. The asterisk causes Report Designer to return only part of **C1**. Placing an asterisk after the flip character returns only the data after the flip character. Placing an asterisk before the flip character returns only the data before the flip character. See examples.

Example: To flip the data in a FULLNAME field from last-name, first-name order to first-name last-name order:

```
FLIP(FULLNAME,',')
```

Sample data:

| <u>FULLNAME</u> | <u>FLIP(FULLNAME,',')</u> |
|----------------------|---------------------------|
| Britten Jr., Roland | Roland Britten Jr. |
| Jefferson, Elvira A. | Elvira A. Jefferson |
| Adams, Abner N. | Abner N. Adams |
| Gladdin III, John | John Gladdin III |

Example: To return only the first name of FULLNAME:

```
FLIP(FULLNAME,',*')
```

Sample data:

| <u>FULLNAME</u> | <u>FLIP(FULLNAME,',*')</u> |
|----------------------|----------------------------|
| Britten Jr., Roland | Roland |
| Jefferson, Elvira A. | Elvira A. |

Example: To return only the last name of FULLNAME:

```
FLIP(FULLNAME,'*')
```

Sample data:

| <u>FULLNAME</u> | <u>FLIP(FULLNAME,'*')</u> |
|----------------------|---------------------------|
| Britten Jr., Roland | Britten Jr. |
| Jefferson, Elvira A. | Jefferson |

FUTURE Returns logical True if supplied date is in the future and logical False if not. If the optional argument “1” is included, the current date is considered to be in the future.

Syntax: FUTURE(D,[1]) where **D** is a date expression and **1** is an optional numeric argument that causes the current date to be considered as in the future.

Example: To determine whether the value in a field named DUE_DATE is in the future, use the following expression:

FUTURE(DUE_DATE)

HALF Returns the calendar half-year of the specified date. If date is in the range January 1 to June 30, this function returns 1; if in the range July 1 to December 31, it returns 2.

Syntax: HALF(D) where **D** is a date expression.

IIF Evaluates a condition and returns one of two values, depending on whether the condition is true or false.

Syntax: IIF(condition,true-value,false-value) where **condition** can be any data type. (See the Notes below for an explanation of how non-logical expressions are evaluated as True or False.) The values returned, **true-value** and **false-value**, must be the same data type, but need not be the same data type as **condition**. **True-value** and **false-value** can be memo fields. By using a memo field as the **true-value** and empty quotation marks ("") as the **false-value**, you can use IIF to return an empty memo field without having an empty field in your text memo file.

If condition involves comparison of character expressions, the result that IIF returns may depend on how Report Designer is configured to handle case sensitivity (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Note: If **condition** is a logical expression, IIF returns **true-value** if the expression is TRUE and **false-value** if the expression is FALSE.

Example: To print the title of each name in a mailing-labels report based on the gender of the addressee, create the field:

IIF(SEX = 'F','Ms. ', 'Mr. ')

Note: If **condition** is a character expression that evaluates to NULL or empty (""), IIF returns **false-value**. If the expression is not empty, IIF returns **true-value**.

Example: To print “Missing” if the character field TITLE is empty and “Okay” if it contains information:

```
IIF(TITLE,"Okay","Missing")
```

Note: If **condition** is a numeric expression, IIF returns **false-value** if the expression evaluates to NULL or 0 and **true-value** if the expression evaluates to non-zero.

Example: To print memo field THANKS if DUE is 0 or memo field SENDCASH, if not:

```
IIF(DUE,SENCASH,THANKS)
```

Note: If **condition** is a date expression that evaluates to empty (for example, a date field that contains no date within it), IIF returns **false-value**; otherwise, IIF returns **true-value**.

Example: To return logical T if DATE contains data or logical F if not.

```
IIF(DATE,.,T.,F.)
```

Note: If **condition** is a memo field, IIF returns **true-value** if the memo field contains characters, even if the characters are only spaces and tabs. Otherwise, IIF returns **false-value**.

Example: To return the string “See Comment” if COMMENT contains characters and the string “No Comment” if COMMENT does not contain characters:

```
IIF(COMMENT, "See Comment", "No Comment")
```

INLIST Compares a value with each item in a list of values to determine if the value is included in the list. Report Designer compares the first value with each value in the list. If it doesn't find a match, INLIST returns 0. If it does find a match, it returns a number corresponding to the position of the value in the list (that is, 1 for the first value, 2 for the second, etc.).

Syntax: INLIST(value,list-value-1,...,list-value-n) where all arguments must be the same data type: character, numeric, date, or logical expressions, and where there must be at least one **list-value**. If the values are character expressions, matching is case sensitive, unless you have changed Report Designer's case sensitivity

setting (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Example: To test each record in the ITEMS table to determine if its product code field (PRODNO) is one of three items in a list, create the field:

```
INLIST(PRODNO,'901','902','903')
```

Sample data:

| <u>PRODNO</u> | <u>INLIST(PRODNO...)</u> |
|---------------|--------------------------|
| 904 | 0 |
| 903 | 3 |
| 901 | 1 |
| 911 | 0 |
| 902 | 2 |

INRANGE Determines if a value is within a specified range of values. Returns logical True if the value is equal to or greater than the lowest value and equal to or less than the highest value. Returns False if not.

Syntax: INRANGE(value,low-value,high-value) where all arguments must be the same data type; character, numeric, date, or logical expressions. If the values are character expressions, matching is case sensitive, unless you have changed Report Designer’s case sensitivity setting (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Example: To determine if the price of each item in a PRICES table is within the range of 4.95 and 6.95, create the field:

```
INRANGE(LISTPRICE,4.95,6.95)
```

Sample data:

| <u>PRODNO</u> | <u>LISTPRICE</u> | <u>INRANGE(LISTPRICE...)</u> |
|---------------|------------------|------------------------------|
| 903 | 12.95 | F |
| 901 | 6.95 | T |
| 902 | 5.00 | T |
| 904 | 4.95 | T |

INT Converts a numeric expression to an integer by discarding all digits to the right of the decimal point.

Syntax: INT(N) where N is a numeric expression.

Example: INT(NUMBERS)

Sample data:

| <u>NUMBERS</u> | <u>INT(NUMBERS)</u> |
|----------------|---------------------|
| 14.345 | 14 |
| 45.543 | 45 |
| 62.987 | 62 |

ISALPHA Determines if the first character of a character expression is any upper or lower case letter, including non-English letters. Returns logical True if yes; False if not.

Syntax: ISALPHA(C) where C is a character expression.

Example: To determine in which records the character field PARTNO begins with a letter, create the field:

ISALPHA(PARTNO)

Sample data:

| <u>PARTNO</u> | <u>ISALPHA(PARTNO)</u> |
|---------------|------------------------|
| abcd | T |
| 1bc2 | F |
| z101 | T |

ISLOWER Determines if the first character of a character expression is a lower case letter, including non-English letters. Returns logical True if yes; False if not.

Syntax: ISLOWER(C) where C is a character expression.

Example: To determine in which records the character field PARTNO begins with a lower case letter, create the field:

ISLOWER(PARTNO)

Sample data:

| <u>PARTNO</u> | <u>ISLOWER(PARTNO)</u> |
|---------------|------------------------|
| ABCDE | F |
| abcde | T |

ISNULL Determines if the specified field contains the NULL value. Returns logical True if yes; False if no.

Syntax: ISNULL(fieldname) where **fieldname** is a field defined in one of the tables used in the report.

ISUPPER Determines if the first character of a character expression is an upper case letter, including non-English letters. Returns logical True if yes; False if not.

Syntax: ISUPPER(C) where **C** is a character expression.

Example: To determine in which records the first character of character field PARTNO is in upper case, create the field:

ISUPPER(PARTNO)

Sample data:

| PARTNO | ISUPPER(PARTNO) |
|--------|-----------------|
| AbCdE | T |
| aBCde | F |

LEFT Selects a specified number of characters starting from the left-most character of a character expression.

Syntax: LEFT(C,N) where **C** is a character expression and **N** is a numeric expression for the number of characters to select.

Example: To create a field PARTNO to contain the first 4 characters of the field PARTID, use LEFT as follows:

LEFT(PARTID,4)

Sample data:

| PARTID | PARTNO |
|--------|--------|
| abcdyy | abcd |
| abefxx | abef |

LEN Calculates the length of a character expression. Trailing spaces, if any, are counted. Length of a null string is zero.

Syntax: LEN(C) where **C** is a character expression.

Example: To produce a list of authors (AUTHORS) and titles (TITLES) with a dot leader (...) between them, use LEN with REPLICATE and RTRIM as follows:

AUTHOR-REPLICATE(" . ",60-LEN(AUTHOR-RTRIM(TITLE)))+RTRIM(TITLE)

Sample report (using a monospaced font):

```
Barr.....Handbook of Artificial Intelligence
Nierenberg.....How to Read a Person Like a Book
Wiener.....Cybernetics
```

LIBNAME If the current report was opened from a report library, LIBNAME returns the full path and name of that report library file. If the current report was saved as a compound file document, this function returns an empty string.

Syntax: LIBNAME(), no arguments.

Example: To include the complete path and name of the report library file, create a calculated field consisting only of LIBNAME(). Then insert the field in an appropriate area of the report.

LIKE Determines whether the value of the character or memo expression given as the second argument matches the pattern specified as the first argument.

Syntax: LIKE(C,I) where **C** is a character expression that uses one or more pattern-matching characters (_ or ?, % or *) and **I** is a character or memo expression.

Example: To determine whether a product description stored in the DESCRIPTION field starts with the letters PC, create the expression:

```
LIKE("PC%",DESCRIPTION)
```

Note that matching of character and memo values may be case sensitive, depending on how Report Designer is configured to handle case sensitivity (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

LOG Calculates the natural logarithm of a given number. If applied to a negative number or zero, LOG produces the error value.

Syntax: LOG(N) where **N** is a numeric expression.

Example: To determine the natural log of 7.3891, create the field LOG(7.3891), which returns a value of 2.0000. To determine the natural log of 8 times 12, create the field LOG(8*12), which returns a value of 4.5643

LOWER Converts upper case letters to lower case letters.

Syntax: LOWER(C) where C is a character expression.

Example: To convert the upper case letters in a character field PRODCODE, create the field:

LOWER(PRODCODE)

Sample data:

| <u>PRODCODE</u> | <u>LOWER(PRODCODE)</u> |
|-----------------|------------------------|
| ABCD | abcd |
| ABCE | abce |

LTRIM Removes the leading spaces from a character expression. Use this function to remove leading spaces that result from using the STR function, for example.

Syntax: LTRIM(C) where C is a character expression.

Example: To left justify the page number field (PAGE) in a document index, create the calculated field:

LTRIM(STR(PAGE,5))

Sample data:

| <u>Topic</u> | <u>Page</u> |
|-----------------|-------------|
| Word truncation | 12 |
| Word-wrap | 8 |

MAX Determines the higher value of two numeric expressions.

Syntax: MAX(N1,N2) where N1 and N2 are numeric expressions.

Example: To prevent the discounted price from going below \$10, create the field:

MAX(DISCPRI,10)

MIN Determines the lower value of two numeric expressions.

Syntax: MIN(N1,N2) where N1 and N2 are numeric expressions.

Example: To prevent discounts of greater than 50%, create the field:

MIN(DISCRATE,50)

MOD Calculates the remainder of a division. Returns the number representing the remainder of one numeric expression divided by another. If used with zero as the denominator, MOD produces the error value.

Syntax: MOD(N1,N2) where **N1** and **N2** are numeric expressions. **N1** is the dividend, and **N2** is the divisor.

Example: To convert data in a field **SIZE** that is expressed in inches to data expressed in yards and inches, create the field:

MOD(SIZE,36)

Sample data:

| Data | Yards | Inches |
|-------------|---------------------|---------------------|
| <u>SIZE</u> | <u>INT(SIZE/36)</u> | <u>MOD(SIZE,36)</u> |
| 38 | 1 | 2 |
| 72 | 2 | 0 |
| 7 | 0 | 7 |
| 119 | 3 | 11 |

MONLEN Returns the number of days in the month for the specified date.

Syntax: MONLEN(D) where **D** is a date expression.

Example: The expression MONLEN({9/01/1996}) returns 30, the number of days in the month of September.

MONSBTWN Calculates the number of full months between two dates. This date difference is derived by subtracting **D2** from **D1**.

Syntax: MONSBTWN(D1,D2) where **D1** and **D2** are date expressions.

Example: To calculate the number of months between the starting date of a contract (STARTDATE) and the ending date (ENDDATE), create the field:

MONSBTWN(ENDDATE,STARTDATE)

Sample data:

| <u>ENDDATE</u> | <u>STARTDATE</u> | <u>MONSBTWN(ENDDATE,STARTDATE)</u> |
|----------------|------------------|------------------------------------|
| 03/14/96 | 12/10/95 | 3 |
| 03/02/96 | 12/10/95 | 2 |
| 12/10/95 | 03/10/96 | -3 |

MONTH Returns the number of the month of a date expression.

Syntax: MONTH(D) where **D** is a date expression

Example: To print the month number of dates in the date field STARTDATE, create the field:

MONTH(STARTDATE)

Sample data:

| <u>STARTDATE</u> | <u>MONTH(STARTDATE)</u> |
|------------------|-------------------------|
| 12/10/95 | 12 |
| 04/23/95 | 4 |

NDOW Returns the next date of the day-of-week number that is supplied as its second argument.

Syntax: NDOW(D,N) where **D** is a date expression and **N** is a numeric expression specifying day-of-week (with 1 being Sunday, 2 Monday, etc.).

Example: To determine the date of the next Saturday following STARTDATE, use an expression like the following:

NDOW(STARTDATE,7)

OVER Returns logical True if more than a specified number of days have passed since the supplied date.

Syntax: OVER(D,N) where **D** is a date expression and **N** is a numeric expression specifying number of days.

Example: To print a message indicating that a payment is past due, use an expression like the following:

```
IIF(OVER(DUE_DATE,90),"Payment is now overdue 90
days. A 10 percent penalty will be added if not
paid within 10 days.," ")
```

As a result, the overdue notice will print only for those values of DUE_DATE that are more than 90 days in the past.

PAGENO Returns current report page number.

Syntax: PAGENO() no arguments.

Example: To print/display a page number in a Footer line of a report, create a field PAGENUM to contain PAGENO() and use it in a Footer line:

----- Page: 99 -----

This line then produces:

----- Page: 1 -----

PAST Returns logical True if supplied date is in the past and logical False if not. If the optional argument “1” is included, the current date is considered to be in the past.

Syntax: PAST(D,[1]) where **D** is a date expression and **1** is an optional numeric argument that causes the current date to be considered as in the past.

Example: To determine whether the value in a field named DUE_DATE is in the past, use the following expression:

PAST(DUE_DATE)

PDOW Returns the previous date of the day-of-week number that is supplied as its second argument.

Syntax: PDOW(D,N) where **D** is a date expression and **N** is a numeric expression specifying day-of-week (with 1 being Sunday, 2 Monday, etc.).

Example: To determine the date of the Monday immediately preceding STARTDATE, use an expression like the following:

PDOW(STARTDATE,2)

If the value of STARTDATE is 6/02/96, this expression will produce a value of 05/30/96, the date of the Monday preceding 6/02/96.

PREVIOUS Returns the value of the specified field in the previous composite record. (Note that records that do not satisfy the filter currently in force are not accessible with this function.) This function is useful for suppressing repeating data in fields other than group fields and for performing calculations with fields in different composite records.

Syntax: PREVIOUS(field name) where **field name** is the name of any field in the report.

Example: If your orders table contains fields for customer number (CUSTNO), order number (ORDERNO), and order date (DATE), you can use the PREVIOUS function to calculate the number of days since any customer's previous order, assuming that orders are sorted by date within customer. The expression for a DAYSINCE field might be:

IIF(PREVIOUS(CUSTNO)=CUSTNO,DATE- PREV(DATE),0)

Translated, this expression means that if the customer number is the same as the customer number in the previous composite record (in other words if Report Designer is reading a record for a second or subsequent order by the same customer), return a value that is the current order date minus the order date in the previous composite record. Otherwise, return 0.

QTR Calculates the number of the calendar quarter of a date expression. (See the DQTR function.)

Syntax: QTR(D) where **D** is a date expression. 1/1 to 3/31 is Quarter 1; 4/1 to 6/30 is Quarter 2; 7/1 to 9/30 is Quarter 3; 10/1 to 12/31 is Quarter 4.

Example: To calculate the quarter number of each date in the STARTDATE field, create the field:

QTR(STARTDATE)

Sample data:

| <u>STARTDATE</u> | <u>QTR(STARTDATE)</u> |
|------------------|-----------------------|
| 12/10/95 | 4 |
| 04/23/96 | 2 |
| 09/18/96 | 3 |

QUERY Returns the current filter expression.

Syntax: QUERY() no arguments.

Example: To print or display the current filter, create a calculated field whose expression is QUERY() and insert the field. Report Designer will print the filter text using a word-wrapped, left-aligned format with a 50-character width. If no filter is specified, this function returns "Include all records."

Note that this function provides text only for the current filter definition; you cannot use QUERY with any other function or with operators.

RECNO Identifies the current composite record number. Composite records are numbered sequentially (starting with 1) after Report Designer does a sort and/or a filter and reads all related records.

Syntax: RECNO(), no arguments.

Example: To number the records in a long report, create a calculated field with the expression RECNO(). Then place this field on a Record line.

REPLICATE Repeats a character expression a specified number of times.

Syntax: REPLICATE(C,N) where **C** is the character expression that is to be copied and **N** is the numeric expression representing the number of copies. The maximum number of characters allowed is 254.

Example: To print a line of asterisks after each record in a report, create the field:

```
REPLICATE('*',50)
```

and include it in a Record line after a line of fields, such as in the following report layout.

```
Customer Name           Order Date  Amount
<xxxxxxxxxxxxxxxxxxxxxx mm/dd/yy  ($999.99)
<xxxxxxxxxxxxxxxxxxxxxx
```

Sample report:

```
Customer Name           Order Date  Amount
Britten, Jr., Roland   01/10/96   $216.00
*****
Gladdin III, John      01/10/96   $96.00
*****
Adams, Abner N.        01/10/96   $144.00
```

REPNAME Returns as a character string the name of the current report.

Syntax: REPNAME(N), where **N** is an optional numeric argument specifying whether the full path and name is returned for a report saved as a compound document file.

For a report saved as a compound document file, if **N** is absent or 0 (zero), this function returns only the report name; the pathname is not included, and the extension is included only if it is something other than the default of RSW. If **N** is non-zero,

this function returns the full path and name, including extension, for the report file.

For a report saved into a report library, this function always returns the report name, regardless of the presence or value of N.

Example: To print the report name as a title, create a calculated field consisting only of REPNAME(). Then place the field in the Title band of the report.

RIGHT Selects the right-most specified number of characters of a character expression.

Syntax: RIGHT(C,N) where C is a character expression and N is a numeric expression that defines the number of characters to select.

Example: To create a PARTNO field to contain the last 5 characters of the 8-character PARTID field, use RIGHT as follows:

RIGHT(PARTID,5)

Sample data:

| <u>PARTID</u> | <u>PARTNO</u> |
|---------------|---------------|
| ababyyyy | byyyy |
| ababzzzz | bzzzz |
| abab | abab |

RIPARAM In reports run with Viewer, returns as a character string the value of a specified character field in the Viewer table or text control file. Returns asterisks for reports run interactively.

Syntax: RIPARAM(C), where C is a string that is the name of a character field in the Viewer control table or file.

Example: To include the user-supplied title stored in the TITLE field in the Viewer control table or file, create the field:

RIPARAM("TITLE")

ROUND Rounds a numeric expression to a specified number of decimal places.

Syntax: ROUND(N1,N2) where N1 is the numeric expression to be rounded and N2 is the number of decimal places. Note that N2 may be signed (e.g., ROUND(260,-2) = 300.)

Example: To round numbers in a numeric field NUMBERS to 0 decimal places, create the field:

ROUND(NUMBERS,0)

Sample data:

| <u>NUMBERS</u> | <u>ROUND(NUMBERS,0)</u> |
|----------------|-------------------------|
| 23453.3455 | 23453 (rounds down) |
| 98789.7656 | 98790 (rounds up) |

RR Ensures that a calculated field formula is not translated.

Syntax: RR(I) where **I** is any field name or expression.

Example: This function is useful in analyzing report behavior. For example, suppose you have specified a sort on a calculated field whose expression is LASTNAME+FIRSTNAME. If this expression can be translated into a form that is evaluatable by your database software, Report Designer will include an "ORDER BY LASTNAME+FIRSTNAME" in the SELECT sent to the database server.

To force Report Designer to perform this sort locally instead, change the calculated expression to:

RR(LASTNAME+FIRSTNAME)

RRUNIN With Viewer, returns 1 if a report is run using a text control file; if using a control table, returns the RI_ID value of the report in that control table.

Syntax: RRUNIN(), no arguments.

Example: If you develop a report that uses RIPARAM to incorporate a user-supplied title, you can use IIF and RRUNIN to specify an alternate title when you run the report interactively. To print "Report Title" instead of the user-specified text supplied by RIPARAM, create the field:

IIF(RRUNIN(),RIPARAM(TITLE),"Report Title")

RTRIM Removes the trailing spaces of a character expression. Since Report Designer automatically trims trailing spaces off all character fields when printing, this function is normally used only to concatenate character fields or to find the length of the actual data in a database field.

Syntax: RTRIM(C) where C is a character expression.

Example: In the CUSTOMER table, to print the state next to the city with only a comma and one space between the two fields, create the following field:

```
RTRIM(CITY)+' '+STATE
```

Report Designer prints the field as follows:

```
Detroit, MI  
Columbia, MO  
Portland, OR
```

SOUNDEX Returns a four-character string that represents the way the input expression sounds. If the character expression is longer than one word, Report Designer looks only at the first word in the expression. This function allows you to locate records based on how they sound, providing that the first letter is the same (e.g., Myers and Meyers, but not Copper and Kopper).

The conventions SOUNDEX uses to represent the sound of a word are as follows:

1. The first letter of the word is retained.
2. All occurrences of a, e, h, i, o, u, w, and y in positions other than the first position are dropped.
3. The remaining letters after the first letter are assigned the following numbers:

| | |
|------------------------|---|
| b, f, p, v | 1 |
| c, g, j, k, q, s, x, z | 2 |
| d, t | 3 |
| l | 4 |
| m, n | 5 |
| r | 6 |

4. Repeated, adjacent occurrences of letters that have been assigned the same number are omitted.

For example, following these conventions, SOUNDEX represents both "Lauren" and "Loren" as L650.

Syntax: SOUNDEX(C1,C2) where C1 is a character expression and C2 is an optional character expression that represents the word break character(s), the character(s) marking word separations.

If **C2** is absent, Report Designer uses the space and hyphen characters to determine word breaks. If you supply **C2**, Report Designer uses only **C2** to determine word breaks (see **WDCOUNT** for an example).

Example: In a report based on a customer table containing names that could have been misspelled due to poor voice transmission, you can use this function to find a customer's record even though the name may have been misspelled.

To select all records where the customer's last name sounds like Meyers, create two calculated fields — one with the expression `SOUNDEX("Meyers")`, the other with the expression `SOUNDEX(LASTNAME)`.

Then define a filter that selects all records where the values of these calculated fields are equal. The filter will select records with `LASTNAME` values of Meyers, Myers, and Miers.

SPACE Produces a character expression made up of a specified number of spaces (blanks).

Syntax: `SPACE(N)` where **N** is a numeric expression representing the number of spaces desired.

Example: To create an underlined blank space on a report, create a calculated field whose expression is `SPACE(99)`. Insert this field on your report layout and use `Format ⇒ Font` to apply the underscoring style. Then use `Format ⇒ Properties` to specify the desired width of the field. As long as the field is left-aligned, centered, or right-aligned, your report will contain an underline of the specified width.

SPELLNUM Spells the integer part of a numeric expression. The first character of the resulting character string is in upper case; all other characters are in lower case. If the number is negative, Report Designer returns a string that begins with the word "Minus." If the integer part of the number is 0 or if the field is blank, Report Designer returns the string "Zero." If the string exceeds the maximum string length of 254 characters, Report Designer returns a string of asterisks.

Syntax: `SPELLNUM(N)` where **N** is a numeric expression.

Example: To convert numbers in field NUMBERS into their English equivalents, create the field:

SPELLNUM(NUMBERS)

Sample data:

| <u>NUMBERS</u> | <u>SPELLNUM(NUMBERS)</u> |
|----------------|--------------------------|
| 0.00 | Zero |
| 0.99 | Zero |
| 25.01 | Twenty-five |
| -5.99 | Minus five |
| Blank | Zero |

SQLEXP Uses its string argument as an expression that can be evaluated by the database software. (Note that this function cannot be used in a UDF.)

Syntax: SQLEXP(C) where C is a string consisting of an expression that is evaluable by the database software.

Example: This function can give you access to certain database-specific functions. For example, Microsoft SQL Server provides a function named REVERSE that reverses a character string. To use this function in Report Designer, you could create a calculated field with the following expression:

SQLEXP("REVERSE(LASTNAME)")

SQRT Calculates the square root of a non-negative numeric expression. If applied to a negative number, SQRT produces the error value.

Syntax: SQRT(N) where N is a numeric expression.

Example: To print the square root of the contents of the numeric field NUMBERS, create the field:

SQRT(NUMBERS)

Sample data:

| <u>NUMBERS</u> | <u>SQRT(NUMBERS)</u> |
|----------------|----------------------|
| 9 | 3 |
| 64 | 8 |
| 1024 | 32 |

STOC Converts a numeric value representing a number of seconds to a character string.

Syntax: STOC(N, *Keyword*) where N is a numeric expression representing a number of seconds and **Keyword** specifies the output format. Valid Keywords are as follows:

| Keyword | Meaning |
|----------------|-----------------------|
| ss | Seconds |
| mm | Minutes |
| hh | Hours |
| mm:ss | Minutes:Seconds |
| hh:mm | Hours:Minutes |
| hh:mm:ss | Hours:Minutes:Seconds |

If no Keyword is specified, the default is hh:mm:ss (hours:minutes:seconds).

Example: Assume that you have a field SECFIELD that contains numeric values representing a number of seconds. You can use STOC to create a calculated field CHARSEC to convert the numeric values to character strings formatted according to the specified Keyword.

Sample data:

| <u>CHARSEC Expression</u> | <u>SECFIELD Value</u> | <u>Output</u> |
|---------------------------|-----------------------|---------------|
| STOC(secfield,ss) | 109832 | 109832 |
| STOC(secfield,mm) | 109832 | 1830 |
| STOC(secfield,mm:ss) | 109832 | 1830:32 |
| STOC(secfield,hh) | 109832 | 30 |
| STOC(secfield,hh:mm:ss) | 109832 | 30:30:32 |
| STOC(secfield,ss) | 5 | 5 |
| STOC(secfield,mm:ss) | 5 | 0:05 |
| STOC(secfield,hh:mm:ss) | 5 | 0:00:05 |

STR Converts a numeric expression to a character expression. This function is the opposite of VAL; that is, it constitutes a change in data type from numeric to character.

Syntax: STR(N1,N2,N3) where all arguments are numeric expressions. N1 is a value to be converted and is required. N2 is an optional argument representing the length of the string in number of characters. N3 is an optional argument representing the number of decimal places.

If the value will not fit in the specified length, the STR function returns a string of asterisks instead.

If you omit the argument **N2**, STR uses 10 as the default length. If you omit the argument **N3**, STR uses 0 as the default number of decimal places.

If the value has more decimal places than specified in **N3**, STR rounds off the number to **N3** decimal places.

Example: To convert a product code field (PRODCODE) from a numeric to a character expression, create the field:

STR(PRODCODE)

Sample data:

| <u>PRODCODE</u> | <u>STR (PRODCODE)</u> |
|-----------------|-----------------------|
| 12345 | " 12345" |
| 9912567 | " 9912567" |

(default length of 10 is used)

STRCOUNT Returns the number of times a substring occurs within a character expression.

Syntax: STRCOUNT(C1,C2,L) where **C1** and **C2** are character expressions and **C1** is a character substring of **C2**. The optional logical expression **L** controls the case sensitivity of the function. When **L** is true, the function is case sensitive; when it is false, the function is case insensitive. Without the third argument, the function uses the COMPARECASE case sensitivity setting in the RSW.SRT file (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Example: You might have a ten-character field (RESPONSE) that contains a string of the letters Y and N in either upper or lower case representing Yes and No responses to a questionnaire. To count the number of Yes responses, create a calculated field whose expression is STRCOUNT("Y",RESPONSE).

STRREP Replaces each occurrence of a character substring with another and returns the full character string.

Syntax: STRREP(C1,C2,C3,L) where **C1** is the full character expression, **C2** is the substring to be replaced, and **C3** is the replacement substring. The optional logical expression **L**

controls the case sensitivity of the function. When **L** is true, the function is case sensitive; when it is false, the function is case insensitive. When this argument is not provided, the function uses the COMPARECASE case sensitivity setting in the RSW.SRT file (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Example: To replace every occurrence of the text “CDS” with “Concentric Data Systems” in a character field named COMMENT, create a field with the following expression:

```
STRREP(COMMENT,"CDS","Concentric Data Systems")
```

STRSEARCH Returns the beginning position of the *n*th occurrence of a character substring.

Syntax: STRSEARCH(C1,C2,N,L) where **C1** is the substring, **C2** is the full character string, and **N** is the number of the occurrence. If **N** is negative, STRSEARCH begins its search for the substring’s position at the end of the character string. (Note that the position of the first character in a string is 1, not 0.)

The optional logical expression **L** controls the function’s case sensitivity. When **L** is true, the function is case sensitive; when it is false, the function is case insensitive. When this argument is not provided, the function uses the COMPARECASE setting in the RSW.SRT file (see Chapter 5, “Setting Defaults,” for information about configuring Report Designer’s case sensitivity).

Example: To extract the parenthesized nickname from a BOXER_NAME character field, create a field with the following expression:

```
SUBSTR(BOXER_NAME,STRSEARCH("(",BOXER_NAME,1)+1,  
STRSEARCH(")",BOXER_NAME,1)-STRSEARCH(")",BOXER_NAME,1)-1)
```

For a value of BOXER_NAME such as “Billy (The Bruiser) Johnson”, this field will return : (The Bruiser).

STUFF Replaces any part of a character expression.

Syntax: STUFF(C1,N1,N2,C2) where **C1** and **C2** are character expressions and **N1** and **N2** are numeric expressions. **C1** is the expression to be changed. **N1** is the starting position of the replacement. **N2** is the number of characters of **C1** to be

removed. **C2** is the replacement expression. The length of **C2** need not be the same as **N2**.

Example: To change four characters of **PRODID** to **BB**, starting with the third character, create the field:

`STUFF(PRODID,3,4,'BB')`

Sample data:

| <u>PRODID</u> | <u>STUFF(PRODID,3,4,'BB')</u> |
|---------------|-------------------------------|
| JTdddT | JTBBT |
| JTdefgT | JTBBT |

SUBDAYS Calculates a date by subtracting a number of days from a date. Note that you can also subtract dates by using the – operator.

Syntax: `SUBDAYS(D,N)` where **D** is a date expression and **N** is a numeric expression representing number of days to be subtracted.

Example: To back schedule the beginning date of a project based on the closing date (**FINALDATE**) and number of days (20) the project will take, create the field:

`SUBDAYS(FINALDATE,20)`

If **FINALDATE** is 05/21/96, then this function yields 05/01/96 as the starting date for the project.

SUBMONS Calculates a date by subtracting a number of months from a date.

Syntax: `SUBMONS(D,N)` where **D** is a date expression and **N** is a numeric expression representing number of months to be subtracted.

Example: To back schedule the beginning date of a project based on the closing date (**FINALDATE**) and number of months (24) the project will take, create the field:

`SUBMONS(FINALDATE,24)`

If **FINALDATE** is 01/10/96, then this function yields 01/10/94 as the starting date for the project.

SUBSTR Extracts a substring from a character expression.

Syntax: `SUBSTR(C,N1,N2)` where **C** is the character expression from which you want to extract a substring. **N1** and **N2** are numeric

expressions. **N1** is the starting position for the extraction. **N2** is the length of the extraction in number of characters and is an optional argument. If you omit **N2**, the substring extends to the end of **C**.

Example: Suppose you want to extract the four characters representing product code from an eight character product number field (PRODID) and that these four characters begin with the third character in the product number. To do this, create the field:

SUBSTR(PRODID,3,4)

Sample data:

| <u>PRODID</u> | <u>SUBSTR(PRODID,3,4)</u> |
|---------------|---------------------------|
| JT3A2378 | 3A23 |
| JT4B6895 | 4B68 |

SUBWKS Calculates a date by subtracting a number of weeks from a date.

Syntax: SUBWKS(D,N) where **D** is a date expression and **N** is a numeric expression representing number of weeks.

Example: To back schedule the beginning date of a project based on the closing date (FINALDATE) and number of weeks (10) the project will take, create the field:

SUBWKS(FINALDATE,10)

If FINALDATE is 4/1/96, then this function yields 1/22/96 as the starting date for the project.

SUBYRS Calculates a date by subtracting a number of years from a date.

Syntax: SUBYRS(D,N) where **D** is a date expression and **N** is a numeric expression representing number of years.

Example: Stock options are 100% vested four years from the date of grant. Records in the table contain the 100% vested date, DATEVEST. SUBYRS(DATEVEST,4) gives the date the option was granted.

TIME Returns the character representation of the system time at the time the report was started. The time is in 24 hour format, hh:mm:ss.

Syntax: TIME(), no arguments.

Example: To print the system time in a Header line, create the field SYSTIME to contain the TIME function:

----- TIME: <xxxxxxx -----

yields the following:

----- TIME: 03:05:51 -----

TODATE Converts a datetime expression to a date.

Syntax: TODATE(DT), where **DT** is a datetime expression.

Example: You can use this function to extract just the date portion of a datetime expression. For example, if one of the values of DTEND is 04/06/96 03:20:45, the expression TODATE(DTEND) would return 04/06/96 (omitting the time portion of the datetime value).

TOTIME Converts a datetime expression to a time.

Syntax: TOTIME(DT), where **DT** is a datetime expression.

Example: You can use this function to extract just the time portion of a datetime expression. For example, if one of the values of DTEND is 04/06/95 03:20:45, the expression TODATE(DTEND) would return 03:20:45 (omitting the date portion of the datetime value).

TRANSFORM Returns formatted character data that results from applying a picture to a numeric or character expression.

Syntax: TRANSFORM(C1 or N,C2) where the first argument can be either **C1**, a character expression or **N**, a numeric expression. **C2** is a character expression that contains the picture (or format) to be applied to the first argument. In the **Notes** below, **C2** is referred to as Picture. (The picture expression comprises two parts, a function and a template. At least one part must be present. If both are present, the function is first.

Function — A function begins with an @ character, followed by one or more character symbols, and ends with a space character (' '). For example, '@C '. Figure 9.3 lists the functions available.

Template — A template comprises a string of special characters, each of which represents an output character position. A template can also contain characters that are to be

output literally. Figure 9.4 lists the special characters that can be used to form a template.

| Use | To | Sample Output |
|------------|---|----------------------|
| C | Output CR (credit) after a positive number; e.g., TRANSFORM(123,"@c") | " 123.00 CR" |
| X | Output DB (debit) after a negative number; e.g., TRANSFORM(-123,"@x") | " 123.00 DB" |
| (| Enclose Negative numbers in parentheses; e.g., TRANSFORM(-123,"@(") | " (123.00)" |
| B | Left justify numeric data; e.g., TRANSFORM(123456,"@b ") | "123456.00 " |
| Z | Output a zero value as spaces (blanks); e.g., TRANSFORM(0,"@z ") | " " |
| ! | Convert lower case letters to upper case; e.g., TRANSFORM("Cole","@!") | "COLE" |
| R | Do not replace input characters with literal characters from the template; applies to character expressions only. e.g., TRANSFORM("ABC", "@R X.X.X.") versus TRANSFORM("ABC", "X.X.X.") | "A.B.C" |

Figure 9.3 TRANSFORM Function

Notes:

1. Report Designer ignores invalid function characters. For example, "@c3 " is treated the same as "@c ".
2. When Report Designer encounters mutually exclusive characters such as "@(x ", the last function specified overrides any preceding function; i.e., "@(x " behaves as "@x ".

| Template Character | Sample Action and Example | Output |
|---------------------------|---|----------------------------------|
| Numeric Data | | |
| 9 or # | Substitutes next digit of number, TRANSFORM(123,'99999') | " 123" |
| \$ or * | Defines "fill character"; used in place of leading blanks, TRANSFORM(12345,"\$9,999,999") TRANSFORM(12345,"*9,999,999") | "\$\$\$\$12,345" "****12,345" |
| . | Represents position of decimal point, TRANSFORM(12345,"999,999.99") | " 12,345.00" |
| , | Represents position of comma (or fill character), TRANSFORM(12345,"9,999,999") | " 12,345" |
| Character Data | | |
| X or x | Substitutes next character of data, TRANSFORM("Anderson","x x x xx") | "A d r on" |
| ! | Substitutes upper case equivalent of next character of data, TRANSFORM("Coleman","!!!!") | "COLE" |

Figure 9.4 TRANSFORM Template Characters

Notes:

1. For numeric data, when a function is given without template characters, Report Designer normally outputs ten integer and two decimal places.
2. For character data, Report Designer treats 9, #, \$, *, . and , literally when they appear in the template. If the picture argument contains "@R ", literals do not replace characters from the input argument.

For example:

```
TRANSFORM("Henderson",'xxxxx.xx')  
produces "Hende.so", but
```

```
TRANSFORM("Henderson",'@R xxxxx.xx')  
produces "Hende.rs".
```

TRIM Removes trailing spaces in a character expression. This function is identical to RTRIM.

Syntax: TRIM(C) where **C** is a character expression.

Example: See RTRIM.

TTOC Converts a time expression or the time portion of a datetime expression to a character string.

Syntax: TTOC(DT) where **DT** is a datetime or time expression.

Example: To extract the time portion of the datetime expression DTEND as a character string, create a calculated field with the expression TTOC(DTEND).

TTOS Converts a time expression or the time portion of a datetime expression to a number of seconds. You can then use the numeric output to perform certain interval calculations (for example, the difference between two time values).

Syntax: TTOS(DT) where **DT** is a datetime or time expression. If **DT** is a datetime expression, the date portion is ignored.

Example: To convert the time portion of the datetime expression DTSTART to a numeric value representing a number of seconds, create a calculated field with the expression TTOS(DTSTART).

Sample data:

| <u>DTSTART Value</u> | <u>TTOS(DTSTART) Output</u> |
|----------------------|-----------------------------|
| 05/05/96 12:30:00 am | 1800 |
| 05/05/96 9:00:00 am | 32400 |
| 05/05/96 1:00:00 pm | 46800 |
| 05/05/96 8:26:00 pm | 73560 |

UDFNAME Returns the path and name of the UDF library file.

Syntax: UDFNAME(), no arguments.

Example: To print the path and name of the Report Designer UDF library, create a calculated field consisting only of UDFNAME(). Then place the field in an appropriate band of the report.

UPPER Converts lower case letters of a character expression to upper case letters.

Syntax: UPPER(C) where C is the character expression you wish to convert to upper case.

Example: To print the CITY field from the CUSTOMERS table in upper case letters, create the field:

UPPER(CITY)

Sample data:

| <u>CITY</u> | <u>UPPER(CITY)</u> |
|----------------|--------------------|
| Columbia | COLUMBIA |
| Jefferson City | JEFFERSON CITY |
| Kansas City | KANSAS CITY |

VAL Converts character representation of numbers into numeric values (i.e., this is a change in data type from character to numeric). This function is the opposite of STR.

Syntax: VAL(C) where C is a character expression containing numbers. VAL ignores leading spaces. Also, VAL converts only digits, one decimal point, and a leading minus sign and stops converting a character value when it encounters a non-digit, an embedded minus sign, or a second decimal point.

Example: VAL(CCHARACTERS)

Sample data:

| <u>CHARACTERS</u> | <u>VAL(CHARACTERS)</u> |
|-------------------|------------------------|
| 346-34-7132 | 346 |
| (617)376-1234 | 0 |
| -123 | -123 |
| -123-456 | -123 |
| 123abc | 123 |
| 123.123.123 | 123.123 |

WDCOUNT Returns the number of words in a character expression.

Syntax: WDCOUNT(C1,C2) where **C1** is the character expression whose words are to be counted. **C2** is an optional character expression that represents the word break character(s), the character(s) marking word separations. If **C2** is absent, Report Designer uses the space and hyphen characters to determine word breaks. If you supply **C2**, Report Designer uses only **C2** to determine word breaks.

Examples: WDCOUNT("this is a character-string") yields 5.

WDCOUNT("this/character/separates/words words","/") yields 4 since Report Designer uses "/" to break words and ignores the space character.

WEEK Returns a number representing the week-of-the-month for a date expression. Week numbers, which start at 1, are determined by the calendar date. Weeks begin on Sunday and end on Saturday.

Syntax: WEEK(D) where **D** is a date expression.

Example: To print the week number of the date field DATE from the ORDERS table, create the field:

WEEK(DATE)

Sample data:

| <u>DATE</u> | <u>WEEK(DATE)</u> |
|-------------|-------------------|
| 06/28/96 | 5 |
| 07/07/96 | 2 |
| 07/28/94 | 5 |

WKSBTWN Calculates the number of full calendar weeks between two dates. This date difference is derived by subtracting **D2** from **D1**.

Syntax: WKSBTWN(D1,D2) where **D1** and **D2** are date expressions. If the number of days is less than 7, the result is 0.

Example: To calculate the weeks between the starting date of a contract (STARTDATE) and its completion date (FINALDATE), create the field:

WKSBTWN(FINALDATE,STARTDATE)

Sample data:

| <u>FINALDATE</u> | <u>STARTDATE</u> | <u>WKSBTWN</u> |
|------------------|------------------|----------------|
| 04/14/96 | 04/10/96 | 0 |
| 04/23/96 | 04/07/96 | 2 |
| 04/28/96 | 04/07/96 | 3 |

WORD Returns a word based on its place in a character expression. For example, you can use this function to print/display the first or last word in the expression.

Syntax: WORD(C1,N,C2) where **C1** is a character expression (string), **N** is a numeric expression that represents the number or place of the word in the expression, and **C2** is an optional character expression that represents the word break character(s), the character(s) marking word separations. If **N** is a positive number, Report Designer processes the expression starting at the beginning of the string. If **N** is a negative number, Report Designer processes the expression starting at the end of the string. For example, when **N** is 1, Report Designer returns the first word of the expression; when **N** is -1, Report Designer returns the last word of the expression. When **N** is 0 or greater than the number of words in the character expression, Report Designer returns an empty character field.

If **C2** is absent, Report Designer uses the space and hyphen characters to determine word breaks. If you supply **C2**, Report Designer uses only **C2** to determine word breaks (see WDCOUNT for an example).

Examples: To print/display the last word in a character field DESCRIPTN, create the expression:

WORD(DESCRIPTN, -1)

Sample data:

| <u>DESCRIPTN</u> | <u>WORD(DESCRIPTN, -1)</u> |
|---------------------|----------------------------|
| PC Cable Connector | Connector |
| PC 3 1/2" Diskettes | Diskettes |

YEAR Returns the year part of a date expression. The result is a four-digit numeric value.

Syntax: YEAR(D) where **D** is a date expression.

Example: To calculate the year number of a date field BIRTHDATE, create the field:

YEAR(BIRTHDATE)

Sample data:

| <u>BIRTHDATE</u> | <u>YEAR(BIRTHDATE)</u> |
|------------------|------------------------|
| 12/10/67 | 1967 |
| 11/19/71 | 1971 |

YRSBTWN Calculates the number of full years between two date expressions; difference is derived by subtracting **D2** from **D1**.

Syntax: YRSBTWN(D1,D2) where **D1** and **D2** are date expressions.

Example: To calculate the age of all employees in a personnel table based on date of birth field (BIRTHDATE) and the current date DATE(), create the field:

YRSBTWN(DATE(),BIRTHDATE)

Sample data:

| <u>DATE()</u> | <u>BIRTHDATE</u> | <u>YRSBTWN(DATE(),BIRTHDATE)</u> |
|----------------|------------------|-----------------------------------|
| 03/31/96 | 12/10/65 | 30 |
| 03/31/96 | 04/11/60 | 35 |
| 04/01/96 | 07/23/57 | 38 |
| 04/01/96 | 12/05/51 | 44 |

Using User-Defined Functions

You create UDFs to process field values according to an expression or formula that you define. The ability to define UDFs provides two main advantages:

- You can use the UDFs that you develop in any Report Designer report.
- Since you define the expression and specify the arguments, you can create UDFs to perform complex operations beyond those available through the use of predefined functions.

After you have created a UDF, it is saved in a file called RSW.UDF, which is created in the Report Designer program directory or in the link directory (if one has been defined). When naming a UDF, you can use lower or mixed case to distinguish its name from the names of predefined Report Designer functions. You can then use the UDF in calculated field expressions in any report just as you would use a predefined function, by typing its name or selecting it from the Function list box.

Creating a User-Defined Function

A user-defined function definition has two parts:

- A declaration
- An expression

The declaration serves three purposes:

- It names the UDF.
- It identifies argument names and data types to be used in the UDF's expression.
- It provides a template for the actual UDF reference.

The expression defines the calculations and processing to be performed on the UDF arguments. Unlike a calculated field expression, a UDF expression uses the argument names as specified in the declaration rather than actual field names. The values resulting from the expression are supplied when you use the UDF in a calculated field.

To create a new user-defined function:

1. Select Calculations ⇒ User Function.

If no UDFs have yet been created, the New User Function dialog box appears. If one or more UDFs have been defined, the User Functions dialog box appears; select New to display the New User Function dialog.

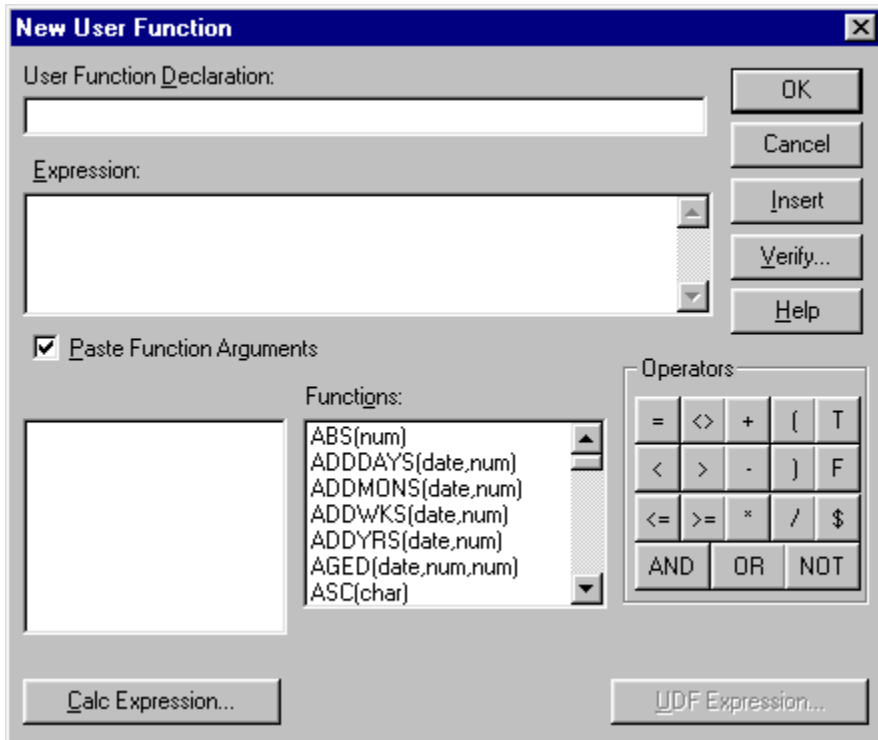


Figure 9.5 New User Function Dialog Box

2. In the User Function Declaration edit box, type a function declaration with the following syntax:

```
UDFName (ArgType_ArgName1, ArgType_ArgName2, ...)
```

- ◆ The UDF name can be up to 20 characters long; the first 4 characters **must** be unique.
- ◆ UDF arguments must start with a character that represents the argument data type, followed by an underscore (_).

Use one of the following letters to indicate the argument data type:

C for a character argument

D for a date argument

L for a logical argument

M for a memo argument

N for a numeric argument (fixed or floating point)

- ◆ The first 9 characters of each argument name **must** be unique and must start with a letter.
3. In the Expression edit box, define the function using any combination of the following methods:
 - ◆ Type all or part of the expression directly in the Expression edit box.
 - ◆ Insert a **predefined function** by selecting an item in the Functions list, then selecting the Insert button.
 - ◆ Insert an **operator** by selecting the Operator buttons.
 - ◆ Insert a **calculated field expression** by selecting the Calc Expression button to display the Calculated Fields dialog box.
 - ◆ Insert another **user-defined function formula** by selecting the User Function Formula button to display the User Functions dialog box.
 4. Select the Verify button to determine whether the expression syntax is correct. Report Designer displays a message box describing what, if any, syntax errors it found in the expression.
 5. Select OK.

UDF Declaration

A UDF declaration, which can be up to 256 characters long, consists of the following parts:

- UDF name in upper, lower, or mixed case;
- In parentheses, the data type and name of each argument to be passed to the UDF.

The syntax for the declaration is:

```
udfname (Argtype_ArgName1, Argtype_ArgName2, ...)
```

For example, the declaration for a sum function that adds two numbers might be `SUM(N_A,N_B)`. Translated, this declaration means that the name of the UDF is `SUM`. It takes two numeric arguments (represented by `N_`), the first of which will be referred to as `A` and the second as `B` in the UDF expression.

To take a more realistic example, the declaration for a function called `ISWEEKEND`, which determines whether a given date falls on a weekend, might be `ISWEEKEND(D_ANYDATE)`. This declaration means that the `ISWEEKEND` function takes one date argument, which will be referred to in the UDF expression as `ANYDATE`.

When you use a UDF in a calculated field expression, you must supply the required arguments that were declared when the UDF was defined. For example, if the UDF declaration specifies one date argument, when you include the UDF reference in a calculated field, you specify one date field as an argument to the UDF.

UDF Names

UDF names can be up to 20 characters long; the first 4 characters must be unique (that is, a UDF name cannot have the same first 4 characters as the name of any other UDF or of any Report Designer function). When you use a UDF in a calculated field expression, you can include just the first 4 characters of the UDF name.

UDF Arguments

UDF arguments represent values that the function will operate on. In the declaration, each argument consists of a letter representing the argument data type, an underscore character (`_`), and a name.

Use one of the following letters to indicate argument data type:

- C for a character argument
- D for a date argument
- L for a logical argument
- M for a memo argument
- N for a numeric argument

An argument name, which follows the data type indicator and underscore character, must be unique in the first 9 characters (for example, a declaration such as `UDF(C_ARG,N_ARG)` is not valid, since both arguments have the same name) and must start with a letter.

The name can contain only letters, numbers, and the underscore character.

Argument names indicate how an argument will be referred to in the UDF expression that defines the function's operation. For example, if the declaration for ISWEEKEND is ISWEEKEND(D_ANYDATE), the expression must use the name ANYDATE to refer to the date variable. If the declaration is ISWEEKEND(D_A), the expression must use A to refer to the date variable.

Actual values are "passed" to a UDF through the intermediary of argument names. When you use the UDF in a calculated field expression, you substitute actual expressions or field names for the argument names in the declaration. For example, with ISWEEKEND(D_ANYDATE), you can substitute a date field name or another date expression for the argument name as follows: ISWEEKEND(NEWYEARS) or ISWEEKEND({01/01/94}). The value of the field or expression is then used in the UDF's calculations wherever ANYDATE appears.

To take another example, a function that calculates the difference between two date values might have the following declaration:

```
DDIF (D_DATE1, D_DATE2)
```

When you use this UDF in a calculated field expression, a function such as DATE(), a field such as BIRTHDATE, or an expression such as CTOD("10/17/62") can be substituted for either argument. This substitution supplies values for the function's calculations.

UDF Expression

A UDF's expression defines the function's operation. A UDF expression has the same structure and uses the same functions and operators as a calculated field expression, but argument names instead of field names represent actual values that will be supplied when the UDF is used in an expression.

For example, the expression for ISWEEKEND is:

```
(DOW (ANYDATE) =7) OR (DOW (ANYDATE) =1)
```

This expression uses the predefined DOW() (day of week) function, a relational operator (=), and a logical operator (OR) to operate on a date expression represented by the argument name ANYDATE. The DOW() function returns a number from 1 to 7 that represents the day

of the week of the ANYDATE expression. The = operator tests to see if this number is 7 (Saturday) or 1 (Sunday). The OR operator means that if the number of the day is either 7 or 1, the expression is true; that is, the date falls on a weekend.

When you include this UDF in a calculated field, the field expression that replaces the ANYDATE argument will supply a date value for the expression to process. For example, you could create a calculated field consisting of the expression ISWEEKEND(DATE()) to determine whether the current system date is a Saturday or a Sunday.

Note that the argument type prefixes (C_, D_, L_, M_, N_) are *not* included in the UDF expression.

Inserting Predefined Functions

When you select a predefined function and insert it in a UDF expression, in most cases you must supply one or more arguments (fields or operators) to that function. You can use the “Paste Function Arguments” setting as an aid to providing function arguments. When “Paste Function Arguments” is On (the default), Report Designer inserts the arguments for a function into the expression. The first argument is highlighted; any item you insert or type as an argument replaces the highlighted argument name.

For example, suppose that you have selected the SUBSTR function and inserted it into your UDF expression. With “Paste Function Arguments” on, the function is inserted as follows:

```
SUBSTR(char, num, opt num)
```

When you enter or insert the first argument, it replaces “char” in the expression. You can then supply the other function arguments as needed.

When “Paste Function Arguments” is Off, Report Designer inserts function names without supplying argument names. Instead, the function name is inserted followed by open/close parentheses — for example, SUBSTR().

Editing a User-Defined Function

To edit an existing user-defined function:

1. Select Calculations ⇒ User Function.

The User Functions dialog box appears.

2. In the Functions list, select the name of the UDF you want to edit.
3. Select the Edit button.

The Edit User Functions dialog box appears.

4. In the User Function Declaration edit box, edit the function name or arguments if you want to change them.

5. In the Expression edit box, edit the expression using any combination of the following methods:

- ◆ Delete the entire expression by selecting the Reset button.
- ◆ Edit all or part of the expression by typing directly in the Expression edit box.
- ◆ Insert a **function** by selecting an item in the Functions list, then selecting the Insert button.
- ◆ Insert an **operator** by selecting the Operator buttons.
- ◆ Insert a **calculated field expression** by selecting the Calc Expression button to display the Calculated Fields dialog box.
- ◆ Insert another **user-defined function formula** by selecting the User Function Formula button to display the User Functions dialog box.

6. Select the Verify button to determine whether the expression syntax is correct.

Report Designer displays a message box describing what, if any, syntax errors it found in the expression.

7. Select the OK button to confirm the changes or select the Cancel button to close the dialog box without making any changes to the UDF.

If the UDF you are changing will change the data type of another UDF or a calculated field expression in the current report, Report Designer will display a list of UDFs and calculated fields that will become unusable as a result of your change. The items on this list will become

impossible for Report Designer to evaluate as a result of your change. At this point, you can select Cancel to cancel the change or OK to make the change. Selecting OK will cause the affected UDFs and fields to be flagged with question marks in field lists. If any flagged UDFs or fields are used in your report, you will have to correct their expressions before you can run the report.

Be very careful about deleting UDFs because they can be used in more than one report. Report Designer cannot notify you of the effect your deletion may have on other reports.

Deleting a User-Defined Function

To delete a user-defined function:

1. Select Calculations ⇒ User Function.
The User Functions dialog box appears.
2. In the Functions list, select the name of the user-defined function you want to delete.
3. Select the Delete button. If the function you selected is used in another UDF expression or a non-join calculated field, that UDF or calculated field will be deleted as well. In this case, Report Designer shows you a list of all the fields and functions that will be deleted and asks you to confirm or cancel the deletions.

Be very careful about deleting UDFs because they can be used in more than one report. Report Designer cannot notify you of the effect your deletion may have on other reports.

4. Select Close.

Sample User-Defined Functions

The following sections present examples of user-defined functions and explain the procedures for creating them.

Creating a Salutation

Another example illustrates how a UDF simplifies the process of creating form letters. Suppose you have a number of tables that contain fields for titles (Mr. or Ms.), first names, and last names. Any of these fields can be blank, leading to form letter salutations like “Dear Smith” or “Dear Mr. John.” To generate an acceptable salutation no matter

which of these fields is empty, you can create a UDF called SALUTATION.

You want SALUTATION to compensate for missing title and name data by generating salutations like “Dear Mr. Smith.” when there is data in both the title and last-name field; salutations like “Dear John,” when the first-name field contains data but either the title or last-name field is empty; and salutations like “Dear Report Designer User:” when only the last-name field contains data.

Assuming that MM is the title argument, FN is the first-name argument, and LN is the last-name argument, the declaration of SALUTATION is:

```
SALUTATION(C_MM, C_FN, C_LN)
```

The expression is:

```
IIF(MM< >" ".AND.LN< >"", "Dear "+MM-" "+LN-" :",
IIF(FN< >"", "Dear "+FN-" ,", "Dear Report Designer
User: ") )
```

Translated, this expression means that if the title and last name both contain text, output a string composed of "Dear "+MM-" "+LN-" :". Otherwise, if the first name contains text, output a string composed of "Dear "+FN-" ,". Otherwise, output "Dear Report Designer User:"

Once this UDF has been defined, it can be used with any table containing title, first-name, and last-name fields. If your report uses a table with fields called MRMS, FIRSTNAME, and LASTNAME, you can create a calculated field called GREETING that invokes the SALUTATION function. The expression for GREETING will be:

```
SALUTATION(MRMS, FIRSTNAME, LASTNAME)
```

By supplying these field values to the SALUTATION expression, the GREETING field will produce output like that shown in Figure 9.6.

| <u>MRMS</u> | <u>FIRST</u> | <u>LAST</u> | <u>GREETING</u> |
|-------------|--------------|-------------|------------------|
| Ms. | Judy | Smith | Dear Ms. Smith: |
| Mr. | | Miller | Dear Mr. Miller: |
| Mr. | John | | Dear John, |
| | Lee | Jones | Dear Lee, |
| | | Cook | Dear Subscriber: |

Figure 9.6 Sample Output Using SALUTATION

Calculating Appreciated Value

Another example illustrates the creation of a numeric UDF that calculates the current value of appreciable assets. Since appreciated value depends on original value, interest rate, and the time that has elapsed since the asset was purchased, the declaration for an appreciated value (AV) function is as follows:

```
AV(N_OV,N_INT,D_DP)
```

In this declaration, OV represents original value, INT is interest rate, and DP is date of purchase. If yearly interest is converted to daily interest, the expression for the AV function is:

```
OV*(1+(INT/365))^DAYSBTWN( DATE( ),DP)
```

Translated, this expression means that appreciated value will be calculated by taking the original value and multiplying it by 1 plus the interest rate divided by 365 (days in a year) raised to a power that is the number of days since the asset was purchased. This number of days is supplied by the DAYSBTWN() function, which calculates the number of days between the current date (supplied by the DATE() function) and the date of purchase.

When you use this function in a calculated field expression, you replace the OV, INT, and DP arguments with actual expressions. For example, if you have an asset table that includes a COST field containing the asset's purchase price and a PURDATE field containing the purchase date, you can use the following expression to compute appreciated value at an 8% interest rate:

```
AV(COST,.08,PURDATE)
```

Two field names and a constant are substituted for the arguments in AV's declaration. This substitution supplies values to the expression that calculates appreciated value. To calculate appreciated value at a different interest rate, all you have to do is change the constant.

Chapter 10

Sorting and Grouping Data

Introduction

This chapter explains how to use the Sort and Group commands to sort and group data in reports. With the Sort command, you can select up to 8 sort fields to determine the order in which data will be presented in a report. With the Group command, you can select up to 8 group fields to group data into categories.

The explanation of sorting and grouping in this chapter is presented in the following sections:

- Sorting Data
- Grouping Data
- Techniques for Sorting and Grouping

For Auto-SQL reports, you use the Sort commands described in this chapter to control the order in which data will be presented in a report. For User-SQL reports, sorting is controlled by the `ORDER BY` clause in your `SELECT` statement. For either Auto-SQL or User-SQL reports, you use the Group commands to select group fields to group data into categories.

Sorting Data

Before you select one or more sort fields, the order of your report data is determined by the order of records in the master table. Selecting sort fields gives you complete control over the order in which data will be presented in a report. The sort order that you establish overrides the database order.

If you select one sort field, the order of data in that field determines the report's record order. You can select additional sort fields to establish a sorting hierarchy; the number of the sort fields determines the hierarchy. The first sort field determines the highest level sort; the eighth sort field determines the lowest-level sort.

Selecting and Analyzing Data

For example, if you select STATE as the first sort field, CITY as the second, and COMPANY as the third, Report Designer sorts data first by state, then by city within each state, then by company within each city.

Note that sorting records in Report Designer affects only the order in which data is presented in reports; it does not affect your tables.

Selecting Sort Fields

The Database ⇒ Sort Order command enables you to select up to 8 fields for sorting the composite records in your report. When you select a sort field, the order in which Report Designer arranges report records is determined by the order of data in the specified sort field.

For example, suppose the composite record structure includes a DESCRIPTN field. If you select DESCRIPTN as a sort field, the report data will be sorted alphabetically by the value found in the DESCRIPTN field of each composite record.

To specify sort fields:

1. Select Database ⇒ Sort Order (or the Sort button) to display the Sort Order dialog (see Figure 10.1).

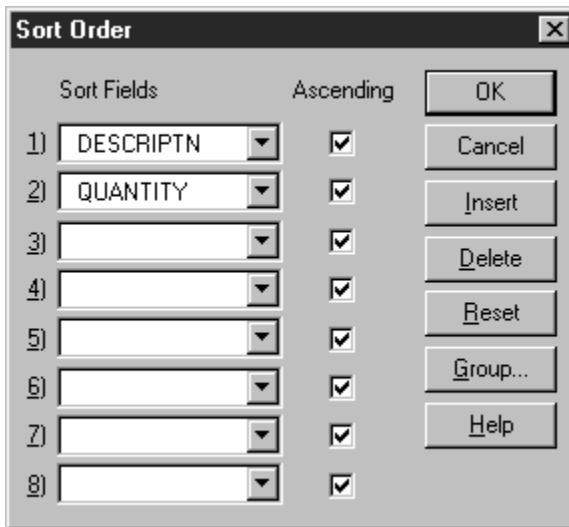


Figure 10.1 Sort Order Dialog Box

2. Open the list box for the first sort field slot. This menu displays all data fields (except memo fields) from the tables used in the report, as well as certain Report Designer calculated and total fields.
3. Select a field from this menu to establish the first level of sorting.
4. Select other sort fields as necessary to specify additional sort levels. If the slot where you want to add a sort level is empty, simply open the list box and select a field.

To insert a sort level between two existing sort fields, first highlight the field that's in the slot where you want to insert; then select Insert. The current sort field and those below it will be pushed down one level. The list box for the inserted slot will automatically be opened; select the sort field you want to insert at that level. Then select OK.

5. Select OK to save the new sort order.

By default, data for the field you select will be arranged in ascending order. Ascending order is alphabetical for character fields, false before true for logical fields, from most negative to most positive for numeric fields, and chronological for date fields. Descending order is the opposite of ascending order. To change to descending order, turn off the “Ascending” setting in the Sort Order column next to the selected field.

Selecting Sort Fields for Best Performance

When choosing sort fields, selecting one of the following types of fields will provide the best performance, since any sorting based on such fields will be done by the database software:

- Database fields;
- Database-evaluatable calculated fields (marked with an x in the field list);
- Calculated fields created using the SQLEXP() function..

If you select total fields or calculated fields that are not database-evaluatable, Report Designer performs the sorting using its own temporary files. Selecting such fields for sorting may cause a significant slow-down in processing, especially for reports involving large amounts of data.

Removing or Resetting Sort Field Selections

To remove a sort field selection:

1. Select Database ⇒ Sort Order (or the Sort button).

The Sort Order dialog box appears.

2. Highlight the sort level you want to remove; then select Delete.

The highlighted sort level is deleted and all the levels below it are moved up.

3. Select OK to save the new sort order.

To clear *all* sort field selections, select Reset. You can then specify new sort fields or simply select OK without specifying fields.

Grouping Data

The Database ⇒ Group Order command enables you to select up to 8 fields for grouping the composite records in your report. By selecting group fields, you can organize the records in your report in up to 8 hierarchical categories. Each category can have an associated Group Header and/or Footer to identify it or to provide summary information about the records in that group.

The number of the group field determines the grouping hierarchy in your report. The first group field selection specifies the most general (most inclusive) grouping level; the eighth group selection specifies the most specific (least inclusive) grouping level.

For example, you might want to group records in a sales report by region, state, city, and product. The report excerpt in Figure 10.2 uses these group fields to report sales at four levels of detail:

- 1 REGION (1st level)
- 2 STATE (2nd level)
- 3 CITY (3rd level)
- 4 PRODUCT (4th level)

Note that if you do not select group fields for a report, the default group fields will be the same as your sort fields.

| Quarterly Sales Report | | | |
|---------------------------|-------------|----------------|--------------|
| Region: Northwestern | | | |
| <u>State</u> | <u>City</u> | <u>Product</u> | <u>Sales</u> |
| Alaska | Anchorage | PC Com | \$999 |
| | | PC Database | \$4,470 |
| | | PC Spreadsheet | \$1,490 |
| | | | ----- |
| Total Sales for Anchorage | | | \$6,959 |
| | Fairbanks | PC Database | \$7,450 |
| | | PC Publisher | \$1,245 |
| | | PC Spreadsheet | \$1,490 |
| | | | ----- |
| Total Sales for Fairbanks | | | \$10,185 |
| Alaska Sales | | | \$17,144 |
| . | | | |
| . | | | |
| . | | | |
| NORTHWESTERN REGION SALES | | | \$45,859 |

Figure 10.2 Grouped Report

Combining Sorting and Grouping

Because your group fields are often the same as your sort fields, the sort fields you initially select automatically become your group fields. However, you can change the default group fields as necessary. In fact, you can combine sort and group field selections to achieve considerable flexibility in organizing your report.

For example, suppose you have a database containing transactions that you want to order by date. In addition, you want to report subtotals by month. You can achieve this result by sorting the composite records by date and then grouping by month.

Note that grouping achieves the desired effect only when records are sorted in the appropriate order. In the example above, grouping by month works only if the records are in date order.

Selecting Group Fields

When you select sort fields, Report Designer automatically makes those fields your group fields. Using the Group Order dialog box, you

can change the existing group field selections, insert or delete group fields, and specify options that control how grouped data will be presented in your report.

To add a group level to a report:

1. Select Database ⇒ Group Order, the Group button, or the Group button in the Sort dialog box to display the Group Order dialog box (see Figure 10.3).

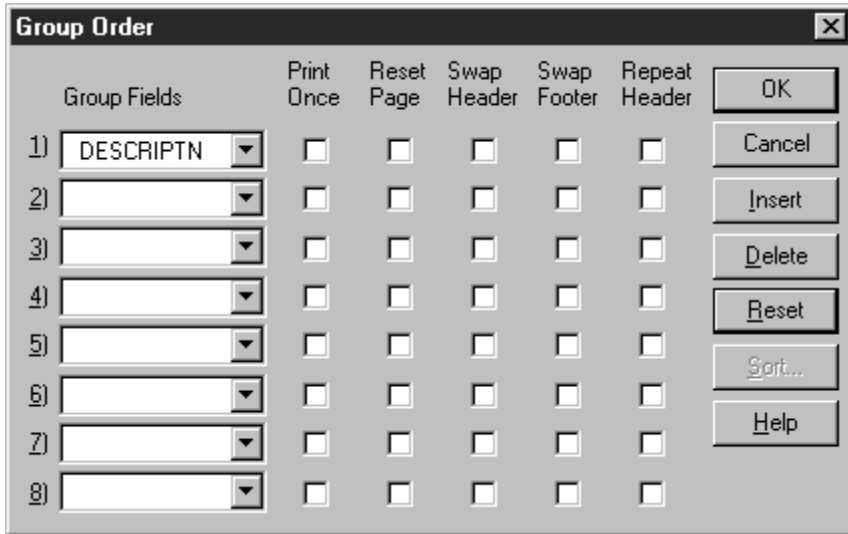


Figure 10.3 Group Order Dialog Box

2. If the slot in which you want to select a field for grouping is blank, select the field name from the drop-down list for that slot.

To insert a group level above a level for which you have already selected a field, highlight the existing group level; then select the Insert button. The highlighted group level and all the levels below it are moved down, leaving a blank slot. Select a field name from the drop-down list for the blank slot.

3. Select OK to save the new group order.

You can specify up to 8 grouping levels on the Group Order dialog box. Once you have specified multiple group fields, you can insert or remove selections; Report Designer automatically adjusts the remaining group field selections.

Removing or Resetting Group Field Selections

To remove a group field selection:

1. Select Database ⇒ Group Order (or the Group button).
The Group Order dialog box appears.
2. Highlight the group level you want to remove; then select Delete.
The highlighted group level is removed and all the levels below it are moved up.
3. Select OK to save the new group order.

To clear *all* group field selections, select Reset. You can then select new group fields or simply select OK without selecting fields.

Changing Group Options

The Group Order dialog contains the following additional options that provide further control over how grouped data appears on the report:

- | | | | |
|--------------------------|-------------|--------------------------|---------------|
| <input type="checkbox"/> | Print Once | <input type="checkbox"/> | Swap Footer |
| <input type="checkbox"/> | Reset Page | <input type="checkbox"/> | Repeat Header |
| <input type="checkbox"/> | Swap Header | | |

By default, each of these options is Off. To turn an option On for a particular group level, click the box in the appropriate column. The following sections explain each of the group options.

Print Once

This option enables you to suppress printing of repeating data on Record lines. For example, if you group a report by STATE, and the STATE field has been inserted in the Record band, the same state name will print for each record in a group. By turning on Print Once, you can suppress this repetition and print the state name once only.

By default, data from a selected group field will print on every line that includes that field. To specify that the data from a group field print only once per group, turn on the Print Once option for that group level.

In the report excerpt illustrated in Figure 10.4, Print Once is Off for the customer name group field.

| Customer Name | Item | Quantity | Amount |
|---------------|------|----------|--------|
| Joyce Adams | 101 | 18 | 162.00 |
| Joyce Adams | 103 | 12 | 60.00 |
| Joyce Adams | 108 | 36 | 144.00 |
| | | | ----- |
| | | Subtotal | 366.00 |
| Greg Anderson | 102 | 18 | 177.00 |
| Greg Anderson | 104 | 64 | 192.00 |

Figure 10.4 Report with Print Once Turned Off

Figure 10.5 shows the same report with Print Once turned On.

| Customer Name | Item | Quantity | Amount |
|---------------|------|----------|--------|
| Joyce Adams | 101 | 18 | 162.00 |
| | 103 | 12 | 60.00 |
| | 108 | 36 | 144.00 |
| | | | ----- |
| | | Subtotal | 366.00 |
| Greg Anderson | 102 | 18 | 177.00 |
| | 104 | 64 | 192.00 |

Figure 10.5 Report with Print Once Turned On

Reset Page

Using the Reset Page setting, you can reset the page number to 1 and start a new page for each group. For example, if you are printing a series of invoices grouped by order number and each invoice contains several pages of items ordered, you can re-start numbering for the first page of each invoice at Page 1.

By default, Report Designer numbers report pages consecutively. To have Report Designer reset the page number to 1 after the last record of each group, turn on Reset Page for that group level; as a result, each group will automatically begin on a new page.

Swap Header

When you create a report layout that contains Group Headers, you can use the Swap Header option to print the Group Header instead of the Page Header on pages where the group changes. The Group Header

created for swapping must be the same number of lines as the Page Header, since it will substitute for the Page Header on some pages. Group Header and Page Header lines should also have the same line height.

By default, Report Designer prints a Group Header before the first record for each group and places the Page Header at the top of each page. To print the Group Header instead of the Page Header at the top of the first page containing records for a new group, turn on Swap Header for that group level; as a result, each group will automatically begin on a new page.

For example, use the Swap Header option to print sales information grouped by region, with the region name at the top of each page on which a new region begins. By turning Swap Header on, you tell Report Designer to print the Group Header at the top of the first page of the group (each group will begin on a new page) and then print the Page Header at the top of each subsequent page in the group.

Swap Footer

When you create a report layout that includes Group Footers, you can use the Swap Footer option to print a Group Footer instead of the Page Footer on each page containing the last record in a group. The Group Footer created for swapping must be the same number of lines as the Page Footer, since it will substitute for the Page Footer on some pages. Group Footer and Page Footer lines should also have the same line height.

This feature is especially useful when you are reporting on pre-printed, multi-page forms, such as invoice forms. For example, you would use this option when printing invoices that group many pages of items by order number.

In this case, for each invoice, each page but the last will contain a Page Footer that includes a page total. However, the last page of each invoice will contain the Group Footer with the total for the entire invoice.

When the Swap Footer option is off, Report Designer prints the Group Footer after the last record for each group and places the Page Footer at the bottom of each page. To print the Group Footer instead of the Page Footer at the bottom of the last page containing records for each

group, turn on Swap Footer for that group level; as a result, each group will automatically begin on a new page.

Repeat Header

This option allows you to reprint a Group Header at the top of the page when a group continues across several pages. When this option is on, each time Report Designer starts a new page it prints a Page Header, if any, and then repeats the Group Header before printing more data within the group. When this option is off, Report Designer prints the Group Header only once at the beginning of each group. You can use this option to reprint column headings contained in a Group Header when the data for that group continues across pages.

Using Group Headers and Footers

Report Designer determines where to place Group Headers and Footers in your report based on the group fields you define. For example, if REGION is the first group field, the first-level Group Header prints before the first record for each new region; the first-level Group Footer prints after the last record for each region. In the same way, the second group field controls the placement of second-level Headers and Footers.

Each Group Header and Footer must have a corresponding group field at the same level. Without a controlling group field, Report Designer does not print or display Group Header and Footer lines.

The line type indicators on the Report Designer window show the connection between group fields and their corresponding Group Header and Footer bands. When you create a Group Header or Footer band, the line type indicator shows the Header or Footer level, followed by the group field name.

For example, in the portion of the report layout shown in Figure 10.6, the 1GH_COMPANY and 1GF_COMPANY that display to the left of the Group Header and Footer bands indicate that the first-level group field COMPANY controls those Header and Footer lines. The Group Header lines print each time the value in the COMPANY field changes; the Group Footer lines print at the end of each group.

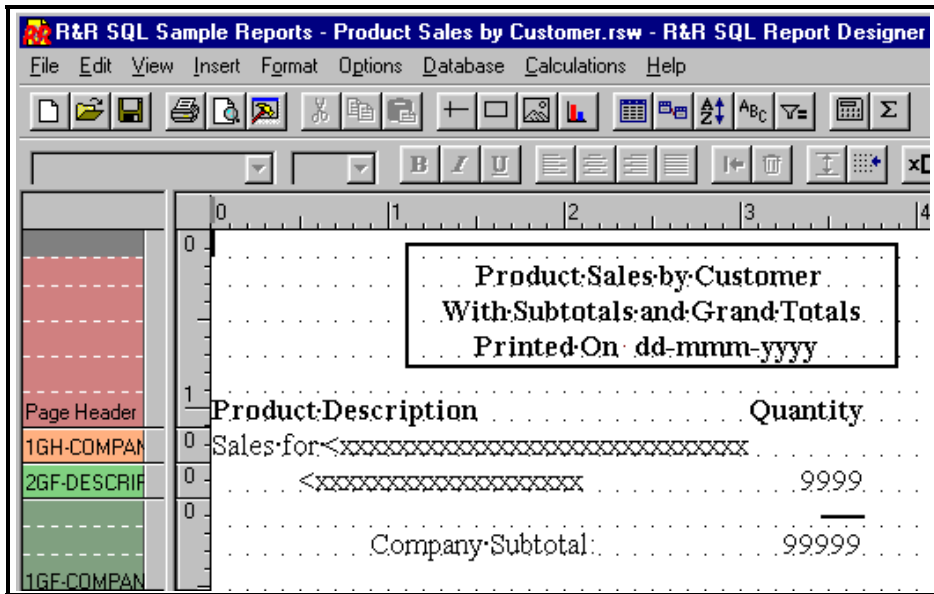


Figure 10.6 Group Field Line Indicators

Using Group Footers enables you to include summary information (such as Company Subtotal figures) at each level of this report.

Techniques for Sorting and Grouping

You can use various techniques to obtain further control over the order of report records. For example, you can:

- Sort and group on total fields;
- Sort and group on calculated fields.

These techniques are explained in the following sections.

Sorting and Grouping with Total Fields

Report Designer allows you to sort and group on total fields, as long as the fields have been designated as pre-processed.

For example, suppose you want to create an orders report that shows total orders by state and within state, by customer. You want to list states in order of decreasing number of orders, and within each state group, you want to list customers in order of decreasing number of orders.

You might create this report as follows:

1. Create the report using STATE and CUSTID as your initial sort and group fields, so that you can create the group totals you want.
2. Create a total field called STATECNT that is a count of the ORDERNO field reset on the STATE group field. This field will count the number of orders for each state. On the Total Field dialog, select Options and select “Pre-processed” as the Processing type.
3. Create a total field called CUSTCNT that is a count of the ORDERNO field that resets on the CUSTID group field. This field will count the number of orders for each customer. On the Total Field dialog, select Options and select “Pre-processed” as the Processing type.
4. Replace the STATE sort field with the pre-processed STATECNT total field.
5. Replace the CUSTID sort field with the pre-processed CUSTCNT total field.

Note that although your list of sort fields will be STATECNT, CUSTCNT, Report Designer will sort your report as if the sort fields were STATECNT, STATE, CUSTCNT, CUSTID. The STATE and CUSTID fields are implicitly included (even though they do not appear in the list of sort fields) to resolve ties between states that have the same number of orders and between customers that have the same number of orders.

As a general rule, when a pre-processed total field (or calculated field using a pre-processed total) is selected as sort field n , Report Designer inserts an implicit sort field between sort level n and $n+1$. The implicit sort field is the group field on which the total resets. If your sort field list includes several contiguous pre-processed totals that reset on the same group field, Report Designer inserts the implicit sort field once, after the last of the contiguous totals.

Sorting and Grouping with Calculated Fields

Report Designer allows you to sort and group on most calculated fields. For example, you could sort and group an orders report by month by creating a calculated field with the expression MONTH(ORD_DATE). Using this expression as the first sort and

group field in your report allows you to sort by month, as well as create Group Headers and Footers for each month's records.

Although you can group on such fields, you *cannot* use as a sort field any calculated field that:

- Uses the PAGENO, RECNO, or PREVIOUS functions;
- Is self-referencing;
- Is running-total-related.

You can also sort and group on many total-related calculated fields, as long as the total fields used in the calculated field expressions have been designated as pre-processed. For example, you could sort and group a customer report by customer category, using a calculated field that assigned customers to a category based on the total dollar volume of their orders. You might create such a report as follows:

1. Create the report using CUSTID as the first sort and group field.
2. Create a total field called CUST_TOT that is a sum of the ORD_AMT field reset on the CUSTID group field. This field will sum the order amounts for each customer.
3. Use the Options setting on the New/Edit Total Fields dialog to make CUST_TOT a pre-processed total.
4. Create a calculated field called CATEGORY that assigns customers to one of three categories ("High Volume", "Moderate Volume", "Low Volume") based on the value in the CUST_TOT pre-processed total field.

The field might have the following expression:

```
IIF(CUST_TOT>50000,"High Volume",  
IIF(CUST_TOT >= 10000,"Moderate Volume",  
"Low Volume"))
```

5. Use the Sort command to replace the CUSTID sort field with the CATEGORY field. If you want to sort by customer total within this category, you could add CUST_TOT as the second-level sort field.
6. Use the Group command to insert the CATEGORY field as the first group field, pushing the CUSTID field down one level.
7. Use Calculations ⇒ Total Field to edit the CUST_TOT total field so that it will continue to reset on CUSTID, which is now the *second* group field.

Although you can group on calculated fields whose expressions include *both* a pre-processed total field and a database field, you cannot select such fields as sort fields. This restriction is a result of the type of processing that produces pre-processed totals.

Chapter 11

Creating Filters

Introduction

This chapter explains how to use Database \Rightarrow Filter to select the composite records that will be included in a report. With this command, you can define a set of selection conditions called a *filter*, which is saved with your report. Each time you run the report, Report Designer will include only those records that meet the selection conditions.

Information about defining and using filters is presented in the following sections:

- Filter Structure
- Defining a Filter
- Editing a Filter
- Filter Techniques

Filter Structure

Each filter consists of one or more *conditions* that instruct Report Designer to retrieve data selectively based on criteria that you establish. To build a filter condition, you select or enter elements using the Condition dialog explained in the **Defining a Filter** section of this chapter. Each filter condition consists of three elements:

- A field from the composite record structure;
- A comparison operator such as “equal to” (see Figure 11.1);
- A comparison value, which can be a field, value, list of values, or range to which the value of the first field is compared.

Fields

Each filter condition begins with a field from the composite record structure. You can use a database field or a calculated or total field created in Report Designer. See the **Filter Techniques** section of this chapter for more information on using calculated and total fields in filters.

Comparison Operators

The second element of every filter condition is a comparison operator, such as “equal to” or “not equal to.” Figure 11.1 lists the comparison operators provided by Report Designer.

| Operator | Field Is |
|--------------------------|--|
| equal to | Equal to entered value or selected field's value |
| not equal to | Not equal to entered value or selected field's value |
| greater than | Greater than entered value or selected field's value |
| greater than or equal to | Greater than or equal to entered value or selected field's value |
| less than | Less than entered value or selected field's value |
| less than or equal to | Less than or equal to entered value or selected field's value |
| in the range | Between two entered values or equal to either |
| not in the range | Not between two values and equal to neither |
| in the list | Equal to one of up to 10 listed values |
| not in the list | Not equal to any listed values |
| like | Like the entered pattern |
| not like | Not like the entered pattern |
| is null | The NULL value |
| is not null | Not the NULL value |

Figure 11.1 Comparison Operators

For example, the following filter consists of two conditions telling Report Designer to select the records for all cities in California with a population greater than 5000.

```
Include all records where  
(STATE is equal to "CA")  
and (POPULTN is greater than "5000")
```

Because the conditions are joined by “and,” Report Designer will retrieve records that satisfy the requirements of *both* conditions. If these conditions were joined by “or” instead, Report Designer would retrieve all records that satisfy *either* condition; that is, records in which the value of STATE is “CA” *or* the value of POPULTN is greater than 5000.

Note that the Field you select controls the list of comparison operators you see. For example, if you select a logical field, only “equal to” and “not equal to” are displayed in the Comparison list.

Comparison Values

The final step in defining a filter condition is to enter or select a comparison value. Depending on the field and operator you have previously selected, the comparison value can be:

- A field of the same data type as the first field you selected.
- A constant value such as a number or character string. Enclose character strings in quotation marks (double or single) or square brackets; enclose date constants in curly braces — for example, {12/01/1996}.
- If you selected “like” or “not like,” a character string that defines a pattern using one or more of the following wildcard characters (see the section entitled **Filter Techniques** later in this chapter): `_`, `*`, `%`, or `?`.
- A list of constant values, any of which can be a character string (see the **Filter Techniques** section). Separate items in the list with commas.
- A pair of constant values that define a range.

Note that the comparison value can have a maximum of 530 characters. If you selected an equality comparison (“equal to,” “not equal to,” “in the list,” “not in the list”), you must enter the exact value you want to match. For example, AL matches AL, not Alabama and Alaska. For approximate matching, use wildcards as described in the section entitled **Filter Techniques** later in this chapter.

Note also that the case sensitivity of filter comparisons depends on how Report Designer or your database software is configured for case sensitivity.

Entering Values in a List

If you selected “in the list” or “not in the list” as the comparison operator, you can enter multiple comparison values. Separate the items in the list with commas.

Defining a Range of Values

If you selected “in the range” or “not in the range” as the operator to define a range of comparison values, separate the values with a comma.

Connectors

You can use “and” and “or” to join conditions in the filter. Joining two or more conditions with “and” means that records must meet the criteria established by *all* conditions in order to be included in the report. Joining conditions with “or” means that records must meet the criteria for at least one of the conditions in order to be included.

When a filter consists of several conditions joined by the same connector, Report Designer evaluates the filter from left to right. For example, in the following filter, the first “or” is evaluated before the second “or”:

```
Include all records where (STATE is equal to "VA")  
or where (STATE is equal to "MD")  
or where (STATE is equal to "DC")
```

When a filter consists of conditions joined by mixed connectors, Report Designer evaluates the “and” connectors before the “or” connectors, regardless of their order in the filter. For example, the following filter selects records of employees who are single (STATUS=S) and have dependents (DEPEND=Y), as well as records of all employees who are married (STATUS=M):

```
Include all records where (STATUS is equal to "M")  
or where (DEPEND is equal to "Y")  
and where (STATUS is equal to "S")
```

To change the order in which connectors are evaluated in a filter, you can use parentheses as described in the following section.

Parentheses

You can use parentheses to control the evaluation order of connectors in a filter. The connectors within parentheses are evaluated first, from the innermost level of parentheses outward. Without parentheses, “and” is evaluated before “or”.

For example, in the following filter, “or” is evaluated before “and,” because the condition in which it appears is inside the innermost level of parentheses:

```
Include all records where
(DEPT is in the list "sales", "research", "software")
and ((HIREDATE is greater than {1/1/90})
or (SALARY is greater than "40000"))
```

The resulting report lists only those employees in the Sales, Research, and Software departments who were *either* hired after January 1, 1990 *or* who earn a salary over \$40,000.

If you eliminate the parentheses from this filter, the “and” operator will be evaluated first. The resulting report will list employees in the selected departments who were hired after January 1, 1990. But it will also list *all* employees who earn over \$40,000, regardless of date of hire or department.

Defining a Filter

To define one or more filter conditions:

1. Select Database ⇒ Filter to display the Insert Condition dialog box. Since you are defining the first condition, the And/Or box is disabled.

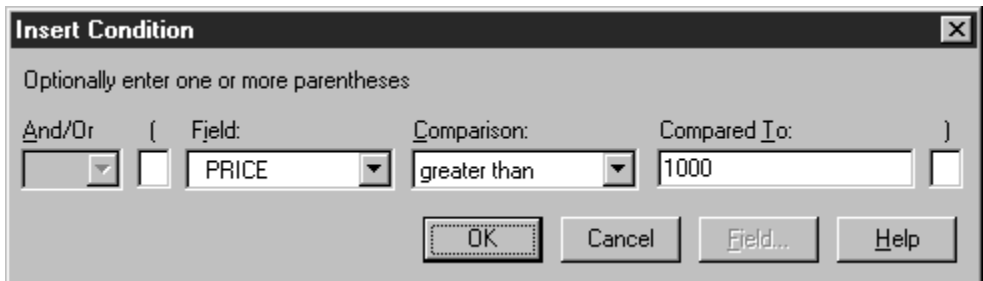


Figure 11.2 Insert Condition Dialog

2. If you are developing a multiple-condition filter, type one or more left parentheses in the edit box to the left of the Field box as necessary. You can use left and right parentheses to change the order in which Report Designer evaluates connectors in a multiple-condition filter.

Selecting and Analyzing Data

3. Open the Field list box. Select a field from the list.
4. Open the Comparison list box. Choose the appropriate operator from the list.
5. In the Compared To box, either enter a comparison value (a field name, a constant, or a list or range of values) or select the Field button and choose a field from the list.
6. Select OK to close the Condition dialog box and display the Filter dialog. To confirm that you have correctly defined the condition, select Verify.

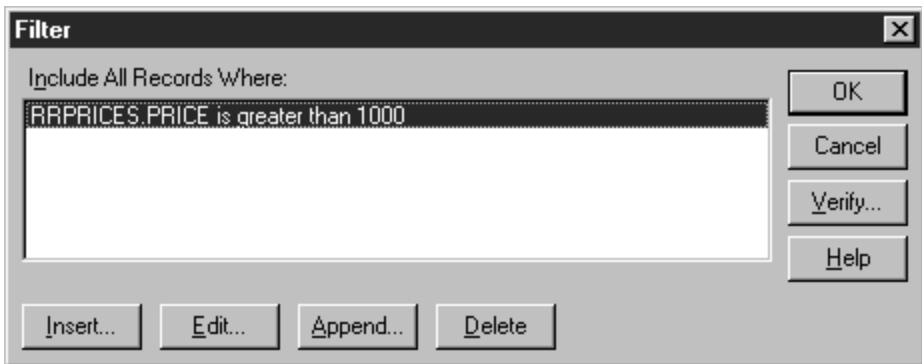


Figure 11.3 Filter Dialog Box with One Condition Defined

7. Insert and append other conditions as necessary. When you have defined all conditions, select OK to save the filter and return to the report layout.

Editing a Filter

You edit filters by modifying existing conditions, adding new conditions, or deleting conditions. Figure 11.4 explains each of the Filter dialog buttons.

| Use | To |
|------------|--|
| Insert | Insert above the currently highlighted condition |
| Edit | Modify the currently highlighted condition |
| Append | Add a condition below existing conditions |
| Delete | Delete the currently highlighted condition |

Figure 11.4 Explanation of Filter Dialog Buttons

Editing a Filter Condition

To edit a filter condition:

1. Select Database ⇒ Filter to display the Filter dialog box.
2. Highlight the condition you want to modify and select Edit to display the Edit Condition dialog box.
3. Modify the connector, parentheses, Field choice, Comparison operator, and/or Compared To value as necessary.
4. Select OK to complete the definition and return to the Filter dialog. If necessary, select Verify to confirm that you correctly defined the condition.

Inserting a Filter Condition

To insert a filter condition:

1. Select Database ⇒ Filter to display the Filter dialog box.
2. Determine where you want to insert the new condition. Highlight the condition that you want to come *after* the new condition and select Insert to display the Insert Condition dialog.
3. Select or enter the connector, parentheses, Field choice, Comparison operator, and/or Compared To value as necessary.
4. Select OK to complete the definition and return to the Filter dialog. If necessary, select Verify to confirm that you correctly defined the condition.

NOTE When you insert a condition as the first one in a multiple-condition filter, the condition that was originally first on the list is placed second and is given a default connector of “and.” If necessary, you can edit the second condition and select “or” as the connector.

Appending a Filter Condition

To add a condition at the end of an existing filter:

1. Select Database ⇒ Filter to display the Filter dialog box.
2. Select Append to display the Append Condition dialog.
3. Enter or select the connector, parentheses, Field choice, Comparison operator, and/or Compared To value as necessary.

4. Select OK to complete the definition and return to the Filter dialog. If necessary, select Verify to confirm that you correctly defined the condition.

Deleting a Filter Condition

To delete a filter condition:

1. Select Database ⇒ Filter to display the Filter dialog box.
2. Highlight the condition you want to delete and select Delete. If you delete a condition by mistake, you can select Cancel to undo the deletion.

Filter Techniques

In addition to selecting records that match specified database field values, Report Designer filters can select records that match character or date patterns, total field values, and calculated field values. The following sections explain these filter techniques.

Pattern-Matching with Wildcard Characters

A pattern-matching filter selects all records where the value in the selected character or date field matches (or doesn't match) a pattern you enter. You specify a pattern using special characters called *wildcard* characters.

For example, to select all records where the value in the CITY field starts with the letter H, you can create the following filter:

```
"Include all records where (CITY is like "H*")"
```

The asterisk (*) in this filter is a wildcard character that stands for any group of characters, like the asterisk in the DOS command `DIR H*.DBF`.

Figure 11.5 lists the wildcard characters used to define patterns in filters.

| Character | Meaning |
|------------------|--|
| _ or ? | In a character or memo filter, matches any single character in the same position in the field. |
| % or * | In a character or memo filter, matches any group of characters (including no characters). In a date filter, * matches any value in that part of the date (for example, {1/*/96}) |
| @ | In a date filter, matches any value that corresponds to that part of the system date (for example, {@/*/96}). |

Figure 11.5 Wildcard Characters

Note that wildcards cannot be used with numeric or logical fields.

Wildcards in Character Field Filters

If the comparison operator you have selected is “like” or “not like,” you can use the wildcard characters *, %, _, and ? to select records with character values that match the pattern you have entered. Several examples are given in Figure 11.6.

| To Include all Records | Enter |
|---|----------------|
| Starting with xyz | xyz% or xyz* |
| Ending with xyz | %xyz or *xyz |
| Starting with, ending with, or containing xyz | %xyz% or *xyz* |
| Consisting of the letter x followed by any character followed by the letter z | x_z or x?z |
| Containing the letter x followed by any character followed by the letter z | %x_z% or *x?z* |

Figure 11.6 Wildcards for Character Filters

Wildcards in Date Filters

You can also use the * or @ wildcard in filters on date values that use the “equal to” or “not equal to” comparison operator. Use * in place of any part of the date (for example, 12/* /96 means “any day in December 1996”). Use @ to signify a part of the current system date at

time of report generation (for example, @ /15/96 means “the 15th of the current month in 1996”). It is useful to think of @ as substituting for *this* month, day, or year and * as substituting for *any* month, day, or year.

Note that the order of month, day, and year in the date value you enter must conform to the month, day, and year order specified in the Windows Regional Short Date format (see your Windows documentation for more information about Regional Date settings). For example, if MDY is the Short Date format specified in Windows, you would enter December 5, 1996 as {12/05/96}.

Note also that filter conditions containing date patterns are evaluated by Report Designer, not by your database software.

Examples:

- To select any date in 1996, enter {* /* /96}
- To select any date in June of any year, enter {06/* /* }
- To select the first day of any month, enter {* /01/* }
- To print a report for all those in a group whose birthdays occur this month, you would use the following condition:

(BIRTHDATE is equal to {@ /* /* })

This condition would include in the report only those records in which the BIRTHDATE field had a value of this month, any day, and any year.

- To print a report of all new customers that you have signed up for the month, you could use the following condition:

(SIGNUP is equal to {@ /* /@ })

This condition would include in the report only those records in which the SIGNUP field had a value of this month, any day, this year.

- To print a report of all customers who signed up in a selected year (such as 1996), you would use a condition like this:

(SIGNUP is equal to {* /* /1996})

This condition would include in the report only those records in which the SIGNUP field had a value of any month, any day, in 1996.

Wildcards in Memo Field Filters

Report Designer also allows you to use % and * wildcard characters with “like” and “not like” to search for and select records based on text

in a memo field. However, the % or * character must be the first or last character of the comparison value.

For example, to include records that contain text starting with the word “Software” in the PROD_NOTES memo field, enter the condition:

```
(PROD_NOTES is like "Software*")
```

Note that memo field filters are based only on the text of the memo field itself, not on any values contained in data fields embedded within the memo.

Filtering for Values Containing Special Characters

In some instances you might want to filter for values that contain one of the four wildcard characters or that consist only of spaces or of the NULL value. Procedures for defining such filter conditions are explained in the following sections.

Filtering for Strings Containing Wildcard Characters

Depending on the database software you are using, you may be able to filter for character strings that contain any of the four wildcard characters (_, ?, %, or *).

Filtering for Values Containing Only Spaces

To include or exclude records containing only spaces in a given character field, select “equal to” or “not equal to” as the comparison operator and simply enter one or more spaces in the “Compared To” box (see your database software documentation to determine whether the number of spaces is significant).

Filtering for Values Containing NULL

To include or exclude records containing the NULL value in a given field, select “is null” or “is not null” as the comparison operator.

Filtering on Total Values

Report Designer allows you to select records based on certain total field values. The types of total filters allowed depend on whether your report includes totals designated as pre-processed (see Chapter 8, “Working with Total Fields,” for information about creating pre-processed totals).

- ❑ For reports that have no pre-processed totals defined, you are limited to filtering on Sum or Count total fields that have a reset level of Grand.
- ❑ For reports with one or more pre-processed totals, you can filter only on pre-processed totals that reset on the highest (most inclusive) group field for which a pre-processed total has been defined.

Running and Pre-Processed Totals

Any total field you create is by default a *running* total; Report Designer calculates its value cumulatively as it reads each record that contributes to the total. You can create filters using running Counts and Sums with a “Grand” reset level, but these filters may be difficult to formulate since only records that meet the filter conditions contribute to the total. Filters on pre-processed total fields — fields whose final values are calculated before the report records are printed — are much easier to formulate, since all records that contribute to the total will have been read before the filter is applied.

Filters on Running Totals

In reports that contain no pre-processed totals, you can filter on Grand running Sums and Counts. However, since Report Designer tests the current record against the filter before computing the total for that record, the filter will be applied based on the total value as of the previous record. In other words, since the total for the current composite record will not have been calculated before the filter is applied, Report Designer’s decision as to whether to include the record will be based on the total value as of the previous composite record.

For example, when you filter on a running Count total field, the count for the current composite record will not have been calculated before the filter is applied. In order to use the filter to select the first N records, you must specify that the Count field value be *less* than N rather than less than or equal to N.

To select the first three records using the COUNTER total field, which counts the NAME field, specify the following filter condition:

```
(COUNTER is less than 3)
```

Without the filter, the report would include the following contributors, sorted by contribution in descending order:

| <u>NAME</u> | <u>CONTRIBUTION</u> |
|-------------|---------------------|
| Warren | 150 |
| Clark | 125 |
| Mortimer | 120 |
| Smith | 100 |
| Jones | 50 |

With the filter, the records selected for the report would be:

| <u>NAME</u> | <u>CONTRIBUTION</u> | <u>COUNTER</u> |
|-------------|---------------------|---|
| Warren | 150 | 1 |
| Clark | 125 | 2 |
| Mortimer | 120 | 3 (value of COUNTER field for this record not calculated until after filter is applied) |

Filters on Pre-Processed Totals

In reports that contain pre-processed totals, you can filter on any pre-processed total that resets at the highest group level at which any pre-processed total has been defined. You cannot filter on any running totals or on any other pre-processed totals in the report.

For example, in an invoice report in which each invoice total is a pre-processed, order number group total, you could create a filter that pulls out only those invoice records with totals of \$500 or more. In an order list grouped by customer number and containing a pre-processed, customer number group total, you could create a filter that pulls out only those customer records with 10 or more orders. Because of the way in which Report Designer accumulates pre-processed totals, none of the running totals in these reports would be available for filtering. In addition, the filters on the pre-processed order and customer totals would be invalid if either report contained higher level pre-processed totals. An error message will notify you of invalid filters when you try to display or print such a report.

Filtering on Calculated Fields

Report Designer allows you to select records based on calculated field values *except* those that:

- Use the PAGENO(), RECNO(), or QUERY() function
- Use totals that cannot be filtered on (see the section entitled **Filtering on Total Values** earlier in this chapter)

Comparing a Field to an Expression

You can compare a field to an expression by using a calculated field in a filter. For example, to define a filter that selects all records where the value in the Amount field equals the value of the expression Discount * Rate, create a calculated field named DiscRate whose expression is Discount * Rate. Then select DiscRate() as the value in the filter:

```
Include all records where  
(Amount is equal to DiscRate())
```

Chapter 12

Creating Charts

Introduction

This chapter explains how to create charts that present report data graphically and incorporate them into your reports.

You can choose from a variety of chart types to embed in your reports, including 2-dimensional or 3-dimensional bar, pie, line, and area graphs. You can control all aspects of the embedded chart, such as size, position, text elements, and color.

Information about creating charts is presented in the following sections:

- Creating an Embedded Chart
- Understanding the Charting Tabbed Dialogs
- Modifying a Chart
- Sample Charting Scenarios
- Special Considerations for Charting

Creating an Embedded Chart

You create an embedded chart for a report by specifying a combination of settings from the dialogs (referred as either *tabs* or *property pages*) on the charting property sheet. Although the order in which you access the dialog tabs will vary depending on the report and the chart you are creating, in the following procedures the tabs are accessed in the order in which they appear on the charting property sheet.

The following sections explain how to create and embed a chart in the Summary Columnar Report, one of the sample reports that is installed with Report Designer. The resulting chart will show sales by customer, and further broken down by product type, and will appear in each Company footer of the report. The techniques explained here for adding a chart to this sample report can easily be adapted for creating and embedding a chart in any report.

Inserting the Chart

In most cases, you will want to insert a chart into a Freeform band line that is large enough to accommodate the entire chart. If necessary you can estimate the area to be occupied by the chart and adjust the band height later.

To insert a chart into the Summary Columnar Report, do the following:

1. Start Report Designer and open the Summary Columnar Report in the Samples folder.
2. Right-click on the third Company group footer line (the line containing the 1GH-COMPANY label). Select Properties from the menu to display the Band Line Properties dialog.
3. In the Height group box, select Freeform; then enter or select a setting of 5 inches. Select OK.
4. Select Insert ⇒ Create Band Line. In the Line Placement group box, select Below Current Line; then check the New Page Line checkbox. As a result, the data for each company will begin on a new page.
5. Select Insert ⇒ Chart (or select the Chart button on the Standard Toolbar). The cursor changes to a combination of crosshair and a rectangle. Click and drag the chart cursor in the Freeform line of the Company band until the insertion rectangle is approximately 5 inches high and 7 inches wide; then release the mouse.

When you release the mouse, the Chart property sheet appears. The Chart property sheet consists of several tabs; when it first appears, the Type tab is active. In the following sections, you will select a chart type and style; specify the data to be charted; add titles and labels; and specify size, font, and other chart characteristics.

Selecting a Chart Type and Style

You can select from one of four chart types, and for each of those types you can specify additional characteristics. You use the Type and Style tabs of the Chart property page to choose the chart elements.

The chart for the Summary Columnar Report will use the default Type of “Bar” and the default Style of “Simple.” For charts that you will be developing for your own reports, you can select any one of the four

chart types and, depending on the type you select, further modify the appearance and orientation of the selected chart type.

For detailed information about each chart type and the styles that can be applied, see the **Understanding the Charting Tabbed Dialogs** section in this chapter.

Specifying the Data To Be Charted

To select the report data to be included in the chart, first click the Data tab to make it active. Then do the following:

1. In the Fields list box, double-click the “cumul_tot” field to add it to the Selected Fields list box. This field contains totals sales figures for each customer.
2. In the Label Field box, select “COMPANY” (under RRCUST); note that this field name is also inserted automatically as the Sort Field value.
3. The settings in the Sub-category group box enable you to provide a further breakdown of data for each customer. To do so, begin by selecting “order_tot” (under RRITEMS) in the Value box; this field calculates the total amount of each item purchased by a given customer.
4. In the Label Field box (also in the Sub-category group box), select “DESCRIPTN” (under RRPRICES); note that this value is automatically inserted into the Sort box.
5. Click the Combine Dups box to turn this option on; as a result, if a given item (as identified by the “DESCRIPTN” value) appears in more than one order for a single customer, totals for that item will be combined into a single value for that customer.

Adding Titles and Labels

The Text tab enables you to add titles, legends, and labels to a chart. Follow these steps to add text elements to the chart for the Summary Columnar Report:

1. In the Chart Title box, type “Customer Sales by Item.”
2. In the Category edit box of the Axis Titles group, type “Company”; this will appear as the X-axis label.

3. In the Value edit box, type “Sales in Dollars”; this will appear as the Y-axis label

The default font for text elements is Arial. To select a different font, use the Font tab, as explained in the **Specifying Size, Font, and Other Options** section.

Specifying Size, Font, and Other Options

You use the Options tab to control chart size and anchoring; you use the Font tab to specify a font to be applied to all text elements and to select a color palette for the chart.

To specify or change the chart dimensions, click the Options tab and enter or select Width and Height values. Use the Anchor setting to specify where the chart will be “anchored” in the report: This setting establishes either the top or bottom edge of the chart as the starting position of the chart on the layout (see the **Chart Anchoring** section for more information).

Use the Font tab to select a font to be applied to all text elements in the chart. The range of available fonts will vary depending on your system configuration and the currently selected printer. You can also use the Font tab to specify a color palette to be used for the chart. See the **Font Property Page** section for details about the available palettes.

Previewing the Completed Report

To preview the placement and appearance of the chart you embedded, select File ⇒ Print Preview (or click the Preview button).

Figure 12.1 shows a zoomed preview of a page from the report.

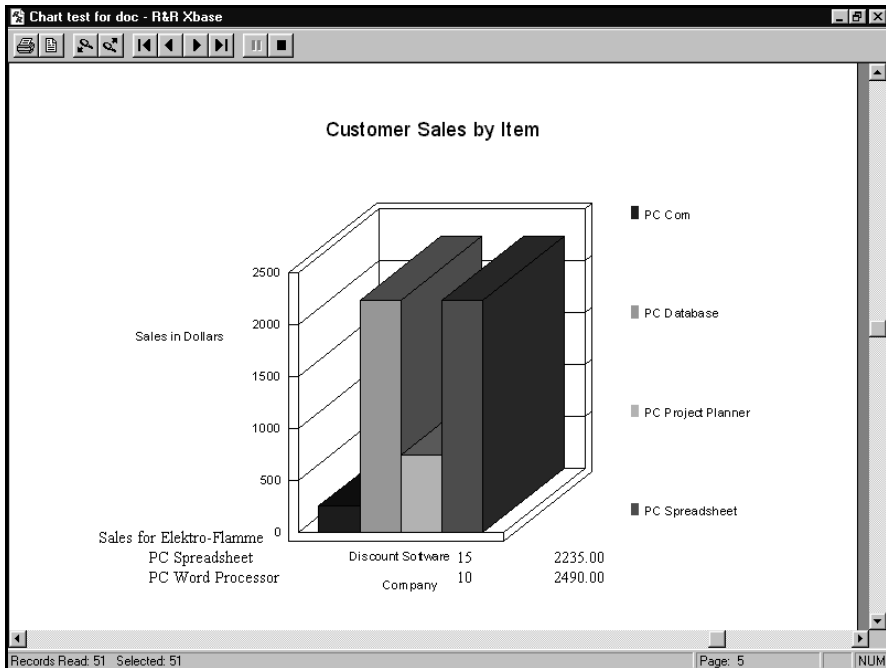


Figure 12.1 Zoomed Preview of Embedded Chart

Modifying an Existing Embedded Chart

To modify an embedded chart, first display the Chart property sheet in either of the following ways:

- Click the chart to select it and choose Format ⇒ Properties;
- Right-click the chart and select Properties.

Using the various tabs of the Chart property sheet, you can change the characteristics of the chart as necessary.

To re-position a chart on the layout, first click to select the chart; then click and drag the chart to the new location. To re-size a chart directly on the layout, first click to select the chart; then click and drag one of the handles that display around the perimeter of the chart.

Understanding the Charting Tabbed Dialogs

The following sections explain the settings available on each of the Charting tabbed dialogs (also referred to as property sheets).

Using the Type Tab

Use the Type tab to specify the kind of chart you want, whether the chart will be 2-dimensional or 3-dimensional, and whether the chart will include vertical and/or horizontal grid lines. Figure 12.2 describes each of the chart types.

| <i>Chart Type</i> | <i>Description</i> |
|-------------------|---|
| Bar | Presents data as a series of bars whose heights are proportional to the values being charted. |
| Pie | Presents each value as wedge that represents the value's percentage of the overall total. (Note that pie charts are not suitable for representing negative values.) |
| Line | Presents values as a series of points connected by lines, with a separate line for each field value being charted. Line charts are suitable only for charts that will contain at least two data points. |
| Area | Presents values in a manner similar to that of the Line chart, except that the region between the line and the horizontal axis is filled with the same color as the line. (Area charts are not suitable for representing negative values, and should be used only for charts that will contain at least two data points.) |

Figure 12.2 Description of Chart Types

By default, each chart type has a flat or two-dimensional appearance. As illustrated in Figure 12.3, you can specify that the chart elements should have a three-dimensional appearance by clicking the 3D box. In addition, you can add horizontal and/or vertical grid lines to the selected chart by clicking the Vertical and/or Horizontal box.

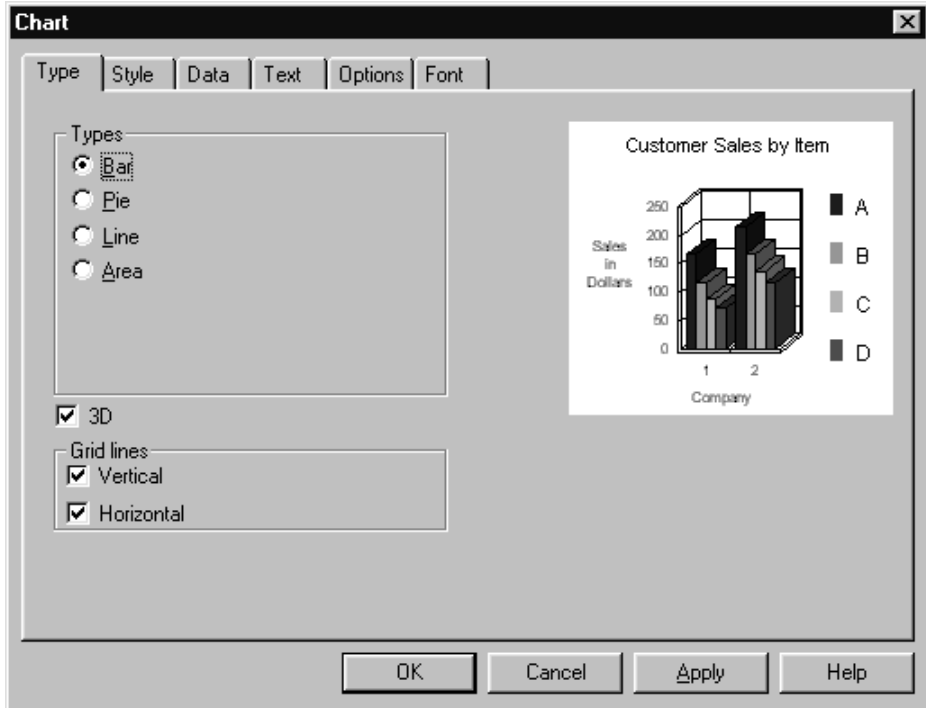


Figure 12.3 Chart Type Tab

Using the Style Tab

For bar and area charts, you can specify additional characteristics using the Style tab (the Style settings do not apply to line or pie charts). The options available on the Style tab depend on the chart type selected.

Style Options for Bar Charts

The following style options are available for bar charts:

- Simple
- Stacked
- Stacked Percentage
- Stacked Floating

Use “Simple” if the chart you are creating will have only one value for each data point; select one of the other styles only if the chart you are creating will contain multiple values for each data point.

Figure 12.4 explains each of these style options.

| <i>Style Option</i> | <i>Explanation</i> |
|---------------------|---|
| Simple | Represents the multiple values as separate, side-by-side bars. |
| Stacked | Represents the multiple values as a single bar with a separate segment for each value. |
| Stacked Percentage | A kind of stacked chart in which all bars are the same height, with each segment representing the percentage contribution of that value to the whole. |
| Stacked Floating | A kind of stacked chart in which the first segment is invisible and thereby serves as an offset from the axis at which the second segment begins. (This style is appropriate only when all values will include the same set of bar segments.) |

Figure 12.4 Style Options for Bar Charts

Additional style settings in the Orientation box (Horizontal and Vertical) enable you to specify whether the bars of the chart extend upward from the horizontal axis or rightward from the vertical axis.

Style Options for Area Charts

The following style options are available for area charts:

- Absolute
- Stacked
- Stacked Percentage

You should select from these styles only if the chart you are creating will contain multiple values for each data point.

Figure 12.5 explains each of these style options.

| <i>Style Option</i> | <i>Explanation</i> |
|---------------------|--|
| Absolute | Represents each series of values as distances from the horizontal axis; portions of some of the resulting filled areas will be obscured behind other filled areas. |
| Stacked | Represents each series of values as distances above the values from the previous series, giving the appearance of areas stacked on top of each other. |
| Stacked Percentage | A kind of stacked chart in which the line defining the top area is a horizontal line at 100 percent, and the other areas are scaled appropriately to indicate what percentage of the whole they represent. |

Figure 12.5 Style Options for Bar Charts

Using the Data Tab

Use the Data tab of the Chart property sheet to select the data to be charted. You must specify at least the following on the Data tab:

- One or more Selected Fields whose values provide the chart data;
- A Label Field whose values provide labels for the chart's data points;
- A Sort Field whose values determine the order of the data points. By default, this setting is the same as the Label Field setting. After selecting a Sort Field, you can choose ascending or descending sort order; in addition, you can specify whether to combine duplicate sort field values.

For each Selected Field, a chart will contain one value per data point. For example, in a simple bar chart each data point is represented by one bar for each Selected Field; a line chart will have one line for each Selected Field.

You can add a field to the Selected Fields box in any of the following ways: highlight the field in the Fields box and select Add; double-click the field in the Fields box; or drag and drop the field from the Fields box to the Selected Fields box.

Fields appear in the Selected Fields list box in the order in which you add them. Use the up- and down-arrow buttons to the right of the Selected Fields box to change the order of the fields. To remove a field from the Selected Fields box, either double-click the field or highlight it and select Remove.

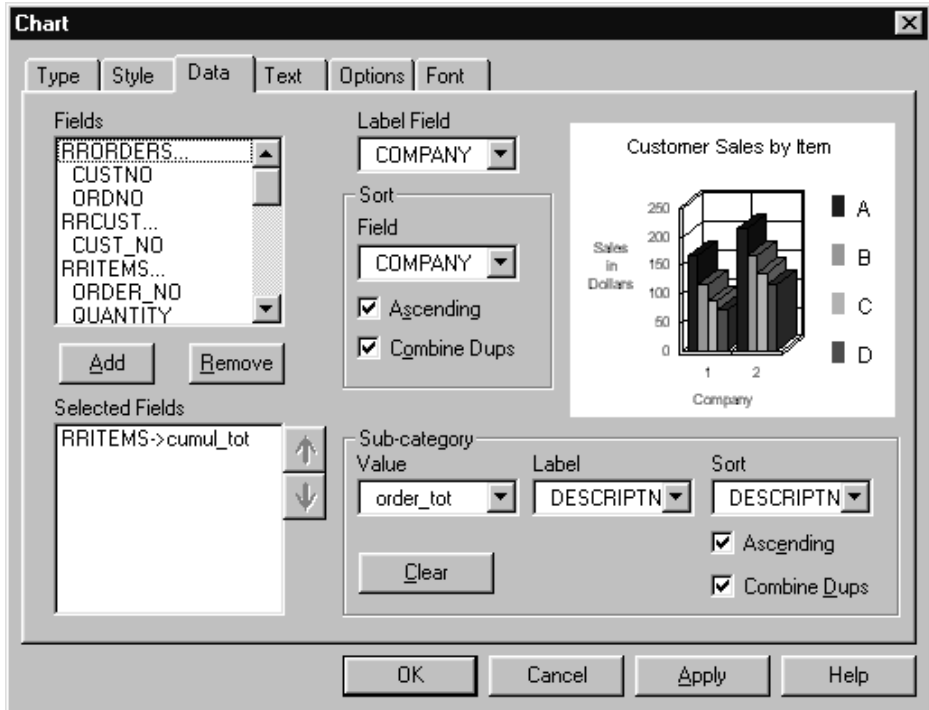


Figure 12.6 Chart Data Tab

In addition to the three required items, if you have added only one field to the Selected Field box, you can also specify three fields that describe a Sub-category (see Figure 12.6). The Value Field in the Sub-category box replaces the Selected Field as the source of data. When you specify a Sub-category, you are essentially informing the charting software that the single Selected Field can be thought of as being composed of a series of values of the Sub-category Value Field. In this case, the Selected Field's values are not actually used at all in preparing the chart, though the Sort and Label Field values associated with the Selected Field *are* used. A given chart can contain more than one Selected Field or a Sub-category but not both, since the Sub-category Value Field replaces the Selected Field as the source of data.

See the **Sample Charting Scenarios** section for an example that uses the Sub-category concept.

See the **Special Considerations for Charting** section for more information about re-ordering the Selected Fields.

Using the Text, Options, and Font Tabs

The Text tab enables you to add titles, legends, and labels to a chart. The Options tab includes settings for chart size, anchoring, and value range. On the Font tab, you can specify a base font to be used by all text elements of the chart and a color palette that will determine the chart's colors.

Text Property Page

Available settings for the Text tab are explained in Figure 12.7.

| <i>Setting</i> | <i>Description</i> |
|----------------|--|
| Chart Title | Appears centered across the top of the chart rectangle. |
| Category (X) | Appears below the horizontal axis of the chart. |
| Value (Y) | Appears to the left of the vertical axis. You can further specify orientation: Left to Right (horizontal), Top to Bottom (vertical, starting at top), or Bottom to Top (vertical, starting at bottom). |
| Depth (Z) | Appears to the right of the chart to serve as a label for the “depth” portion of a 3D chart. |
| Legend | Specifies inclusion of a legend to the right of the chart that explains the different chart elements (not applicable to pie charts). |
| Label Points | Specifies inclusion of numeric labels to indicate the values that have been charted (not applicable to 3D charts). |

Figure 12.7 Chart Text Tab

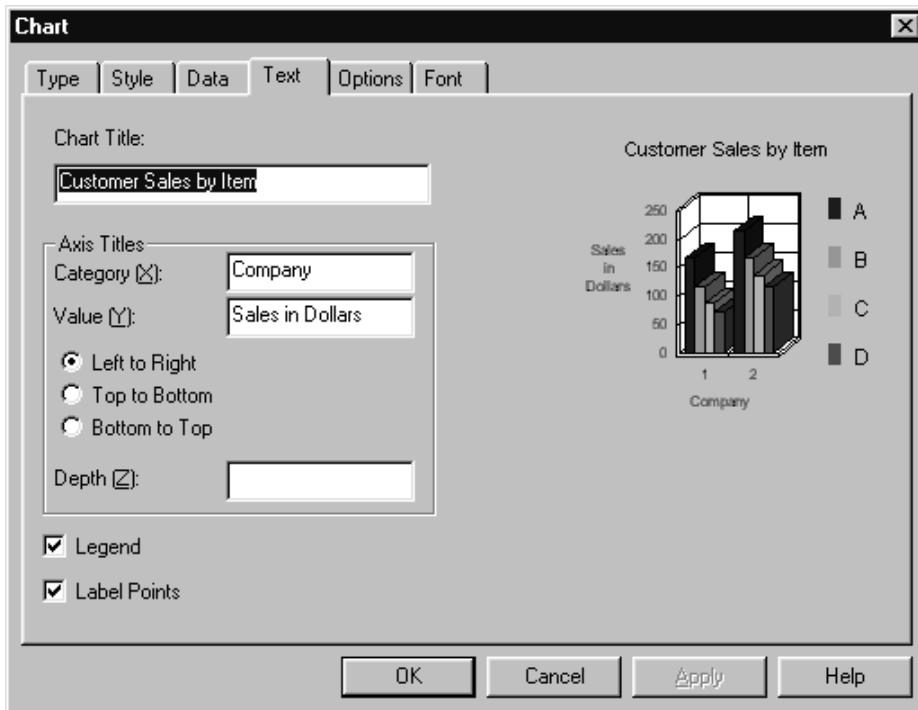


Figure 12.8 Chart Text Tab

Options Property Page

On the Options property page (see Figure 12.9), you can specify:

- A precise Chart Size in inches.
- Whether to Anchor the chart by its top or bottom edge. This setting is relevant only when the chart is not confined to a single band line. See the **Special Considerations for Charting** section for further discussion of this option.
- A Value Range to use for all instances of a given chart. You can specify either that you want each chart's value axis to have its own value range (Automatic) suited to the values it contains, or that you want a single value range for all charts. If you want a single value range for all charts, you can specify either that Report Designer should compute a range suitable for all the values present in all instances of the chart in the entire report (Normalize) or that a range of values that you specify should be used instead (User Defined). By default, the value range is Automatic and always includes the value zero. With this

default setting, for example, if you are charting a range of values between 1001 and 1009, they will all appear about the same, unless you specify a value range of, for example, 1000 to 1010.

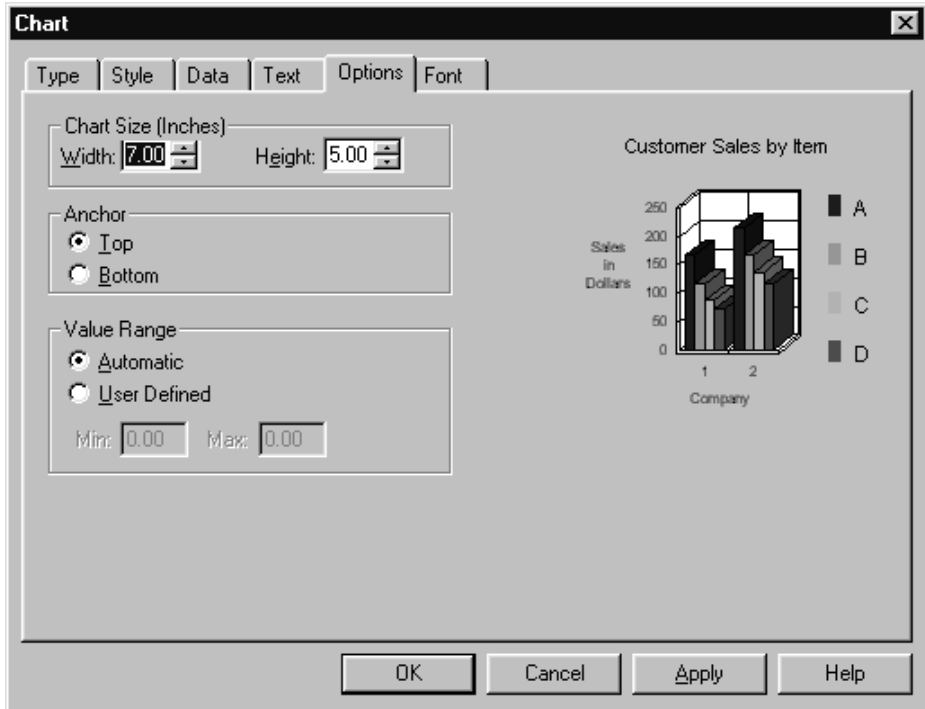


Figure 12.9 Chart Options Tab

Font Property Page

On the Font property page, you can specify:

- A Base Font name to use for all text items on the chart.
- A color Palette from which to select colors for use on the chart. The available palettes are:
 16-Color, which contains the standard Windows colors
 Shades of Gray
 Pastels, which contains “washed out” shades of the primary colors
 Shades of RGBCMY, which contains various intensities of the primary colors

Rainbow, which contains various shades of a spectrum of colors

Shades of Red

Shades of Green

Shades of Blue

Shades of Cyan

Shades of Magenta

Shades of Yellow

The monochromatic palettes can be used to create “tasteful” charts, but the various shades can be difficult to distinguish from each other in certain types and styles of charts.

Sample Charting Scenarios

In this section, we will discuss some sample charting scenarios and describe how to specify the chart, concentrating on the Data property page.

Chart of Customer Totals in Summary Band

Suppose you have a report of items purchased, sorted and grouped by invoice number within customer. You have defined “OrdSum,” which is a sum of item prices resetting on a change in order number (OrdNum) and which therefore represents the total dollar amount for a given order; and “CustSum,” which is a sum of item prices resetting on a change in customer ID (CustID) and which therefore represents the total dollar amount for a given customer.

Insert a chart in the summary band. On the Data page, specify “CustSum” as the Selected Field, “CustSum” as the Sort Field, and “Company” as the Label Field. Do not check the Combine Dups check-box. Do not check the Ascending check-box. If you specify Simple Bar chart as the Type and Style, you will have a chart in the summary band that shows one bar per customer using the values of the CustSum field to determine the bar heights. The bars will be presented in decreasing order of total sales per customer.

If on the Data page, you also specify a Sub-category with a Value field of “OrdSum,” a Label Field of “OrdNum,” and a Sort Field of “OrdNum,” and you change the chart Style to Stacked Bar, the

summary will contain a chart with a single bar per customer where each bar is broken into segments representing order totals.

Chart of Sales Attributable to Product Line

In the same report as described in the **Chart of Customer Totals in Summary Band** section, suppose you want a chart in each customer footer showing what percentage of sales for that customer are attributable to each of various product lines. Assume that each item record includes a product-line field (ProdLine) and that each item is in one of six product lines. On the Data page, specify “CustSum” as the Selected Field and “Company” as the Label and Sort Fields. Specify “Price” as the Sub-category Value Field, “ProdLine” as both the Sub-category Label and Sort Fields, and check the Combine Dups checkbox. These settings ensure that each product line will have a single pie wedge representing the sum of all contributions of that product line, independent of invoice number. Specify Pie chart on the Type page. In each customer footer, you will see a pie chart depicting the percentage of sales to that customer due to items in each product line.

Special Considerations for Charting

In our attempt to provide a maximum of flexibility in our charting support, we have given you control over some aspects of your charts that may puzzle you if you specify “odd” settings. This section describes some of the “tricky” areas and how to think about them.

Sort Field & Label Field

Generally speaking, you will want to specify the same field as both the Sort Field and the Label Field. However, you may have occasion to make these two fields distinct. For example, suppose you want to label the bars in a bar chart with the names from a last-name field. However, to ensure that values representing different individuals are separately depicted in the chart, you may want to sort by social-security number or other unique identifier.

Combine Dups

When Report Designer collects data for a chart, it stores the values of the Selected Fields, as well as the values of the Label and Sort Fields. Each remembered “value set” actually consists of these three values.

The remembered Sort Field values are used to order the data for presentation in the chart. Sometimes multiple value sets will have identical Sort Field values. The Combine Dups setting determines whether such duplicate Sort Field values should be treated as distinct (Combine Dups not checked) or should be combined (Combine Dups checked). When the values of a field that is a sum, a count, or a non-total are combined, the values are simply added together and the number of separate data points decreases accordingly. For total types other than sums or counts, appropriate calculations are done in combining the values.

As a rule of thumb, you will probably want to check the Combine Dups box if the values being charted are two or more levels deeper than the band line in which the chart is anchored, or if the Sub-category Value Field has a group level two or more levels deeper than the Selected Field's group level.

One way to think of the meaning of checking the Combine Dups check-box is as a request for an implicit total of all values for which the Sort field has the same value. If the data you are charting is such that you would not have duplicate values of the Sort field, the setting doesn't matter, but if you do expect duplicates, you should (or should not) check the Combine Dups box depending on whether you want each value set having duplicate Sort field values to be treated as part of an implicit total or as a separate value set. Some examples that illustrate the decision process follow.

Here is an example where you would want to check the Combine Dups check-box. Suppose you have a report with group levels of Customer and Order. If you are making a chart of Customer spending patterns by Item, you will expect to have multiple Orders for some Customers in which the same Item was ordered. You would want to combine duplicate values in this case because you want a single value for each Item and Customer, not for each Item and Order. Note that the Item level is at the level of the record band and is two levels down from the Customer level, which is where the chart is located.

Here is an example where you would probably not want to check the Combine Dups check-box: Suppose you have a table that includes electoral votes by state, and you want a chart in the summary band showing the number of electoral votes by state in increasing order of number of votes. There are many states having the same number of electoral votes. If you combine duplicates, there will be fewer bars than states, and the bars representing combined values will depict the

total number of electoral votes among all states having that same number of votes. If you were also to label the bars with the number of electoral votes, you might see a bar labeled “9” with a height of 27 because there are three states that have nine electoral votes each. If you were to label the bars with the state name instead, the label would be the name of whichever state happened to come first after the sorting of states by number of electoral votes.

Chart Anchoring

The anchor setting specifies whether the top or bottom edge of the chart rectangle should determine the “official” position of the chart on the layout. When a chart is not confined to a single band line, the anchor setting determines whether it “grows up” into areas of the report above the line containing the bottom of the chart rectangle, or “grows down” into areas below the line containing the top of the chart rectangle. You might use this feature by having a group footer consisting of multiple band lines, where the footer text and data are displayed along the left side of the layout and the chart is displayed across the entire footer on the right side of the layout.

Significance of the Order of Selected Fields

The order in which the fields appear in the Selected Fields list-box has special significance for certain chart types. In a Simple Bar chart, the first field will appear leftmost among the bars for each data point. In a Stacked Bar chart, the first field will appear on the bottom of the stack of bars for each data point in a Stacked Bar chart. In an area chart, the first field’s area will be drawn first, and as a result will be overlaid by the subsequent fields. If you were plotting a sum, a minimum, a maximum, and an average for each data point, it would make sense to list the fields in the order sum, maximum, average, minimum, so that the tallest area appears farthest back. In a 3D area chart, the 3D area for the first value is also depicted farthest back in the perspective view. Similarly, in a 3D line chart, the “ribbon” representing the first line is depicted farthest back.

Group Levels and Charting

A chart of a given Selected Field can vary dramatically depending upon the band line the chart is in. For example, suppose you have a report that includes order, customer, and state group fields. Further

suppose that the report includes an order-level total field (OrdTot). If you chart OrdTot as a bar chart in the order-level group footer, each chart will consist of a single bar representing the value of OrdTot for that order. If you move (or copy) the same chart to the customer footer, it will contain a bar for each order from that customer. If you move the same chart to the state footer, it will contain a bar for each order from each customer from that state.

Enhancing Report Appearance

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Chapter 13

Adding Lines, Boxes, and Shading

Introduction

This chapter explains how to draw lines and boxes for inclusion in reports and how to add various levels of shading to report areas. This explanation is presented in the following sections:

- Drawing and Manipulating Lines
- Drawing and Manipulating Boxes
- Adding Shading
- Extending Lines and Boxes Across Bands
- Special Considerations

After drawing a line or box, you use the Line Properties or Box Properties dialog to modify the object. You can display the Line or Box Properties dialog in any one of the following ways:

- Right-click on the object (for a box, right-click on the box border) and select Properties;
- Select the object and press F9;
- Select the object and select Format ⇒ Properties.

Drawing and Manipulating Lines

Using the Insert ⇒ Line command or the Line button on the Standard Toolbar, you can draw horizontal or vertical lines. After drawing a line, you can move it, cut and paste it, or re-size it as necessary. In addition, you can select one of 5 line thicknesses and assign one of 16 colors to the line.

The following sections explain how to draw and manipulate lines on the report layout.

Drawing and Positioning a Line

To draw a line, do the following:

1. Select Insert ⇒ Line (or the Line button on the Standard Toolbar). The cursor becomes a crosshair (+).
2. Click and drag the cursor either horizontally or vertically to draw the line. If Snap-To-Grid (accessed by selecting Format ⇒ Snap-To-Grid) is on, the line snaps to the ruler increments (or to the top or bottom of an Automatic band line) as you draw it.
3. When the line is the desired length (use the rulers as a guide), release the mouse. The size of the line is displayed in the Status Bar.

To move a line after inserting it on the layout, first select it; sizing handles appear at either end of the line. To move the line with the mouse, click and hold the mouse on any part of the line except the handles; then drag the line to its new position and release the mouse. To move the line with the keyboard, press F7 and position the line with the arrow keys.

To re-size a line, click and drag one of the sizing handles until the line is the desired length; then release the mouse.

Specifying Alignment

Right-click on a drawn line and select Alignment to specify Left (the default), Center, or Right alignment. Although the default setting is usually appropriate, you can change the alignment in order to provide more precise control over placement and sizing of the line. The alignment setting also determines the direction of increase or decrease when you select a different line thickness.

Changing Line Thickness and Color

When you draw a line, it is assigned a default thickness (the thinnest of the 5 available line weights) and color (black). You can change the thickness and color using the Line Properties dialog (see Figure 13.1).

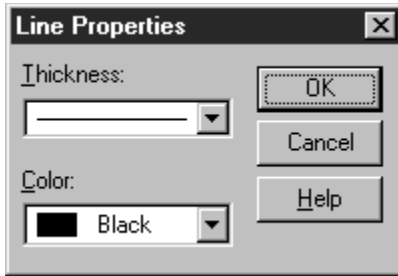


Figure 13.1 Line Properties Dialog Box

To select a different line thickness and/or color, do the following:

1. Open the Line Properties dialog. The current Thickness and Color settings are displayed.
2. Open the Thickness menu and select the desired line weight from those displayed.
3. Open the Color menu and select the desired color from those displayed.
4. Select OK.

Drawing and Manipulating Boxes

Using the Insert \Rightarrow Box command or the Box button on the Standard Toolbar, you can draw boxes to set off portions of your report. After inserting a box, you can control the thickness and color of the box border; specify exclusion of one or more of the box sides; and add one of several shading patterns to the box background (see the **Adding Shading** section of this chapter for an explanation of box shading).

Drawing and Positioning a Box

To draw a box on the report layout, do the following:

1. Select Insert \Rightarrow Box (or the Box button on the Standard Toolbar). The cursor becomes a combination of a crosshair (+) and the Box button.

2. Position the crosshair of the box cursor at the place where you want the top left of the box to begin. Click and drag the mouse; Report Designer draws an outline representing the size and placement of the box. If Snap-To-Grid (accessed by selecting Format ⇒ Snap-To-Grid) is on, the outline snaps to the ruler increments (or to the top or bottom of an Automatic band line) as you draw it.
3. When the box outline is the desired size (use the rulers as a guide), release the mouse. The size of the box is displayed in the Status Bar.

To move a box after inserting it on the layout, first click on one of its sides to select it; sizing handles appear at each corner and at the center of each side. To move the box with the mouse, click and hold the mouse on any part of the box except the handles; then drag the box to its new position and release the mouse. To move the box with the keyboard, press F7; then position the box using the arrow keys.

Specifying Alignment

Right-click on a drawn box and select Alignment to specify Left (the default), Center, or Right alignment. Although the default setting is usually appropriate, you can change the alignment in order to provide more precise control over placement and sizing of the box. The alignment setting also determines the direction of increase or decrease when you select a different border thickness.

Sizing a Box

After you insert a box on your report layout, you can change the size of the box as necessary.

Note that if the “Snap-To-Grid” setting (accessed by selecting Format ⇒ Snap To Grid, by pressing Shift+F8, or by selecting the Snap-To-Grid button) is on, the box shape will “snap” to the horizontal and vertical ruler increments (or to the top or bottom of an Automatic band line) as you size the box.

To change only one dimension of a box (either width or height), do the following:

1. Click on the box to select it. Eight “handles” appear at the edges of the image — one at each corner and one at the center of each side.

2. Depending on which dimension you want to change, click and drag the top, bottom, or side handle as necessary. As you drag the handle, a dotted outline indicates the changing dimensions of the box.
3. When the box outline is the desired size, release the mouse.

To change both the width and the height of a box at the same time, follow these steps:

1. Click on the box to select it. Eight “handles” appear at the edges of the box — one at each corner and one at the center of each side.
2. Click and drag a corner handle. For example, if you want to increase box size while maintaining the top left position, click and drag the bottom right handle.

To maintain the box’s aspect ratio (the ratio of width to height), hold down Shift as you drag a corner handle.

3. When the outline is the desired size, release the mouse.

Changing Border Thickness and Color

By default, a newly drawn box has a black border on all sides and is assigned the thinnest border weight of the five available. Using the Box Properties dialog box, you can specify a thicker border and select from one of 16 border colors.

Follow these steps to change the thickness and color of a box border:

1. Open the Box Properties dialog (see Figure 13.2). The current Thickness and Color settings are displayed in the Borders group box.
2. Open the Thickness menu and select the desired border weight from those displayed.
3. Open the Color menu and select the desired color from those displayed.
4. Select OK.

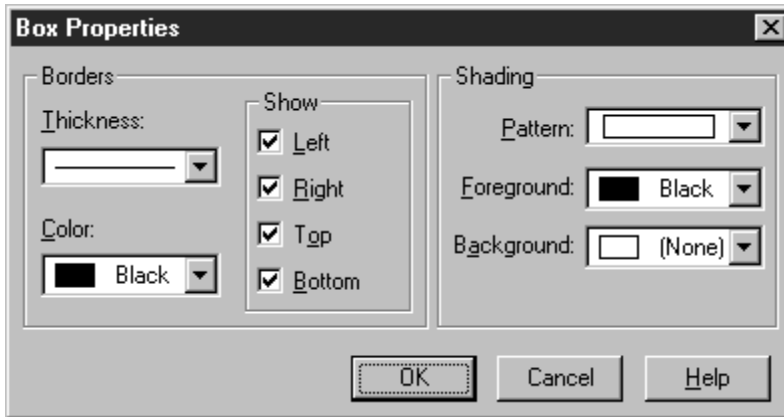


Figure 13.2 Box Properties Dialog Box

Excluding One or More Box Sides

The Show group box on the Box Properties dialog controls display and printing of the top, bottom, left, and right sides of the box. By default, all four sides of a box are initially included, as indicated by the x's in the check boxes.

You can specify that one or more of the box sides be excluded. This capability is useful, for example, if you want to print a border above and below a field or group of fields. By turning off all four sides of a box and applying a shading pattern, you can insert borderless shading areas on your report.

To control which sides of a box will be included, do the following:

1. Open the Box Properties dialog. The x's next to the Left, Right, Top, and Bottom settings in the Show box indicate that all four box sides will print.
2. Click the check box for the side or sides that you want to exclude from the box; the x is cleared from that setting. For example, if you want to print only the Top and Bottom of the box, turn off the Left and Right check boxes.
3. If necessary, change the Pattern, Foreground, and Background settings in the Shading box (see the **Adding Shading** section).
4. Select OK.

In Figure 13.4, a box has been drawn around the report title in the Page Header band and the left and right sides of the box have been

excluded. A gray shading background has been applied to the box around the column titles and all four sides have been excluded, resulting in a shaded, borderless box.

Adding Shading

You can also use the Box Properties dialog to add one of several shading patterns and background colors to a box. You can control any of the following characteristics of a box:

- ◆ **Pattern:** Select one of seven shading patterns to assign to the box background. Figure 13.3 shows the shading options available.
- ◆ **Foreground:** Specify a color for the crosshatch pattern (if any).
- ◆ **Background:** Specify a color for the background of the box.

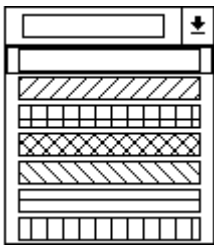


Figure 13.3 Pattern Selection Box

The default settings for Shading are no Background (that is, transparent), black Foreground, and solid Pattern. To change the Shading settings, open the Box Properties dialog and do the following:

1. Open the Background list box. Select a color from those displayed.
2. Open the Pattern list box (see Figure 13.3). Select a pattern from those displayed.
3. If you selected a crosshatch pattern (any pattern except the first selection), open the Foreground list box and select a color to assign to the crosshatch lines. Select OK.

In Figure 13.4, the borderless box around the column headings in the Page Header band has been assigned a solid Pattern and a gray Background.

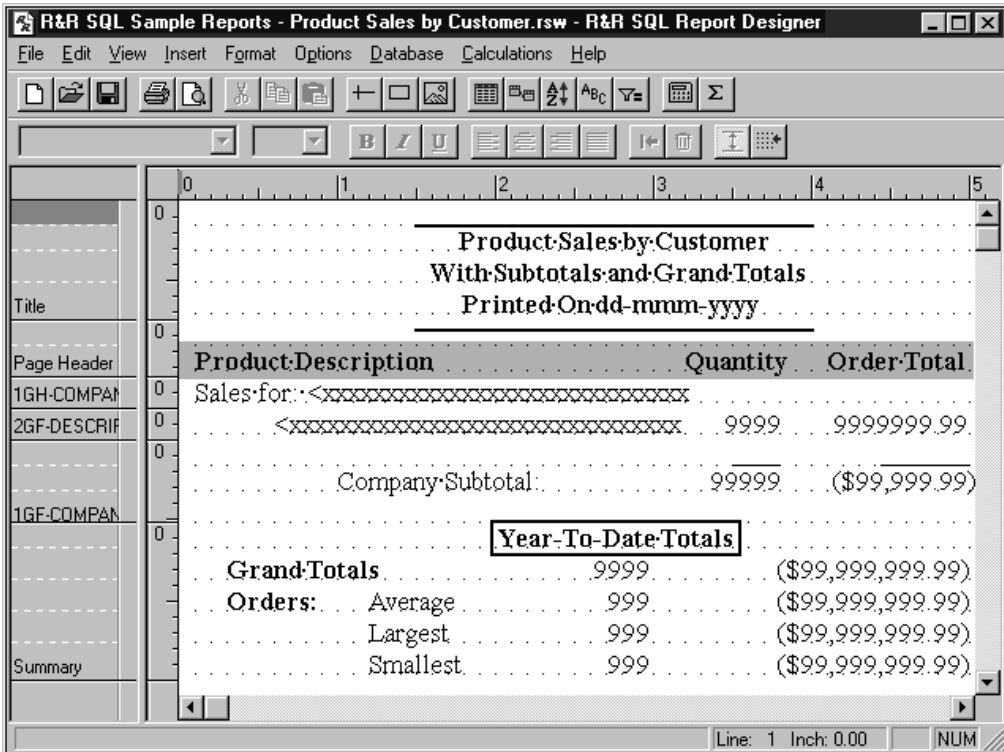


Figure 13.4 Report with Boxes and Shading

Extending Lines and Boxes Across Bands

Boxes and vertical lines can extend across multiple band areas. The box or line will begin printing when the band line containing the *top* of the box or line prints. The box or line will end when the band line containing the *bottom* of the box or line prints.

For example, a box that starts in the Header band and ends in the Record band will end on the *first* Record line. If you have multiple Record lines and you want the box to span all of those lines, size the box so it ends in the Footer or Summary band instead.

Reports with New-Page Lines

You cannot place the top or bottom of a box or vertical line on a New-Page line. However, if the box or line extends across a New-Page line, the object will be carried across pages.

Reports with Multiple Records Across

For reports with multiple records across, boxes will print for each record in the Record band as long as the box begins and ends in that Record band. If the box begins or ends in another band, it will print for the first record only.

Boxes and Lines that Extend Across Pages

When a box or vertical line extends across pages, it will print down the page until the Page Footer (if any) or bottom margin is reached. When the box or line resumes on the next page, the top margin and Page Header (if any) are skipped; then the box or line resumes printing.

Special Considerations

The following sections explain several special characteristics of lines and boxes that you may need to take into consideration to ensure proper placement and alignment.

Increasing Line or Box Thickness

When you increase the thickness of a horizontal line, the bottom of the line remains anchored and the thickness increases upward.

When you increase the thickness of a vertical line, the direction of increase depends on whether the line is left-, center-, or right-aligned:

- A left-aligned vertical line (the default) increases in thickness to the right.
- A center-aligned vertical line increases equally in both directions.
- A right-aligned vertical line increases to the left.

When you increase the thickness of a box, the outer edge of the box remains fixed and the thickness increases *inward*.

Lines and Boxes on Automatic Band Lines

When Snap-To-Grid is on, any vertical line or box drawn on an Automatic band line will snap to the top and bottom of the band line; a horizontal line will snap to the bottom of the band line.

If you increase the font size of any field or text on a band line, you will have to adjust the height of any boxes or vertical lines on that band line accordingly.

Band Lines with Logical Conditions

If the band line on which a box or vertical line *begins* is suppressed as the result of a logical condition, the vertical line or box will not print.

If the band line on which a box or vertical line *ends* is suppressed as the result of a logical condition but the band line on which it begins is not, the vertical line or box will begin printing in the appropriate place. However, the vertical line or the box sides will print continuously to the end of report.

Chapter 14

Inserting Bitmapped Images

Introduction

This chapter explains how to insert and size images in reports. This information is presented in the following sections:

- Importing an Image
- Pasting an Image from the Clipboard
- Sizing an Image on the Layout
- Using the Picture Properties Dialog

The band line in which you insert an image can have either an Automatic or a Freeform line height. Report Designer does not automatically increase band line height to accommodate an inserted image; you may have to adjust band line height to prevent the image from overlapping other band lines. If you use Freeform line height for band lines containing images, you can adjust the height of such lines directly on the layout. See Chapter 3, “Working with Bands,” for more information about Automatic and Freeform line heights.

Report Designer supports the image file formats listed in Figure 14.1.

| File Extension | Image File Type |
|-----------------------|--|
| BMP | Windows Bitmap |
| TIF | Tagged Image File format |
| PCX | PC Paintbrush format |
| EPS | Encapsulated PostScript |
| JPG | JPEG |
| GIF | CompuServe Graphics Interchange Format |
| TGA | TARGA |
| WMF | Windows Metafile |
| DIB | Windows Device-Independent Bitmap |
| PCT | Macintosh PICT |
| WPG | WordPerfect Graphic |
| DCX | Intel FAX format |

Figure 14.1 Supported Image File Types

Note that EPS, WMF, PCT, and WPG file formats can include both bitmapped and vector components. For these file formats, Report Designer will use *only* the bitmapped graphic information.

Importing an Image

To import a graphic image into a report, do the following:

1. Select Insert ⇒ Picture (or the Insert Image button on the Standard Toolbar). The cursor changes to a combination of a crosshair and an outline of the Image button.
2. Position the crosshair of the Image cursor at the place where you want the top left of the image to begin. Click and drag the mouse down and to the right; Report Designer draws an outline representing the size and placement of the image.
3. When the outline is the desired size, release the mouse. The Picture File selection dialog displays (see Figure 14.2). The File Name box lists files in the default picture directory that have the default picture file extension (if no picture directory or file extension defaults have been specified, Windows BMP files in the current directory are listed). Select a file from those listed.

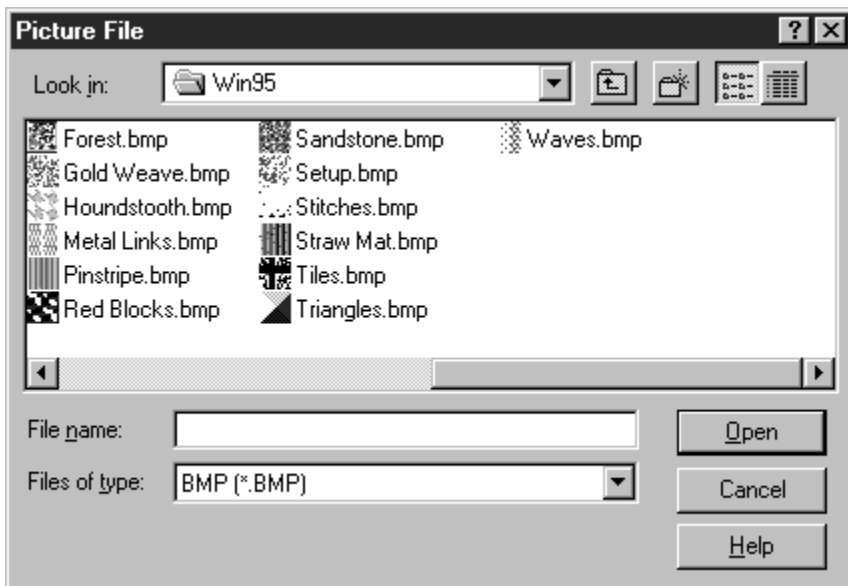


Figure 14.2 Picture File Selection Dialog

4. Select Open. Report Designer inserts the image at the specified location, maintaining the aspect ratio (the ratio of width to height) of the original image file.

You can move, cut, copy, paste, or delete the inserted image just as you do any field on the layout (note that cutting, copying, and pasting are performed internally; the image is not placed in the Windows Clipboard). If you move the image to another band of the report (or if you Paste it in another band), you may have to adjust the band line height to accommodate the size of the image.

To move an image, first select it. Then click and hold the mouse anywhere on the image except at one of the “handles” around the edge. Drag the image to the new location and release the mouse.

Pasting an Image from the Clipboard

You can also paste an image from the Windows Clipboard into a report. To do so, follow these steps:

1. Copy or cut the image to the Clipboard; then switch to or start Report Designer.
2. Position the edit cursor at the place where you want the top left of the image to begin. Select Edit ⇒ Paste Clipboard Image.
3. Report Designer inserts the image at the specified location. You can then move or size the image as necessary.

When you save a report that contains an image pasted from the Clipboard, Report Designer displays the dialog shown in Figure 14.3. This dialog shows a “thumbnail” of the image and prompts you to supply a path and file name; this information is saved with the report. Initially, the edit box displays the name of the default image file directory (if one has been set in the Options ⇒ File Settings dialog).

The file extension you specify determines the graphic type of the saved image file. Supported image types for saved files are BMP, GIF, JPG, PCX, TGA, TIF, WMF, and WPG. If you do not specify an extension, the graphic will be saved in BMP format.

For example, the file name specified in Figure 14.3 has a TIF extension; therefore, the graphic will be saved in TIF format.

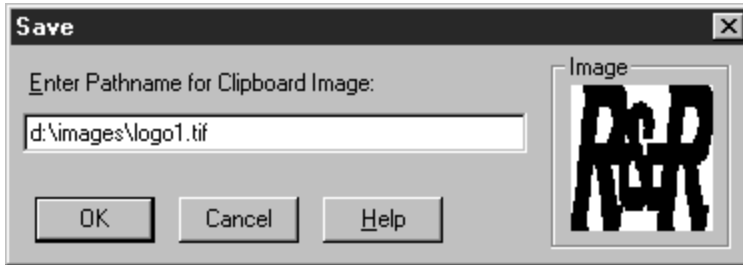


Figure 14.3 Save Report with Clipboard Image Dialog

When you retrieve a report with a saved Clipboard image, Report Designer looks for the image file first in the current directory; if the file is not found, Report Designer then looks in the directory saved with the report. If the image file is in neither location, Report Designer looks in the default image directory.

Sizing an Image on the Layout

After you have inserted an image on your report layout, you can change the size of the image as necessary.

Note that if the “Snap-To-Grid” setting (accessed by selecting Format ⇒ Snap To Grid or by pressing Shift+F8) is on, the image shape will “snap” to the horizontal and vertical ruler increments as you size the image.

For images with a Scaling setting of “Stretch” or “Crop,” you can change one dimension without changing the other. However, you cannot change just one dimension of an image with a Scaling setting of “Zoom,” since width-to-height ratio of such an image must be maintained. (See the **Selecting a Scaling Setting** section in this chapter for a full explanation of the Scaling settings).

To change both the width and the height of an image at the same time, follow these steps:

1. Click on the image to select it. “Handles” appear at the corners of the image (see Figure 14.4).



Figure 14.4 Selected Image with Sizing Handles

2. Click and drag a corner handle. For example, if you want to increase image size while maintaining the top left position, click and drag the bottom right handle.
3. When the outline is the desired size, release the mouse.

To change only one dimension of an image (either width or height), do the following:

1. Select the image and press F9. On the Picture Properties dialog, select “Stretch (size to fit)” as the Scaling setting. Select OK.
2. The image now has four additional “handles” — one at the center of each side. Depending on which dimension you want to change, click and drag the top, bottom or side handle as necessary. As you drag the handle, a dotted outline indicates the changing dimensions of the image.
3. When the image outline is the desired size, release the mouse.

Using the Picture Properties Dialog

Instead of sizing an image on the layout, you can use the Picture Properties dialog to specify image width and height. To display the Picture Properties dialog (see Figure 14.5), right-click on the image on the layout and select “Properties.”

You can also use the Picture Properties dialog to do the following:

- Select a different image file to replace the current image;
- Select a Scaling option to control the image’s aspect ratio.

The following sections explain how to manage inserted images using the Picture Properties dialog.

Sizing an Image Using Picture Properties

To size an image using the Picture Properties dialog, do the following:

1. Select the image and press F9 to display the Picture Properties dialog. In the Picture Size box, the current dimensions of the image are displayed.
2. Enter or select the appropriate Width and Height settings. If you use the up and down arrows to select a size, the setting value increases or decreases in increments of one-tenth of an inch.
3. Select OK. Report Designer re-sizes the image based on the specified Width and Height settings. Note that if the Scaling setting is “Zoom” (the default), the image’s original aspect ratio will be maintained even if you specified Width and Height settings with a different ratio.

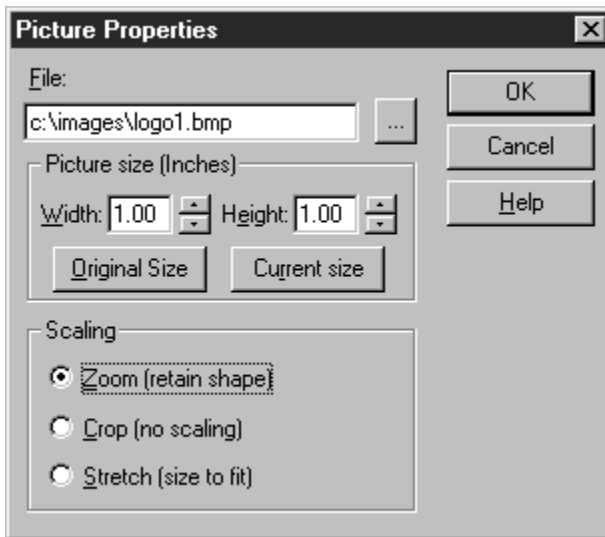


Figure 14.5 Picture Properties Dialog Box

To reset the image to its original dimensions, select “Original Size” on the Picture Properties dialog. The original dimensions of the file are displayed in the Width and Height boxes. When you select OK, Report Designer increases or decreases the image size on the layout to match the original dimensions.

Selecting a Scaling Setting

Three Scaling settings are available on the Picture Properties dialog: “Zoom (retain shape),” “Crop (no scaling),” and “Stretch (size to fit).” The default setting of “Zoom” is appropriate in most instances. In those instances when you want to display or print only a portion of the image, change the setting to “Crop.” In those instances when you want the image to fit within the dimensions you specify, regardless of the original aspect ratio, change the setting to “Stretch.” The following sections explain each setting in more detail.

Selecting the Zoom Scaling Option

The default Scaling setting is “Zoom (retain shape)”; the image retains its original aspect ratio (ratio of width to height), regardless of the dimensions of the insertion rectangle drawn or of the width-to-height ratio as specified in the Picture Size box. With this scaling setting, the aspect ratio is maintained when you increase or decrease the image size.

Selecting the Crop Scaling Option

When Scaling is set to “Crop (no scaling),” the image is inserted at its original size, and no scaling is performed. If the image is larger than the insertion rectangle drawn or if you enter Width and Height settings smaller than those of the original image, the image is cropped — that is, only the top left portion of the image that fits within the rectangle or specified dimensions is inserted.

Selecting the Stretch Scaling Option

When Scaling is set to “Stretch (size to fit),” the image is scaled to fit the insertion rectangle drawn or to fit the dimensions specified on the Image Properties dialog. If the aspect ratio (the ratio of width to height) of the rectangle or of the specified Width and Height dimensions differs from the aspect ratio of the original, the shape of the image in the report will be distorted (either stretched or shrunk).

Specifying Alignment

Right-click on an image and select Alignment to specify Left (the default), Center, or Right alignment. Although the default setting is usually appropriate, you can change the alignment in order to provide more precise control over placement and sizing of the image.

Selecting a Different Image File

To select a different image to replace the current one, select the browse button to the right of the File edit box on the Picture Properties dialog. The Picture File selection dialog displays (see Figure 14.2). The File Name box lists files in the default image directory that have the default image file extension (if no image directory or file extension defaults have been specified, Windows BMP files in the current directory are listed). To display image files of a different format, open the “List Files of Type” box and select a format. Then select a file from those listed.

Printing and Exporting Data

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Chapter 15

Printing Reports

Introduction

This chapter explains how to preview and print Report Designer reports. This information is presented in the following sections:

- Overview of Print-Related Commands
- Defining Page Setup and Record Layout
- Previewing and Printing a Report
- Controlling Pagination

Report Designer provides the capability of selecting from a wide variety of Avery labels for printing. When you select an Avery label (using the “Label Type” setting on the Record Layout dialog), Report Designer automatically defines the appropriate page and record layout. See the **Multiple Columns** section of this chapter for details.

Also, Report Designer provides for the printing of “snaked-column” reports in which the report data flows from the bottom of one column to the top of the next (similar to the format of a telephone book). See the **Snaked-Column Reports** section of this chapter for information about this type of report.

Overview of Print-Related Commands

The following commands display dialog boxes whose settings affect Report Designer’s printed output:

- File ⇒ Print
- File ⇒ Page Setup
- Format ⇒ Record Layout
- Options ⇒ Default Settings

Figure 15.1 briefly explains the Print settings in each dialog box.

| Dialog | Print Settings |
|------------------|---|
| Print | Printer, item to print (Report, Test Pattern, or Specification) number of copies, page range, paper source, Print to file |
| Printers | Lists available printers |
| Page Setup | Paper size, margins, and orientation |
| Record Layout | Record layout; record width, height, copies, number of records across; settings for snaked column and Avery label reports |
| Default Settings | Global settings for Paper Size, Margins, Font, and Ruler Spacing |

Figure 15.1 Print, Page Setup, and Record Layout Settings

The Print, Page Setup, and Record Layout settings you specify apply only to the current report and will be saved with that report. Each time you create a new report, Report Designer will use the default Windows printer and the global layout settings specified in the Options ⇒ Default Settings dialog box. See Chapter 5, “Setting Defaults,” for information about the Default Settings dialog box.

Defining Page Setup and Record Layout

After you have selected a printer, you can specify Report Designer settings to control paper size, margins, and orientation (portrait or landscape) and to define how records will be laid out. The following sections explain how to specify settings that control page and record layout.

Page Setup Settings

To change paper size, margin, and orientation settings, select File ⇒ Page Setup (see Figure 15.2).

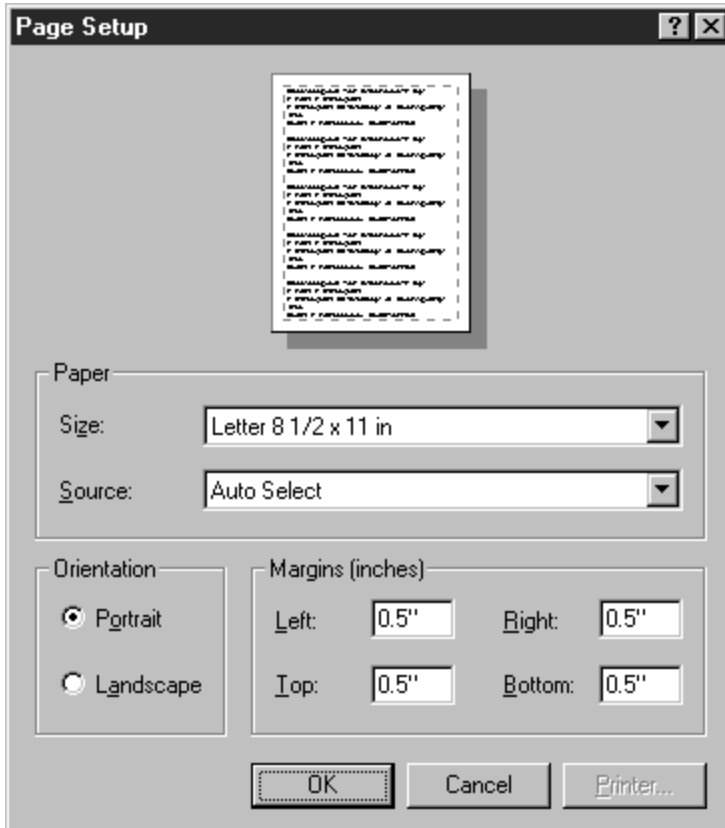


Figure 15.2 Page Setup Dialog Box

The unit of measurement (inches or centimeters) for paper size and margins depends on your Windows configuration and the paper size you select.

The Page Setup settings override the equivalent options on the Report Designer Default Settings dialog and the Windows Printer Properties tabbed dialog. Note that the Report Designer Page Setup settings are saved with each individual report. Changes to these settings do *not* affect other reports, new reports, or other Windows applications.

Changing Paper Size

Use this setting to specify paper size for printed output. The default is Letter. To change the Paper Size used for your report:

1. Select File ⇒ Page Setup to display the Page Setup Dialog.

2. In the Paper group box, open the Size list and select a predefined paper size (the default is Letter).
3. Select OK.

The new paper size is applied to the report.

Some printers allow you to specify a custom paper size (instead of a predefined size). For those printers, you specify the dimensions for the custom size on the Paper tab of the Properties tabbed dialog for the printer (select File ⇒ Print ; then select the Properties button). Note that many Windows printer drivers do *not* support custom paper sizes.

The predefined paper size settings enable Report Designer to compute page length automatically based on the paper size and the Orientation setting. Selecting a predefined size also automatically determines the size of the page that displays when you preview reports.

Changing Paper Source

Many printers provide more than one paper source — some have upper and lower trays and envelope feeders, for example, and most provide the capability of manually inserting pages. To print using a paper source other than the default, use this setting to specify the source.

To change the paper source for printing a report:

1. Select File ⇒ Page Setup to display the Page Setup dialog box.
2. In the Paper group box, open the Source list (the items on this list depend on the currently selected printer). Select the appropriate paper source.
3. Select OK; the report will now be printed using the paper source you selected.

Changing Page Orientation

A report's orientation determines whether the report prints vertically (Portrait) or horizontally (Landscape). Portrait is the default.

To change a report's page orientation:

1. Select File ⇒ Page Setup to display the Page Setup dialog.
2. In the Orientation group box, select "Portrait" or "Landscape".
3. Select OK; the new orientation is applied to the report.

Note that some printers do not support landscape printing.

Setting Margins

Enter values to specify the amount of white space at the top, bottom, left, and right of the report page. To set the margins for your report:

1. Select File ⇒ Page Setup to display the Page Setup dialog.
2. In the “Margins” group box, type the measurements you want to use in the “Top,” “Bottom,” “Left,” and “Right” edit boxes.
3. Select OK.

The new margins are applied to the report.

On the layout, the right margin is indicated on the ruler by the letter **R**. The right margin setting controls where Report Designer places fields on left-, right-, and center-justified band lines. (Note that Report Designer does not prevent you from inserting a field so that it extends beyond the right margin, nor does it prevent such a field from printing beyond the right margin.)

Defining Record Layout

Select Format ⇒ Record Layout to control how records are laid out on the page (see Figure 15.3).

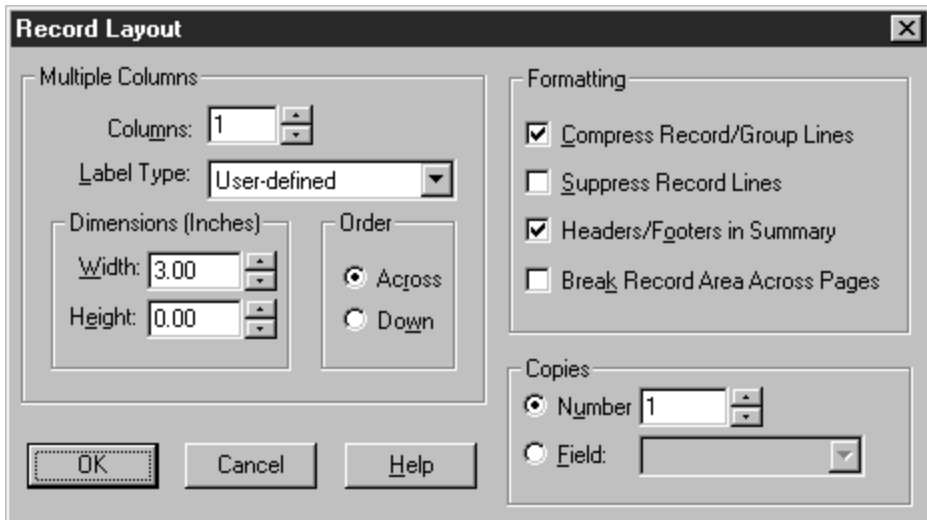


Figure 15.3 Record Layout Dialog Box

The following sections explain each of the settings in the Record Layout dialog box.

Multiple Columns Settings

Use the settings in this group box to define layouts for reports requiring multiple columns, “snaked columns,” or specific horizontal or vertical spacing of data on Record lines.

Columns

Use this setting to specify how many records you want to print across the page. Enter a value in this field for reports in which you want to save space by printing records in two or more columns.

Note that when you print multiple records across, Report Designer does not insert additional lines for word-wrapped fields. A word-wrapped field will wrap to fill as many lines as are available, pushing fields below it down if necessary. Therefore, you should not use word-wrapped fields when printing more than one record across unless your Record band contains enough lines to accommodate the maximum length of any word-wrapped field(s) and any fields in the Record band beneath the word-wrapped field(s).

Snaked-Column Reports

Use the “Columns” and “Order” settings on the Record Layout dialog to design multi-column reports in which the records “snake” from the bottom of one column to the top of the next. All data on Record, Group Header, and Group Footer lines will flow from one column to the next when this setting is greater than 1.

To set up a “snaked” columnar report, do the following:

1. Set “Columns” to the number of columns you want horizontally across the page.
2. Enter a “Width” setting appropriate for the maximum width of the data in your records and the number of columns across.
3. Select Down in the “Order” box.

Figure 15.4 shows the top portion of a snaked-column report. The “Columns” setting for this report is 3, and the “Width” setting is 2.5 inches. As a result of these settings, the report data prints in three columns, flowing from the bottom of one column to the top of the next.

| Global Corporation | | |
|---|---|--|
| <i>Accounting</i> | | |
| Anne Smiley Emp # : 72 Born: 06/12/63 Hired: 11/13/89 Salary: \$45,600 | Shawn O'Leary Emp # : 85 Born: 02/17/67 Hired: 10/09/90 Salary: \$26,400 | Scott Hardy Emp # : 80 Born: 05/29/69 Hired: 10/07/91 Salary: \$33,600 |
| Jane Stealth Emp # : 86 Born: 02/07/36 Hired: 10/09/90 Salary: \$31,200 | Charlene Pagan Emp # : 87 Born: 12/06/48 Hired: 10/15/90 Salary: \$31,200 | Michael Procter Emp # : 97 Born: 03/12/50 Hired: 03/30/92 Salary: \$42,000 |
| Employee count: ----- 2 | Employee count: ----- 7 | Stephen Most Emp # : 99 Born: 11/05/58 Hired: 05/04/92 Salary: \$52,800 |
| <i>Administration</i> | | |
| John Hardy Emp # : 1 Born: 08/25/43 Hired: 12/14/79 Salary: \$60,000 | James Bufford Emp # : 4 Born: 02/03/47 Hired: 09/22/80 Salary: \$36,000 | Shawn O'Malley Emp # : 101 Born: 09/21/61 Hired: 06/22/92 Salary: \$46,800 |
| Joan Hardy Emp # : 2 Born: 08/24/44 Hired: 07/01/88 | Stephen Cirraca Emp # : 6 Born: 09/27/49 Hired: 03/01/82 Salary: \$38,400 | Employee count: ----- 9 |
| <i>Documentation</i> | | |

Figure 15.4 Top Portion of Snaked Column Report

Label Type

Report Designer provides over 150 choices for printing a variety of labels (for example, mailing labels) on commercially available Avery label stock. These settings are contained in a file named RRLABELS.INI that is installed in the Report Designer program directory.

Select “Label Type” on the Record Layout dialog to display a menu of label choices. When you select a label type, Report Designer automatically sets page size, margins, record width, and record height to the values appropriate for that label type.

Dimensions

Use these settings to specify the dimensions (width and height) of the Record area when printing multiple records across. Enter values in these fields for reports in which the Record area must fit within a predefined horizontal area. If you are printing mailing labels, the value in this field should be the distance from the left edge of one label to the left edge of the adjacent label.

Copies

Use this setting to specify how many copies of each Record area you want to print.

You can specify the number of Record areas to print for each composite record in either of two ways:

- Enter a number in the Number edit box.
- Open the Field list box and select a numeric field whose value will control the number of Record areas printed. You can use any field except a total field or a calculated field that uses a total field or the PAGENO() function. If the value of the field is one, zero, or negative, Report Designer prints one copy of each Record area. If the setting is positive, Report Designer uses the integer part of the setting to determine the number of record copies to print.

Record Formatting Settings

The Formatting box contains check boxes for these settings: Compress Record/Group Lines, Suppress Record Lines, Headers/Footers in Summary, and Break Record Area Across Pages.

Compress Record/Group Lines

Use this setting to suppress printing of empty lines in the Record, Group Header, and Group Footer areas of a report. If you want empty lines in these areas to print, turn this setting Off.

When this setting is On, lines are suppressed if they consist entirely of empty fields of any sort, of database fields containing spaces or the NULL value, or of non-underscored text fields consisting entirely of spaces. Spaces in calculated fields are treated as “hard” spaces, so lines with calculated fields will be suppressed only if those fields are empty.

NOTE Report Designer always prints empty Record and Group lines — that is, lines that have *no* fields on them (for example, lines placed in a report layout for white space).

Suppress Record Lines

Use this setting to print a report without Record lines. For example, you can use this option to print a report that contains only totals (on lines other than Record lines). When this option is On, Report Designer ignores any Record lines. When this option is Off, Report Designer prints Record lines as usual.

Headers/Footers in Summary

Use this setting to specify whether Page Headers and Footers will print or display on a page containing only Summary lines. When this setting is On, any Page Header and Footer lines you defined will print on a page containing only Summary lines. When this setting is Off, Page Header and Footer lines will not print on a Summary-only page.

Break Record Area Across Pages

If a record area takes up more than one line and cannot fit on the current page, you can use this option to tell Report Designer where you want the page break (this option also affects Report Designer's widow/orphan control). You can split the record area between two pages, or you can keep the record area together by printing the entire record on the next page.

To specify page break behavior for multiple-line record areas:

1. Select Format ⇒ Record Layout to display the Record Layout dialog.
2. In the Formatting group box, check or uncheck the “Break Record Area Across Pages” box.

When this option is On (checked), a page break can occur within a multiple-line record area. Report Designer prints as many lines of the current composite record as will fit on the current page; the rest of the record will be continued on the next page.

When this option is Off (unchecked), multiple-line records are kept together on the same page. If all the Record lines won't fit on the current page, the entire record will print on the next page.

3. Select OK.

Previewing and Printing a Report

To print a report, you access the print dialog by selecting File ⇒ Print. (You can also select the Print Report button on the Standard Toolbar to bypass the print dialog and print the report directly.)

Report Designer Print Dialog Settings

When you select File ⇒ Print, the Report Designer print dialog displays (see Figure 15.9). Use this dialog to specify report, test pattern, or report specification printing; to set the range of pages and number of report copies to print; and to specify printing to a file.

These settings are saved with the report and override any corresponding settings in the Windows Properties tabbed dialog for the currently selected printer.

By default, if you print multiple copies of a report, the pages will not be collated. To print collated multiple copies, turn on the “Collate Copies” setting on the Report Designer Print dialog. Printing multiple copies will take longer when this setting is on, since Report Designer must process the entire report for each copy that is printed.

Figure 15.5 briefly explains each of the items in the Print dialog box.

| Item | Purpose |
|----------------|--|
| Printer | Displays name and status of currently selected printer and enables selection of a different printer |
| Print to file | Specifies that the report be printed to a file (with printer codes included); enter file path/name in “Print file” box below |
| Print range | Selects a range of pages to print by setting beginning (From) and ending (To) numbers |
| Copies | Specifies how many report copies to print (default is 1) |
| Collate | Specifies collating for multiple report copies |
| Print what | Specifies printing of Report (the default), Test Pattern, or Report Specification |
| Print file | Specifies output path and file name for printing to a file (when “Print to file” is On) |
| Preview button | Displays Preview of current report |

Figure 15.5 Explanation of Print Dialog Box

Windows Printer Properties Dialog Settings

You can access the Windows Printer Properties tabbed dialog by selecting Printers on the Windows Control Panel and then selecting File ⇒ Properties for a specific printer. This dialog controls nearly all printer properties, including paper size, source, and orientation; graphics resolution; and font downloading options. Changes made using these dialogs will apply to any Windows application (including Report Designer) that uses this printer driver.

Remember, though, that the Paper Source, Paper Size, and Orientation settings you select in Report Designer for a particular report (using the Print and Page Setup dialogs) *override* the Windows Paper Source, Paper Size, and Orientation settings specified on the Paper tab of the Printer Properties tabbed dialog.

Previewing a Report

Before sending a report to the printer, you can preview it on screen to check fonts, field placement, page breaks, and other elements of the page layout. The Preview screen (see Figure 15.6) consists of a facsimile of the first page of the report, with VCR-like buttons at the top that allow you to page forward and backward through a multi-page report, magnify portions of the page, print the current page or the entire report, and pause or cancel the Preview (you can also perform these operations from the keyboard using the function keys, as shown in Figure 15.7).

To preview a report, use any of these methods:

- Select File ⇒ Print Preview;
- Select the Print Preview button on the Standard Toolbar;
- Select File ⇒ Print; then select the Preview button.

When you select any of these options, Report Designer displays the Print Preview window (see Figure 15.6).

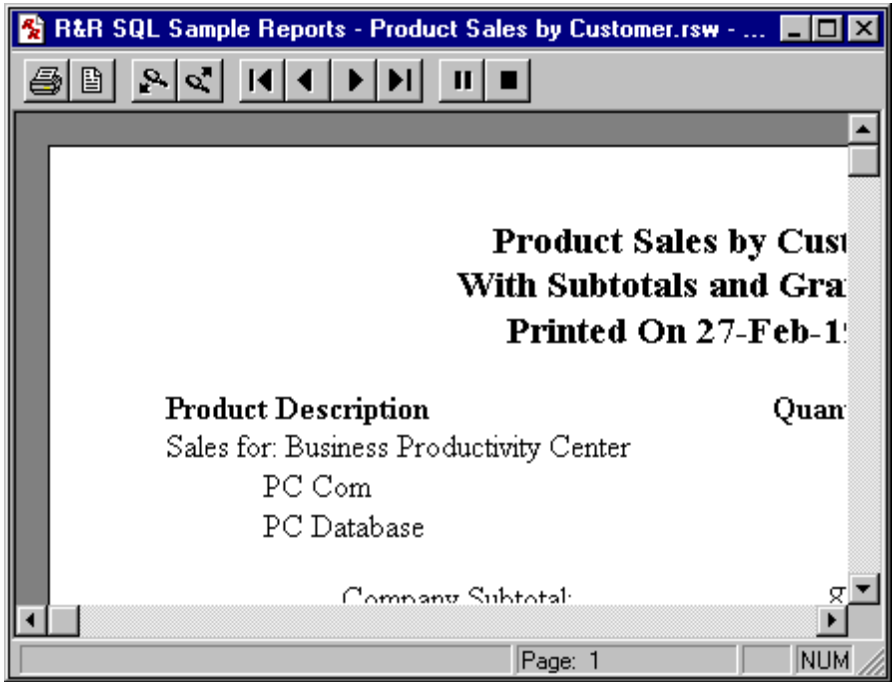


Figure 15.6 Print Preview Display

You can “zoom” the display simply by clicking at the desired location on the preview page. Note that the zoom level is maintained as you page through a report and will be retained if you exit and restart Preview.

You use the Preview buttons to move around in multiple-page reports and to close the Preview screen and return to the report layout. Figure 15.7 shows the Preview control buttons and lists the Shift + function key that corresponds to each. Figure 15.8 explains the purpose of each button.

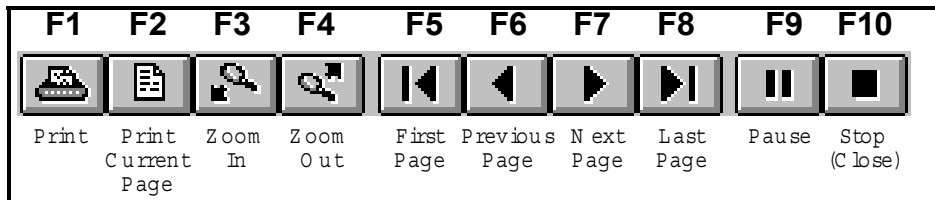


Figure 15.7 Preview Buttons (and Corresponding Function Keys)











| Button | Key: Shift + | Purpose |
|---|-------------------------|--|
|  | F1 | Prints report with current settings |
|  | F2 | Prints currently displayed page |
|  | F3 | Displays magnified page preview |
|  | F4 | Returns to previous magnification level |
|  | F5 | Displays first page of multi-page report |
|  | F6 | Displays previous report page |
|  | F7 | Displays next page |
|  | F8 | Displays final report page |
|  | F9 | Pauses preview when positioning to last page |
|  | F10 | Closes Preview window |

Figure 15.8 Explanation of Preview Buttons

Dealing with Low Memory During Preview

When you page forward through a report in Preview, Report Designer keeps the previously viewed report pages in memory. If you have several other Windows applications running, you might reach a point when previewing a large report where there is not enough memory to store additional preview pages. If this occurs, Report Designer will display a Low Memory Condition dialog containing the message “Insufficient Memory to Continue Print Preview.”

You can select one of three actions for Report Designer to take:

- Pause Print Process
- Free Earlier Pages
- Terminate Preview Process

Pause Print Process

Selecting this option is equivalent to selecting the Pause button on the Preview screen. After pausing the preview, you can switch out of Report Designer and free up memory by terminating other Windows applications. You can then continue with the report preview.

Free Earlier Pages

You can select this option to have Report Designer begin removing earlier report pages (beginning with the first page) from memory until enough memory has been freed up to continue the preview. After you select this option, Report Designer will continue to free earlier pages as necessary as you page forward through the report.

Once these earlier pages have been freed from memory, of course, you must cancel and then restart Preview in order to view them. In some cases, restarting Preview will cause Report Designer to re-execute the report's SELECT statement.

Terminate Preview Process

Selecting this option is equivalent to selecting the Close button on the Preview screen. Report Designer returns to the layout window; if you select Print Preview again, the preview will begin at the first report page.

Changing the Print Settings

You can change any of the settings in the Print dialog box before printing. For example, you may want to print multiple report copies or specify a page range to print. You can also display the report on the screen using the Preview button or select a different printer.

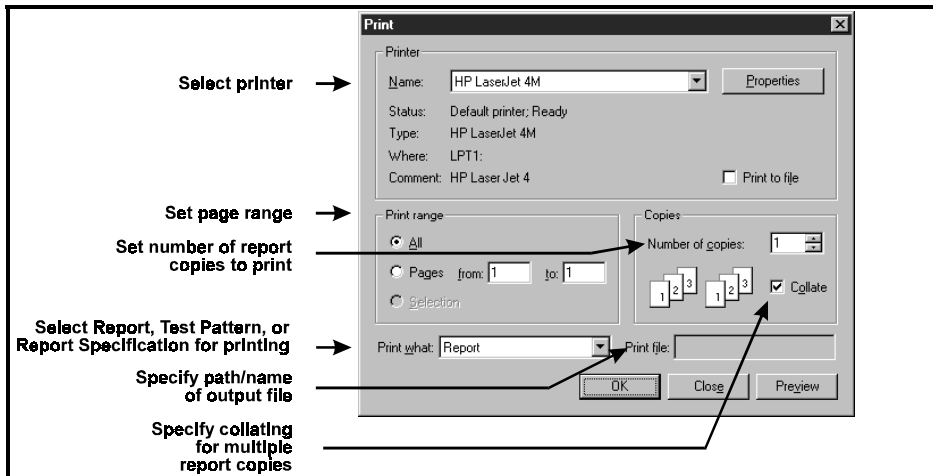


Figure 15.9 Print Dialog

The following sections explain the settings in the Print dialog box and describe how to change them.

“Print What” List Box

The Print What list box has three choices: Report (the default), Test Pattern, and Report Specification.

- Select Report to print or preview the current report.
- Select Test Pattern to print only Page Header, Page Footer, and Record areas of a report in the form of text fields and field symbols (for example, **AAA**) that represent data fields. Printing a test pattern is useful for aligning forms or mailing labels before printing the actual report data.
- Select Report Specification to print or preview a complete description of the content and layout of the current report. (For an explanation of the Report Specification option, see Chapter 2, “Managing Reports.”)

Printing Multiple Report Copies

By default, Report Designer prints one copy of all report pages. To print multiple report copies, enter or select the number of copies to be printed in the Copies edit box.

Note that in order to avoid having to process a report multiple times when the “Collate” setting is off, Report Designer takes advantage of the ability of some printer drivers to print multiple uncollated copies. Printing multiple copies will take longer when the “Collate” setting is on, since Report Designer must process the entire report for each copy that is printed.

Changing the Print Range Setting

To specify a range of report pages to print, select Pages in the Print Range box; then enter or select the beginning page number in the “From” box and the ending page number in the “To” box. In each case, “page number” is the number of a physical page rather than a printed page number; that is, you must take into account *all* report pages, even if page numbering does not begin on the first page.

Printing to a File

To print a report to a file rather than to the printer, do the following:

1. Select File ⇒ Print to display the Print dialog.
2. Check the “Print to file” check box.
3. Enter the name of the output file (optionally including a path) in the “Print file” edit box. If you do not include a path, the file will be output to the current directory.
4. Select Print to send the output to the specified disk file. To return to the report layout without outputting the report, select Close; the print-to-file setting will be retained.

NOTES The output file will include printer codes for the currently selected Windows printer. To output to a plain text file with no printer codes, use the File ⇒ Export command.

The print-to-file setting is saved with the report. To remove this setting so that print jobs will be sent to a printer rather than a file, select File ⇒ Print and turn off “Print to file.” Then select Close.

Printing a Report Specification

To print a detailed specification of your report:

1. Select File ⇒ Print to display the Print dialog.
2. In the “Print What” list, select the “Report Specification” option.
3. Select OK.

Printing a Test Pattern

To print a test pattern showing the placement of fields in your report:

1. Select File ⇒ Print to display the Print dialog.
2. In the “Print What” list, select the “Test Pattern” option.
3. Select OK.

Controlling Pagination

The following features affect how Report Designer determines where to place automatic page breaks in your report:

- Page Setup settings (Paper size, margins, and orientation);
- Record Layout settings;
- New-page lines inserted on the report layout;
- Fields with word-wrap format;
- Line heights calculated automatically by Report Designer or manually specified with the Format ⇒ Band Line Properties “Freeform” setting;
- Report Designer’s automatic widow/orphan control.

Page Setup Settings

When Report Designer prints your report, it uses the current Paper Size, Margins (Top and Bottom), and Orientation settings in the File ⇒ Page Setup dialog box to determine how much remaining space is available on the page.

Record Layout Settings

The Format ⇒ Record Layout settings determine record layout and control which records and lines Report Designer will print. All of these settings affect where Report Designer will place page breaks, especially “Compress Record/Group Lines,” “Suppress Record Lines,” and “Break Record Area.”

When calculating the number of lines that can fit on the page, Report Designer ignores blank Record, Group Header, and Group Footer lines compressed by the “Compress Record/Group Lines” setting. In addition, it ignores Record lines suppressed by the “Suppress Record Lines” setting and any lines whose printing is suppressed with the Band Line Properties “Logical Field” setting.

Report Designer uses the “Break Record Area” setting to determine whether to allow page breaks to occur within Record areas that occupy more than one line.

Note that when printing more than one record across the page, Report Designer controls pagination by using the actual number of Record

lines, not taking into account blank line compression or line logical conditions.

Inserting a Page Break

You can specify where page breaks should occur on your report by inserting a new-page line anywhere on the layout except in a Page Header or Page Footer band.

To insert a page break in your report:

1. Select Insert ⇒ Create Band Line (or press Ctrl+F11) to display the Create Band Line dialog.
2. In the “Line Placement” group box, specify where you want the new-page line to be inserted (Above Current Line, Below Current Line, or in any band except a Page Header/Footer or a swapped Group Header/Footer).
3. Turn on the “New Page Line” setting at the bottom of the dialog; an X appears indicating that the line you are inserting is a new-page line.
4. Select OK.

Report Designer inserts a dashed line in the specified area of the layout, indicating a page break.

When you output your report, Report Designer starts a new page at that line. All lines following the page break line are printed starting on the next page.

You can move, copy, or delete a new-page line just like any other line on the report layout.

Figure 15.10 explains several areas where new-page lines can be inserted to produce page breaks in different places in your report.

| <i>Position of New-Page Line on Report Layout</i> | <i>Resulting Page Break in Report</i> |
|--|--|
| Last line in Title band | After title |
| Last line in Group Footer band | After group |
| Last line in Record band | After each record |
| First line in Summary band | Before summary |

Figure 15.10 Location of New-Page Lines

Word-Wrapped Fields

If your report includes word-wrapped fields in the Title, Record, Group Header, Group Footer, or Summary band, the pagination of the report may be affected by the number of lines the data in these fields occupies. You can control the length of a word-wrapped field by using the Width tab on the Properties tabbed dialog to change the width within which the data wraps. See Chapter 4, “Working with Fields,” for more information about word-wrapped field format.

Line Heights

Report Designer determines how many lines it can fit on a page by taking into account the height of each band line in the report. For band lines that have been assigned an Automatic height, Report Designer calculates line heights automatically based on the largest font on each line. To set a specific height, select Freeform on the Band Line Properties dialog and specify a height in inches or points.

Widow/Orphan Control

In all reports, Report Designer has automatic widow/orphan control that prevents a Group Header from appearing at the bottom of a page when there is not enough room for the Record area of at least one record.

In addition, for reports that have the following features, Report Designer prevents a Group Footer from appearing at the top of a page unless it is preceded by the Record area of at least one record:

- A Record band that does not contain any new-page lines.
- A Group Footer band containing at least one field.
- The following Format \Rightarrow Record Layout settings:
 - ◆ Break Record Area = Off
 - ◆ Suppress Record Lines = Off
 - ◆ Records Across = 1
- “Reset Page,” “Swap Header,” and “Swap Footer” Group Order settings turned Off for all group fields.

Chapter 16

Exporting Data

Introduction (Exporting Data)

This chapter explains how to export report data to a text file, Xbase (DBF) file, worksheet file, Excel 5.0 PivotTable, Excel 5.0 chart, HTML file, ActiveX Viewer control file, Rich Text Format (RTF) file, text data file, or Word merge file. This information is presented in the following sections:

- Exporting to an ActiveX Viewer Control File
- Exporting to an Excel 5.0 Chart
- Exporting to an Excel 5.0 PivotTable
- Exporting to HTML
- Exporting to a Rich Text Format (RTF) File
- Exporting to a Text File
- Exporting to a Text Data File
- Exporting to a Word Merge File
- Exporting to an Xbase or Worksheet File

You access each of these export options by first selecting File ⇒ Export to display the Export dialog (see Figure 16.1). In the Export Type list box, highlight the type of export you want and then select Edit to define the results of the export.

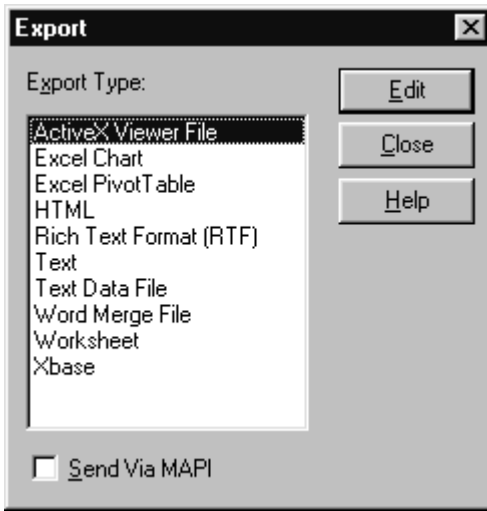


Figure 16.1 Export Dialog

Note that in order to export to an Excel PivotTable or Chart, you must have Excel 5.0 (or later) installed on your system.

“Send via MAPI” enables you to export ActiveX Control, HTML, text, RTF, Word Merge, Xbase, or worksheet files as mail attachments. This option is available only if you have MS Mail or another email application that supports MAPI (Messaging Applications Programming Interface). If you turn on this option by clicking in the check box, Report Designer will start up or switch to your email application and attach the exported file to a mail message.

Exporting to an Excel 5.0 Chart

Report Designer also employs Object Linking and Embedding (OLE) automation to coordinate with Excel 5.0 in the creation of charts. When you select Excel Chart as the export type and specify the data elements of the chart, Report Designer generates the data and causes a chart to be created in Excel.

General Procedures

Follow these general procedures to export report data to an Excel 5.0 Chart (details on some of these steps are provided in the next section):

1. On the Export dialog box, highlight “Excel Chart” in the list box and select Edit.
2. On the Excel 5.0 Chart Specification dialog (see Figure 16.2), highlight a field in the Fields list that will supply the category (x-axis) values for the chart. Click the right arrow button next to the Categories box to insert this field name there.
3. Highlight a field in the Fields list that will supply the values (y-axis) for the chart. Click the right arrow button next to the Values box to insert this field name there.
4. In the Value Type list box, highlight the total type that you want applied to the field value.
5. By default, “Export Summary Information Only” is selected. To export only summary field data, leave this box checked; to export data for all records, click the check box to remove the check mark.

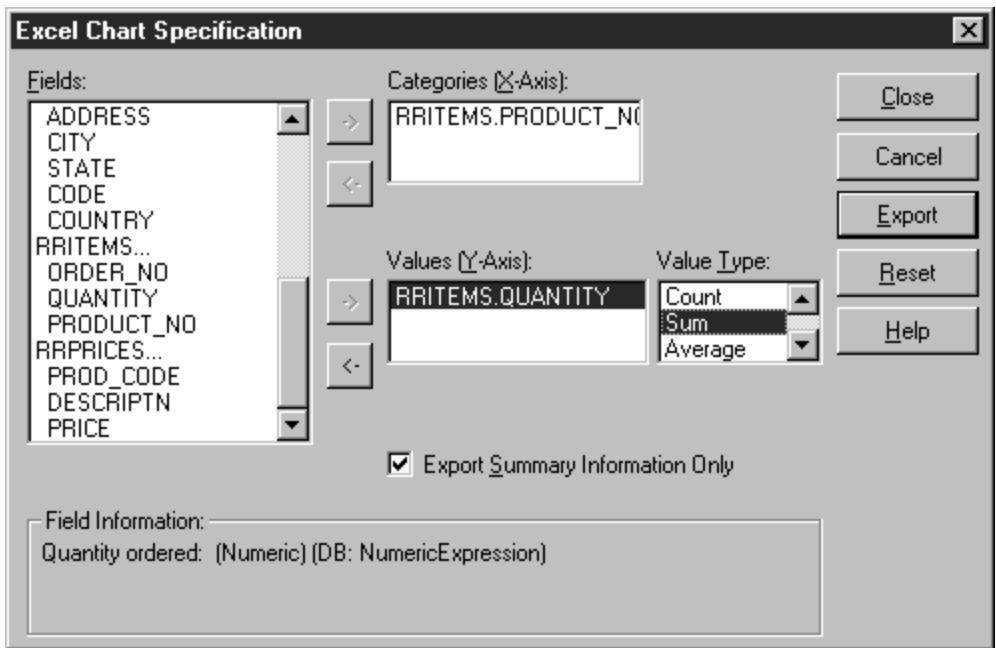


Figure 16.2 Excel 5.0 Chart Specification Dialog

If you export only summary field data, Report Designer performs the necessary totaling and passes only the total data to Excel; this method is efficient but limits how much additional manipulation of the data you can perform in Excel. If you export all field data, Report Designer passes all of the specified record data to Excel and Excel performs the totaling; this method is less efficient but allows greater flexibility in working with the exported data in Excel.

6. Select Export. Report Designer exports the data to a temporary file, starts Excel (or switches to Excel if it is already running), and creates the chart in Excel.
7. Modify the chart as necessary; then save the Excel workbook file. See your Excel documentation for detailed information about using Excel.

Note that the Excel 5.0 Chart settings are saved with the report, but that any changes you make to the chart in Excel will not be reflected in the report.

Specifying Data Elements for a Chart

Suppose you want to create a chart that shows the total quantity ordered for each product number. You create a report using the tables RRITEMS and RRORDERS; two of the fields in the report are PRODUCT_NO and QUANTITY. To create a chart from this data, you would do the following:

1. Select File ⇒ Export and specify “Excel Chart” as the export type. Select Edit.
2. Highlight PRODUCT_NO in the Fields list. Click the right arrow button next to the Categories box to insert this field name there.
3. Highlight QUANTITY in the Fields list and click the right arrow button next to the Values box to insert this field name there.
4. Highlight Sum in the Value Type box; then select Export.

An Excel worksheet is displayed, with the exported data arranged as a chart (see [Figure 16.3](#)). Use Excel to modify, format, and print the chart.

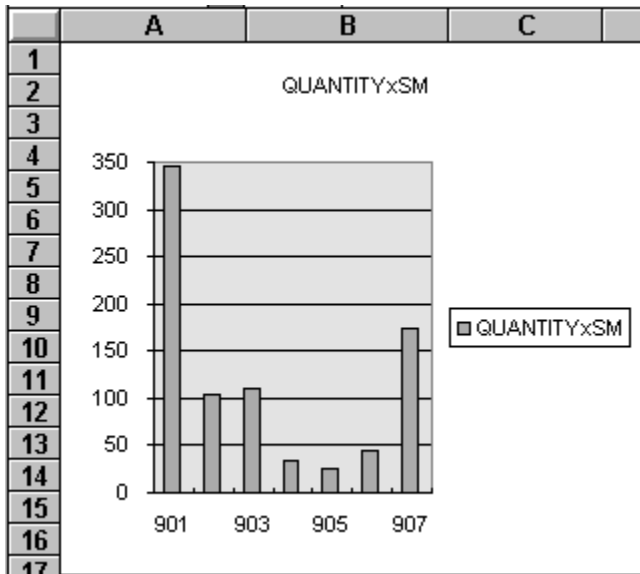


Figure 16.3 Portion of Excel 5.0 Chart after Export

Exporting to an Excel 5.0 PivotTable

Report Designer employs Object Linking and Embedding (OLE) automation to coordinate with Excel 5.0 in the creation of crosstab reports. When you select Excel PivotTable as the export type and specify the data elements of the crosstab, Report Designer generates the data and causes a PivotTable to be created in Excel.

General Procedures

Follow these general procedures to export report data to an Excel 5.0 PivotTable (details on some steps are provided in the next section):

1. On the Export dialog box, highlight “Excel PivotTable” in the list box and select Edit.

The Excel PivotTable Specification dialog shown in Figure 16.4 displays.

2. Select one or more fields in the Fields list box to be inserted as a Row label, Column label, or table cell value in the crosstab (see the next section of this chapter for information on each of these steps).

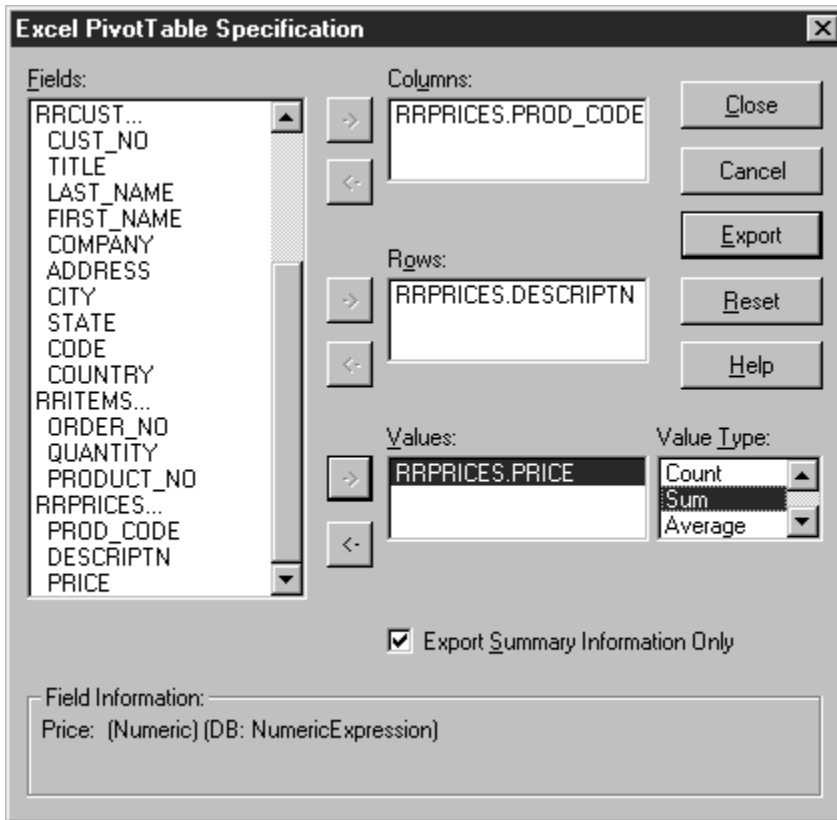


Figure 16.4 Excel PivotTable Specification Dialog

3. By default, “Export Summary Information Only” is selected. To export only summary field data, leave this box checked; to export all field data, click the check box to remove the check mark.

If you export only summary field data, Report Designer performs the necessary totaling and passes only the total data to Excel; this method is efficient but limits how much additional manipulation of the data you can perform in Excel. If you export all field data, Report Designer passes all of the specified record data to Excel and Excel performs the totaling; this method is less efficient but allows greater flexibility in working with the exported data in Excel.

4. Select Export. Report Designer exports the data to a temporary file, starts Excel (or switches to Excel if it is already running), and creates the PivotTable in Excel.

5. Modify the PivotTable as necessary; then save the Excel workbook file. See your Excel documentation for detailed information about using Excel.

Note that the Excel 5.0 PivotTable settings are saved with the report, but that any changes you make to the PivotTable in Excel will not be reflected in the report.

Specifying Labels and Cell Data for the Crosstab

The fields that you select using the buttons next to the Columns and Rows boxes on the PivotTable dialog become the labels for the x-axis (Columns) and y-axis (Rows) of the resulting crosstab. The combination of the field that you insert in the Values box and the Value Type you specify for that field supplies the values for the crosstab cells.

Take the simple example of a report that draws data from three tables, RRORDERS, RRPRICES, and RRITEMS. Suppose you want to create a crosstab that uses product descriptions as the row labels and order dates as the column labels. Suppose also that you have defined a calculated field call ORDER_TOT that multiplies quantity times unit price.

Your goal is to create a crosstab that uses product descriptions as the row labels and order dates as the column labels and that inserts the total order amount for each date in the crosstab cells.

After creating a report that provides the necessary field values, you would do the following to create such a crosstab:

1. Select File ⇒ Export and specify “Excel PivotTable” as the export type. Select Edit.
2. On the Excel PivotTable Specification dialog (see Figure 16.4), all fields from the report’s composite record structure are shown in the Fields list box. In the Fields list box, highlight the field that you want to supply values for the Column labels (in this case, the DATE field) and click the right arrow button next to the Columns box.
3. In the Fields list box, highlight the field that you want to supply values for the Row labels (in this case, the DESCRPTN field, which contains the product names) and click the right arrow button next to the Rows box.

4. In the Fields list box, highlight the field that you want to serve as the basis for the crosstab cell data (in this case, the ORDER_TOT field) and click the right arrow button next to the Values box. Then in the Value Type box select the total type that you want applied to the field value (in this case, Sum).
5. Select Export. Report Designer exports the data to a temporary file and launches Excel (or switches to it if it is already running). The OLE Driver dialog displays a series of informational prompts (“Starting PivotTable Module,” “Reading in Exported Data,” and “Creating PivotTable”) as the crosstab is set up in Excel.
6. An Excel worksheet is displayed, with the exported data arranged as a PivotTable (see Figure 16.5). Use Excel to modify, format, and print the crosstab.

| | H | I | J | K | L | M | N | O |
|----|--------------------|---------|---------|---------|---------|--------|--------|----------|
| 1 | Sum of order toxSM | DATE | | | | | | |
| 2 | DESCRIPTN | 2/10/94 | 2/16/94 | 2/22/94 | 3/2/94 | 3/6/94 | 3/8/94 | 3/10/94 |
| 3 | PC Com | 1998 | 0 | 1498.5 | 2497.5 | 999 | 999 | 249.75 |
| 4 | PC Database | 11920 | 0 | 9685 | 9685 | 6705 | 3725 | 1490 |
| 5 | PC Graphics | 0 | 4980 | 0 | 0 | 1245 | 0 | 0 |
| 6 | PC Project Planner | 0 | 1490 | 2235 | 0 | 0 | 2235 | 0 |
| 7 | PC Publisher | 0 | 1245 | 0 | 0 | 1245 | 0 | 0 |
| 8 | PC Spreadsheet | 1490 | 1490 | 6705 | 0 | 1490 | 2235 | 0 |
| 9 | PC Word Processor | 0 | 4980 | 0 | 0 | 1245 | 0 | 11205 |
| 10 | Grand Total | 15408 | 14185 | 20123.5 | 12182.5 | 12929 | 9194 | 12944.75 |

Figure 16.5 Portion of Excel 5.0 PivotTable After Exporting

Exporting to HTML

Use this export option to export report data to an HTML. HTML (Hypertext Markup Language) is the format used for presenting information on the World Wide Web. You can generate files suitable for inclusion on a web page directly from Report Designer.

You can export report data to an HTML file simply by entering the export file name on the Location tab and clicking Export. You also have the option of specifying a background color or image and inclusion of a border grid to enclose field values.

Procedures for Exporting to HTML

Follow these procedures to export report data to an HTML file (note that specifying Background and Border settings is optional):

1. On the Export dialog box, highlight “HTML” in the list box and select Edit to display the HTML Export dialog (see Figure 16.6).

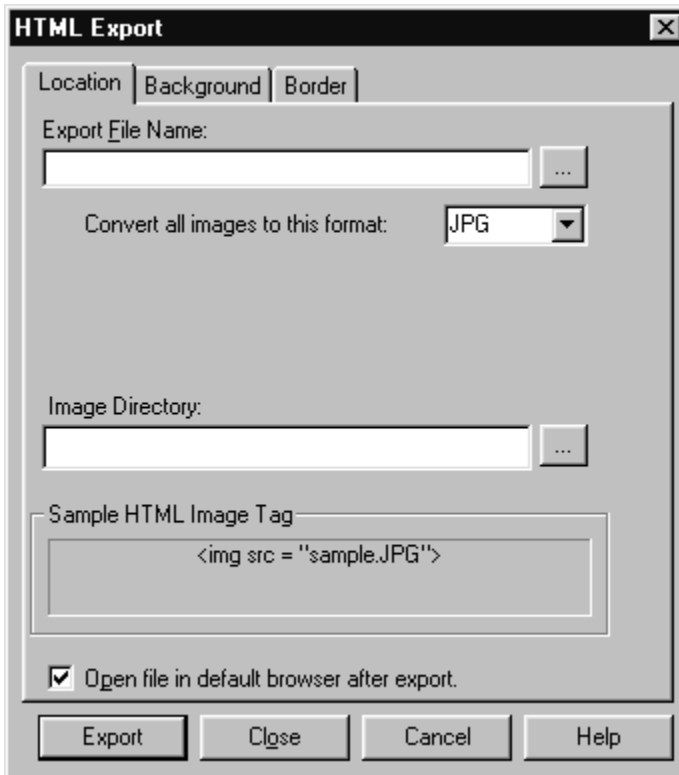


Figure 16.6 HTML Export Tabbed Dialog

2. Click the Location tab. In the Export File Name box, enter a name and, optionally, a directory location for the HTML file. As an alternative, you can click the ellipsis button at the right to select a directory location for the file to be exported.
3. Click the Background tab. To specify a solid color background for the HTML page, click the Color radio button and select a color from the drop-down list at the right.

To specify an image to serve as the page background, click the Image button and enter the name and directory location of the image file. As an alternative, you can click the ellipsis button at the right to select an image file from a specific folder.

4. Click the Border tab. To specify that the exported data be enclosed in a border grid on the HTML page, click the Width button and enter or select a border thickness.
5. When you are finished specifying the characteristics of the HTML export, click Export.

Note that lines and boxes on the report layout are not included in the HTML output, and that in certain cases there may be some loss of text formatting.

Any OLE objects or charts in the original report are converted to image files and saved to the same directory as any images in the report. By default, the image directory is a subdirectory of the HTML file location, and the directory name is the root of the HTML file name. For example, if the report is exported to **c:\work\exportfile.html**, the image directory will be **c:\work\exportfile**. The directory path will appear in the Image Directory box on the Location tab, and the sample below will show what the HTML tag will look like.

In this example, an image named **picture.gif** would be referenced as **exportfile\picture.gif** in the HTML.

Exporting to an ActiveX Viewer Control File

When you select this export option, you can create a report file that is readable by the ActiveX Viewer control. This control can be placed in an HTML file to display a report in an Internet/Intranet environment.

Unlike some reports exported to HTML, a report exported using this option will look the same when accessed through the Viewer control as it does when previewed or printed, including lines, boxes, images, and formatting. Note that the Viewer control can be used only with browsers that support ActiveX controls.

Procedures for Exporting to a Viewer Control File

Follow these procedures to export report data to a Viewer control file:

1. On the Export dialog box, highlight “ActiveX Viewer File” in the list box and select Edit to display the ActiveX Viewer Control dialog (see Figure 16.7).

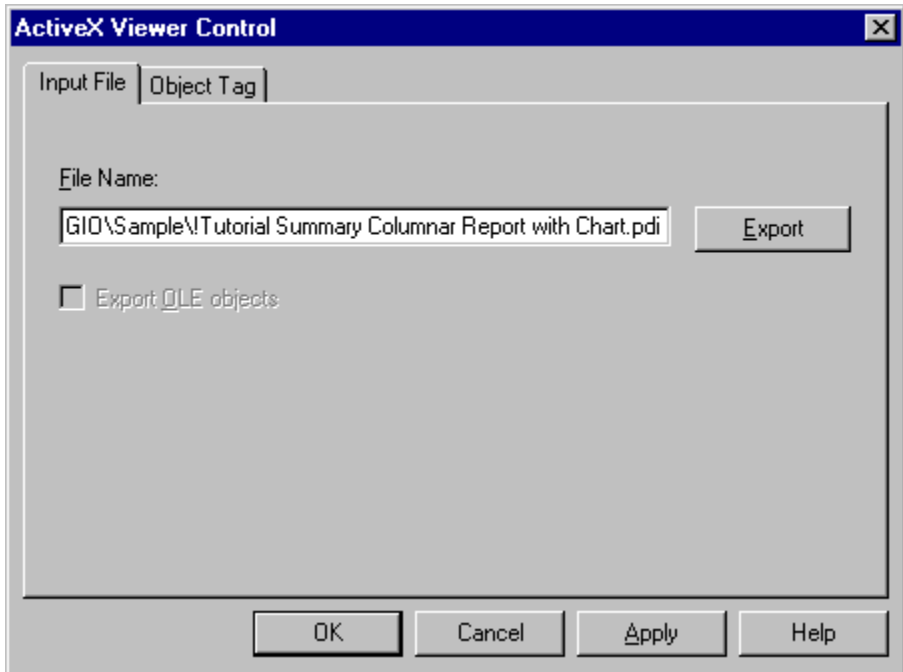


Figure 16.7 ActiveX Viewer Control Dialog

2. In the File Name box of the Input tab, enter a name for the output file (default extension is PDI). This file will serve as the input for the Viewer control.
3. Select Export to create the Viewer control output file.
4. Enter the necessary information on the Object Tag tab. For a full explanation of this tab, see the next section of this chapter.

Embedding the Viewer Control in an HTML File

In order to make the PDI output file accessible to a browser, you must embed the Viewer control in an HTML file. You can use either of the

following methods to create this container HTML file and embed the Viewer control in it:

- Select the Object Tag tab on the ActiveX Control export dialog to create a basic HTML container file and then edit that file as necessary.
- Create an HTML file from scratch using the syntax explained in this section.

This section provides instructions for using the Object Tag tab to create a basic container file, explains the various elements of the Object Tag tab, and illustrates the syntax for embedding the control.

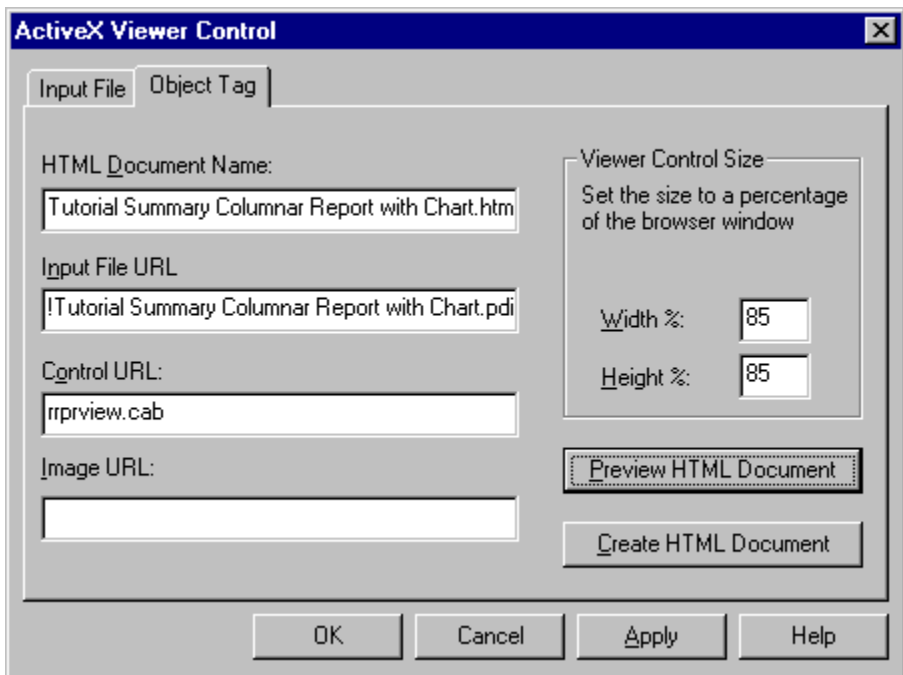


Figure 16.8 Object Tag Dialog

Using the Object Tag Tab

The best way to create the HTML container file for the Viewer control is to enter the necessary information on the Object Tag tab (see Figure 16.8), create the document, and edit the resulting file as necessary.

The following steps describe how to create a basic HTML container document using this dialog.

1. On the ActiveX Control export property sheet, select the Object Tag tab.
2. In the HTML Document Name box, enter a name and, optionally, a path for the HTML container document.
3. In the Input File URL box, enter the path and name of the exported report file (the PDI file created using the Report Viewer Control Export dialog).
4. In the Control URL box, enter the location of the Viewer control file on your Web server, either as a full or relative path (see the **Syntax for HTML Container File** section in this chapter for details about the Control URL entry).
5. If the images used by the exported report will not be in the same folder on the web site as the input (PDI) file, enter the location of the image folder in the Image URL box as you would like it to appear in the HTML document.
6. In the Viewer Control Size box, enter Width and Height settings (as percentages of the browser window) to establish the dimensions of the Viewer control window.
7. When you are finished entering information on the dialog, select Create HTML Document.

Syntax for the HTML Container File

A file created using the Object Tag dialog contains the necessary HTML tags to embed the Viewer control and to specify the exported report file as input to the control. Here is a sample of the HTML created for such a file:

```
<HTML><HEAD>
<TITLE>Report Viewer Control Document</TITLE>
</HEAD><BODY>
<OBJECT ALIGN=LEFT WIDTH=500 HEIGHT=300
  CLASSID="CLSID:66960E23-DE25-11CF-876F-444553540000"
  CODEBASE="http://web_server/cab/rrprview.cab"#Version=2,0,0,2>
  <PARAM NAME=>ReportURL"
  VALUE="http://web_server/basic_columnar_report.pdi">
  <PARAM NAME="LanguageID" VALUE="0409">
```

```
<PARAM NAME="ImagePath" VALUE="ImageDir">
<EMBED WIDTH=500 HEIGHT=300
  CLASSID="CLSID:66960E23-DE25-11CF-876F-444553540000"
  CODEBASE="rrprview.cab#Version=2,0,0,2"
  TYPE="application/oleobject"
  PARAM_ReportURL="basic_columnar_report.pdi">
  PARAM LanguageID="0409"
  PARAM ImagePath="ImageDir">
</OBJECT>
</BODY>
</HTML>
```

The Viewer control is embedded in the file using the <OBJECT> tag. These are the attributes and parameters that are defined in the <OBJECT> section of the file:

- The WIDTH and HEIGHT attributes set the size of the control window on the HTML page. In the example, the unit of measure is pixels. To set width and height as a percentage of the HTML page instead, enter a value followed by a percent sign (%) in each.
- The CODEBASE attribute identifies the location of the Viewer control. This file is packaged in a “cabinet” file named RRPRVIEW.CAB that is installed in the ActiveX subfolder of your program installation folder. Copy the cabinet file to your Web server and reference that location using the CODEBASE attribute. You can use either a full URL path or one that is relative to the location of the HTML container document. If the cabinet file and the HTML container file are in the same folder, you can reference just the file name (for example, CODEBASE=RRPRVIEW.CAB).
- The Version attribute indicates the software version of the Viewer control. Do not change this attribute; use the version as it was exported or as it appears in the Preview HTML Document window
- The ReportURL parameter specifies the exported report file that will serve as input for the Viewer control (the file created using the Input File tab). You can use either a full URL or one that is relative to the HTML container file.

The EMBED tag specifies settings that enable the report to be viewed in Netscape Navigator (since Netscape itself does not support ActiveX controls) using the ScriptActive plugin from nCompass.

Exporting to a Rich Text Format (RTF) File

Use this export option to export report data to a Rich Text Format file. Rich Text Format files can be imported by most popular word processing programs, including Word for Windows.

To export a report to a Rich Text Format (RTF) file, do the following:

1. Select File ⇒ Export, highlight “Rich Text Format (RTF)” in the export type list, and select Edit.
2. Enter a name for the export file in the File Name edit box.
3. Select Export.

Note the following:

- Lines, boxes, and images are not included in an RTF export.
- Text/data within Freeform lines will be positioned at the bottom of that line.
- For snaked-column reports, data will be exported in a single column; you can then edit the RTF file using a word processor to restore the desired format.
- Swapping of headers and footers is ignored; page and group headers/footers will be output without regard to swapping.
- Page setup settings such as margins and page size are included in an RTF export; therefore, select an appropriate printer before exporting.

Exporting to a Text File

Use this option to export report data to an unformatted text file.

Exporting to a text file is useful if you plan to include report data in a word processing document or import it into a desktop publishing program. When you export to a text file, Report Designer exports all the data on every line of the report, including text fields.

To export report data to a text file:

1. Select File ⇒ Export. On the Export dialog, highlight “Text” in the list box and select Edit.

The Text Export dialog shown in Figure 16.9 displays.



Figure 16.9 Text Export Dialog

2. In the File Name box, enter a file name, optionally including a path and file extension. If you do not include a path, Report Designer creates the file in the program directory.
3. Choose the options you want in the Text File Options box:
 - ◆ Select either Windows (ANSI) or DOS (PC) character set. In general, you should select Windows (ANSI) if you plan to import the file into a Windows word processing or desktop publishing application; select DOS (PC) if you plan to import the file into a DOS word processing or desktop publishing application. The default is Windows (ANSI).
 - ◆ In the Carriage returns box, select either Every Line (to insert a hard return after every line in the report output) or Once per Band (to insert a hard return after each band area in the report output). The default is Every Line.
4. To generate the file, select Export.

NOTE When exporting to a text file, Report Designer ignores lines, boxes, and images, but does export text and memo fields.

Exporting to a Text Data File

Export to Text Data File enables you to export report data to a text file using one of several separators or delimiters.

To export report data to a Text Data file:

1. Select File ⇒ Export, highlight “Text Data File” in the export type list, and select Edit.

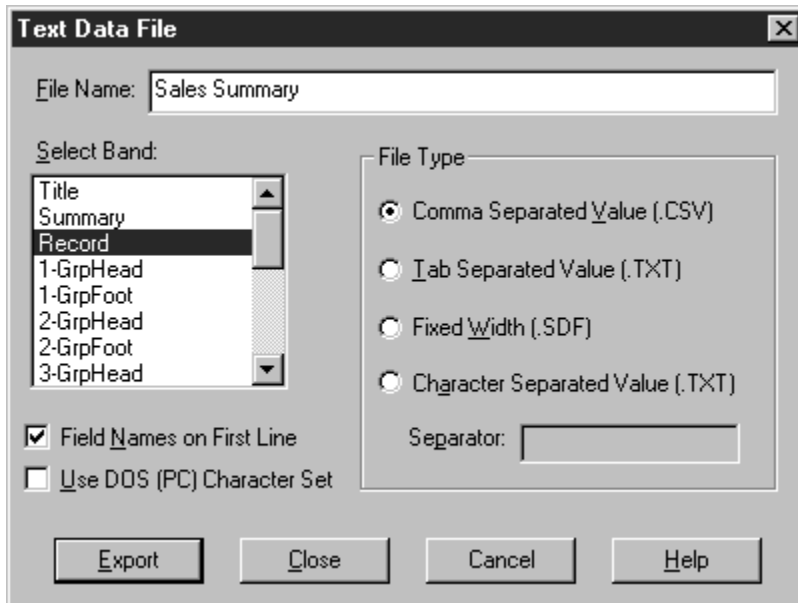


Figure 16.10 Text Data File Export Dialog

2. On the Text Data File dialog (see Figure 16.10), enter a name for the export file in the File Name box (default extension is determined by the File Type you select), optionally including a path.
3. In the Select Band box, highlight the report band containing the data to be exported.

4. In the File Type box, select Comma Separated Value, Tab Separated Value, Fixed Width, or Character Separated Value.

If you select Fixed Width, data will be exported using the field widths as defined in Report Designer. If you select Character Separated Value, in the Separator box enter the character that will serve as a field separator in the exported file.

5. By default, field names are included as column headings on the first line of the export. To prevent field names from being included, turn this setting off.

6. By default, data is exported using the Windows (ANSI) character set. To use the DOS character set instead, click the “Use DOS (PC) Character Set” check box to turn that setting on.
7. Select Export.

Note that all numeric data is exported in Fixed numeric format and all date/datetime data is exported in Windows International format. To retain either numeric or date/datetime field formats as they are specified in the report, you can include one or both of the following entries in the [Export] section of RRW.INI:

```
CSVKeepNumFormats=1
```

```
CSVKeepDateFormats=1
```

Exporting to a Word Merge File

Export to Word Merge File enables export to a file that can be used as the source of data for a Word for Windows Print Merge or Mail Merge. The Word Merge dialog is similar to the Text Data File dialog (see Figure 16.9), except that the Fixed Width and Character Separated Values options in the File Type box are grayed out, as is the “Use DOS (PC) Character Set” setting.

To export report data to a Word Merge file:

1. Select File ⇒ Export, highlight “Word Merge File” in the export type list, and select Edit.
2. Enter a name for the export file in the File Name box (default extension is determined by the File Type you select), optionally including a path.
3. In the Select Band box, highlight the report band containing the data to be exported.
4. In the File Type box, select Comma Separated Value or Tab Separated Value.
5. By default, field names are included as column headings on the first line of the export. To prevent field names from being included, turn this setting off.
6. Select Export.

Exporting to an Xbase or Worksheet File

When you export report data to an Xbase or worksheet file, you choose the band line type that contains the data you want to export. Report Designer will export all fields on every line in the specified band. After exporting the data in the selected band to a worksheet file, you can use the file with a spreadsheet program such as Excel; after exporting to an Xbase file, you can use the file with any Xbase-compatible program or with Report Designer. (Note that for database and worksheet file exports, text fields, memo fields, lines, boxes, and images are ignored.)

To export report data to an Xbase or Worksheet file, do the following:

1. On the Export dialog box, highlight either “Xbase” or “Worksheet” in the list box and select Edit. Depending on the export type, either the Xbase Export dialog (shown in Figure 16.11) or the Worksheet Export dialog displays.
2. In the File Name box, enter a file name, optionally including a path and file extension. If you do not include a path, Report Designer creates the file in the program directory.
3. In the Select Band box, highlight the band containing the data you want to export; then select Export. For example, to export data contained in the Summary band area of your report, highlight “Summary” in the list box and select Export.

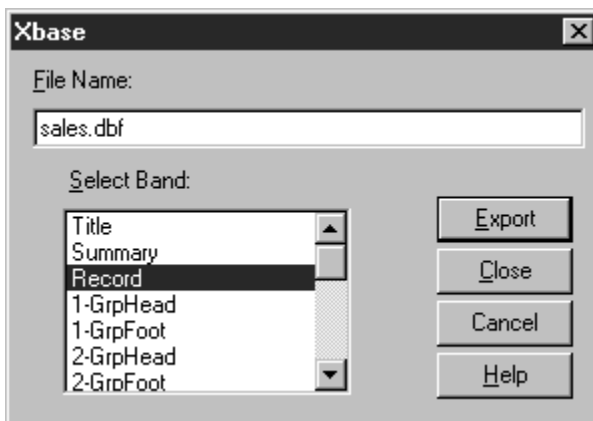


Figure 16.11 Xbase/Worksheet Export Dialog

Chapter 17

Using the Scheduling System

Introduction

This chapter explains how to use the scheduling system components—Application Scheduler and Scheduler Status—and provides a brief overview of their features. Detailed information about the scheduling system is presented in the following sections:

- Using Application Scheduler
- Using Scheduler Status

Figure 17.1 illustrates the components of the scheduling system.

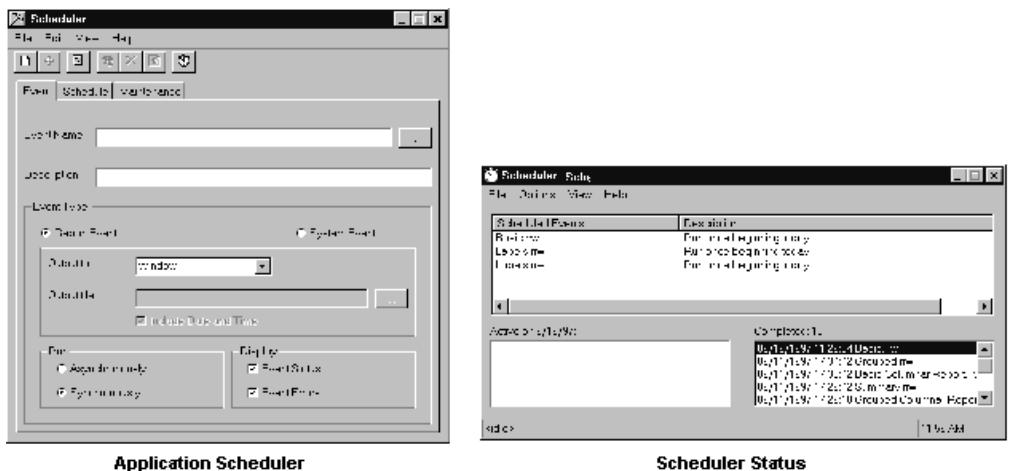


Figure 17.1 Components of the Scheduling System

Using Application Scheduler

The Application Scheduler, shown in Figure 17.2, enables you to schedule reports to run automatically at virtually any time and at any interval. Therefore, you can schedule reports to run after hours, freeing up system resources for other daytime activities and eliminating the need for personal attention. You can also schedule reports to run periodically, such as daily orders, weekly status, monthly payroll, etc.

You can also use Application Scheduler to run any system executable. The Application Scheduler manages those events by adding, removing, and changing event parameters as necessary. An *event* is any file that you can run, namely .rrw, .rsw, .dbo, .exe, .bat, etc. For example, you can use Application Scheduler to start product builds, check for electronic mail on a remote server, and run ARPEGGIO Data Organizer files. Data Organizer files enable you to organize your work environment by grouping objects together in a single workspace. In Data Organizer documents, you can build a batch of objects. In a batch, you can specify what each object does when the batch is run, such as display the data in an application, or print data.



Figure 17.2 Application Scheduler dialog box

As Figure 17.2 shows, the Application Scheduler dialog box contains tabs that you use to add and maintain events.

Event tab

The Event tab sets the scheduling criteria for an event you want added in the scheduling system. The Event tab displays by default.

For detailed information, see the section entitled “Adding an Event.”

Schedule tab

The Schedule tab displays information about an event before it is added in the scheduling system; such as how the event should run, the frequency, start date, start time, etc. This information is read-only.

For detailed information, see the section entitled “Viewing Scheduling Details on a New Event.”

Maintenance tab

The Maintenance tab lists all events entered in the scheduling system and provides information about the event, such as its start date and start time, and how often it is scheduled to run. By clicking on any of the column headers, the list is sorted based on the appropriate column. A second click on the same column header causes the list to be sorted in reverse order. Multiple clicks toggle between ascending and descending sort order.

This tab also activates the Change Event dialog box when you double-click on an event.

For detailed information, see the section entitled “Changing and Maintaining Event Parameters.”

Using the Toolbar

For many commands, you can select a button on the Application Scheduler toolbar, shown in Figure 17.3, to execute a command or to open a dialog box in which you can select or change various options.



Figure 17.3 Application Scheduler Toolbar

Figure 17.4 identifies the Menu Bar command (and associated shortcut if applicable) that corresponds to each standard toolbar button. The Schedule button is a shortcut to the Schedule Event dialog box.








| Button | Menu Bar Command |
|---|--|
|  | File ⇒ New |
|  | File ⇒ Add |
|  | File ⇒ Start Scheduler Status |
|  | Edit ⇒ Change |
|  | Edit ⇒ Remove |
|  | Edit ⇒ Refresh |
| Button | Shortcut |
|  | Activate the Schedule Event dialog box |

Figure 17.4 Toolbar Button and Corresponding Commands

Selecting from Menus

From the Application Scheduler, you execute commands by selecting from menus or clicking buttons and then using dialog boxes to provide additional information required by some commands.

Figure 17.5 summarizes the purpose of each menu choice on the Application Scheduler.

| Command | Purpose |
|------------------------|---|
| File menu | Provides choices for adding a new event, starting Scheduler Status, and exiting Application Scheduler. |
| New | Select an event. |
| Add | Add the selected event (report, executable, etc.). |
| Start Scheduler Status | Start Scheduler Status or redisplay it, if active. |
| Exit | Shut down Application Scheduler and return control to Windows. |
| Edit menu | Provides choices for modifying events and refreshing the display. Edit commands are active only from the Maintenance tab. |
| Change | Enable parameters for an event to be modified. |
| Remove | Remove selected event from the display area. |
| Refresh | Rereads the database and repopulates the list. |
| View menu | Provides choices for turning the Toolbar and Item Tooltips display on or off and displaying where the event resides. |
| Toolbar | Hide or show the toolbar. |
| Item Tooltips | Enable or disable Tooltips display. |
| Preferences | Display the directory structure where Report Events reside. |

Figure 17.5 Application Scheduler Menu Choices

Toolbar, Status Bar and ToolTips Settings

A check mark next to the toolbar or status bar means that the item is currently displayed. To turn off the display, select the appropriate item. The Status Bar provides information on the current state of the application, for example “<Idle>” or “Running event xyz.” The status bar also provides a digital representation of the current time known to the Scheduler Status in the right status pane.

A check mark next to the “Item Tooltips” item on the dialog means that a help label will display when you position the cursor over one of

the toolbar items. To turn off display of these labels, click the box to remove the check mark.

Adding Events

The Event tab enables you to enter scheduling criteria for the event you want the Application Scheduler to run.

To add an event:

1. In the Description edit box, enter a description of the event up to 255 characters in length. Although Description is optional, its detail can help you locate the file in the future.
2. In the Event Name edit box, type in the path and filename of the event you want to run. You can also click on the ellipsis button to visually select a file. The filename (and possibly the path) of the event to run is placed in the “Event Name” edit box.
3. Select a report type or system program you want to run. A Report Event can be either any R&R report. System Events are all other programs. After selecting an event type, different options display. Enter the applicable information.

Report Event—Select the destination type to output or export the file. Window is the default. For additional information on exporting files, consult Chapter 16, “Exporting Data.”

- a) Saved Destination—sends the report to the saved destination.
- b) Window—displays the report on the screen, as in print preview.
- c) Printer—queues the report to the default printer.
- d) Text File—exports the report to a text filename that you specify in the Output file field.
- e) DBF File—exports the report to the Xbase filename that you specify. You can use this file with any Xbase-compatible program.
- f) WKS File—exports the report to a Worksheet filename that you specify .
- g) Prompt User—when the event runs, prompts you to select the report destination type for the event: screen, printer, or export.
- h) RTF File—exports the report to the Rich Text Format filename that you specify. RTF is read by most popular word processing programs, including Word for Windows.

- i) ActiveX Viewer File—exports the report to an ActiveX control filename that you specify. This file can be placed in an HTML file to display a report in an Internet/Intranet environment.
- j) HTML File—exports the report to the Hypertext Markup Language filename that you specify. HTML is the format used for presenting information on the World Wide Web.

System Event—Select the destination type where you want the file to output to and enter the Command Line (/X, /S, etc.) that you want passed as parameters to the executable, if applicable.

4. Specify how the file should run: Asynchronous or Synchronous.
 - Asynchronous events run concurrently. The system can start another event before the current event finishes. Therefore care should be taken when adding asynchronous events to run at the time same. If you have multiple events that need to run asynchronously, it is good practice to stagger their start times a minute or two apart.
 - Synchronous events run consecutively. The system waits for the event to finish before starting the next one.
5. Check whether Event Status and Event Errors messages should display. These are optional. If checked, these messages display in the Scheduler Status when the event starts.
6. Click on the Schedule button on the toolbar to display the Schedule Event dialog box.
 - a) In the dialog box, specify how often the event should run. The default is Once. Then specify when you want the event to start and at what time. As you enter your selections, the days of the week on the calendar reflect your settings. For example, the days that the event can run turn green. If Exclude Days is checked, the excluded days are red.

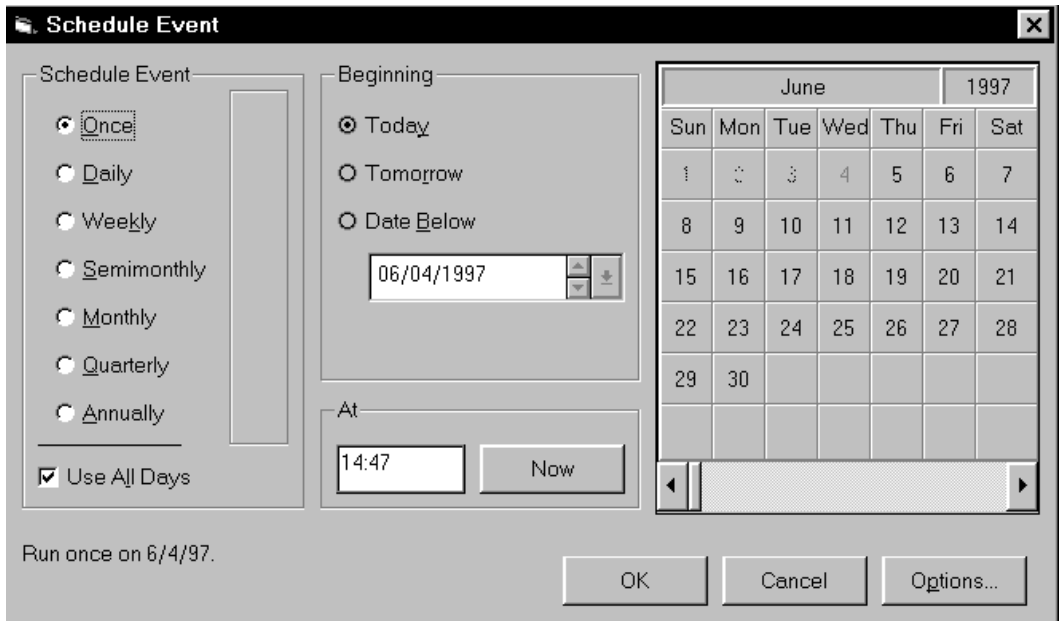


Figure 17.6 Schedule Event dialog box

Note: When a Weekly or greater period event cannot run because it happens to fall on an excluded day, Application Scheduler will run the event on the first available day prior to the exclude day.

- a) To set additional scheduling parameters, click the Options... button to display the Event Options dialog box.

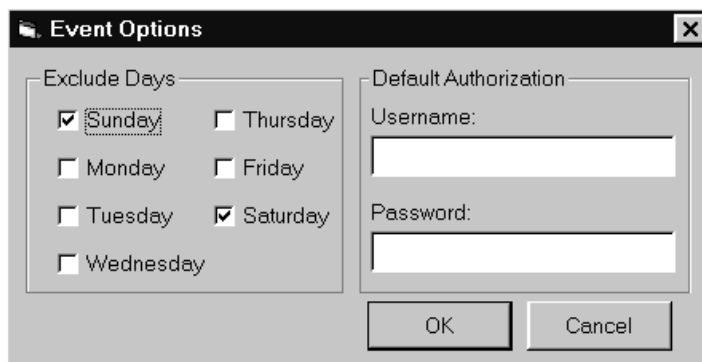


Figure 17.7 Event Options dialog box

- Specify the days you want to exclude the event from being scheduled.

Note: If *UseAllDays* is checked on the *Schedule Event* dialog box, *UseAllDays* overrides *Exclude Days* allowing this event to run on any day of the week.

- If the platform the report event accesses requires a log on, enter the user name and password. The authorization values will be encrypted in the Scheduler database.
- Click OK.

7. Click the Add button on the toolbar to add the event.

Viewing Scheduling Details on a New Event

The Schedule tab enables you to view details prior to adding an event to the Scheduler database. This information is read-only.



Figure 17.8 Schedule Tab

As Figure 17.8 shows, the Schedule tab displays the following:

- Event Name—Displays the filename and its location for the event to be added, such as C:\Program Files\R&R

ReportWriter\Sample\Multi-Line Columnar Report.rrw or C:\Program Files\WALLDATA\Sample\Multi-Line Columnar Report.rsw, or C:\Program Files\Accessories\notepad.exe, etc.

- Starting Date—Displays either a specific date or the current calendar date for the event to be added, using the format mm/dd/yy.
- Starting Time—Displays current time for the event to be added, using the format hh:mm.
- Frequency — Displays scheduling criteria for the event to be added, such as Once, Daily, Weekly, Semi-monthly, etc. The default is Once.
- Year Type — Displays the first month of your company's Fiscal Year, if checked. The default is Calendar, which equates to January.
- Days to run — Displays the scheduling days for the event, if checked, such as “Every day.” or “Every day except for exclude days.” The default is the current calendar date.
- Exclude Days — Displays the nonscheduling days for the event, if checked. The default is UseAllDays. UseAllDays overrides Exclude Days settings on the Event Options dialog box.
- Days of month to run — Displays the scheduling days of the month for the event to run, if checked, such as first day, last day, 1st & 15th, or 15th & last or 1st, 2nd, 3rd, 4th, and last Mon.
- Description — Provides additional scheduling information on how the event should run, such as “Run once beginning today.” or “Run monthly on the nonexcluded days on the first and 15th days of the month beginning on mm/dd/yy.”

Changing and Maintaining Event Parameters

From the Maintenance tab, shown in Figure 17.9, selecting Change from the Edit menu or double-clicking on the event activates the Change Event dialog box. This dialog box enables you to change any event parameters, including scheduling information for an event. The procedure for changing an event is similar to adding an event.

To change an event:

1. On the Maintenance tab, select the event whose parameters you want to change.
2. From the Edit menu, select Change. You can also double-click on the event. The Change Event dialog box appears.
3. Click on the **Schedule...** toolbar button to display the Schedule Event dialog box.
4. Follow Step 4 through Step 6 in “Adding an Event.” for procedural details.
5. Check Create new event from current information, if applicable.
6. Click OK.

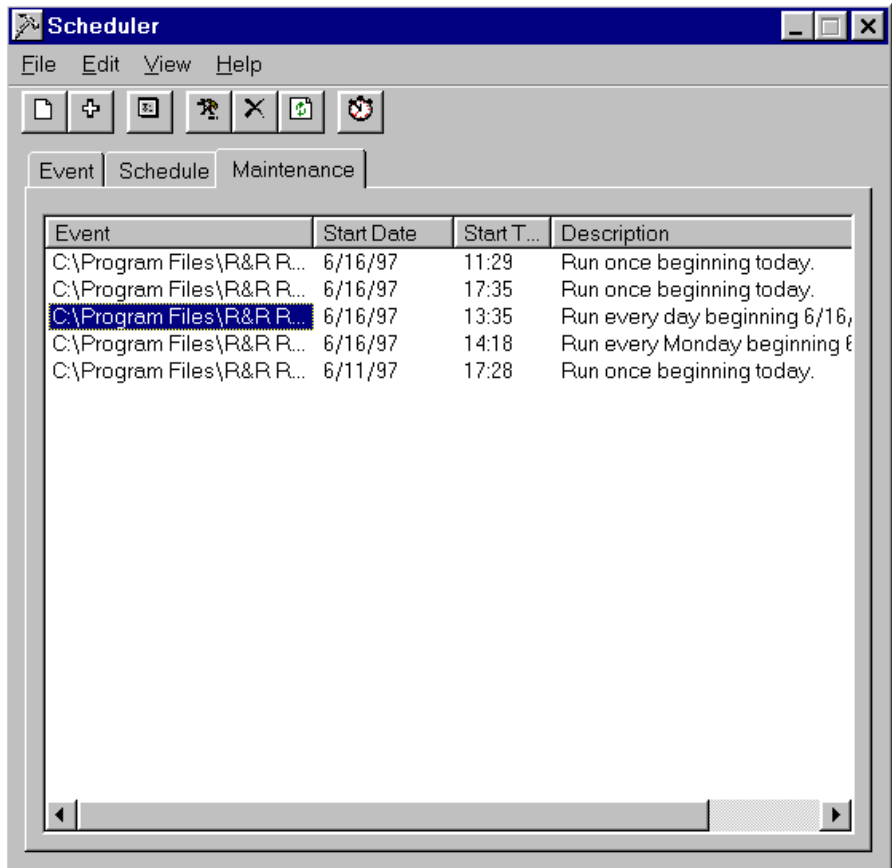


Figure 17.9 Maintenance Tab

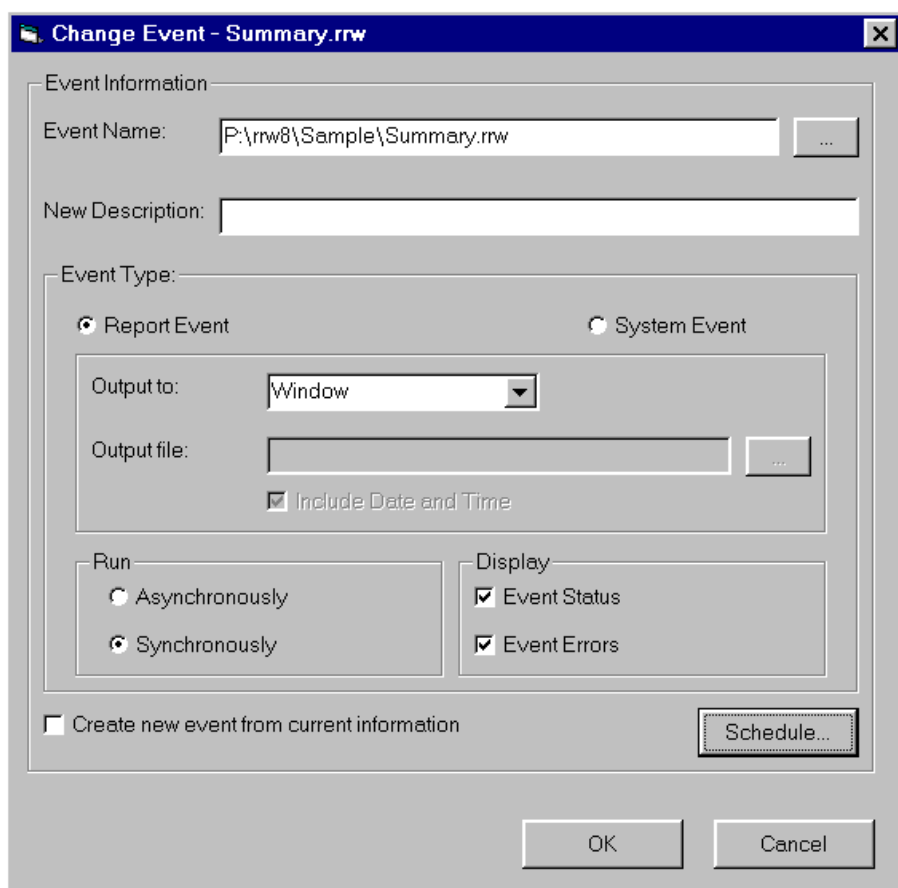


Figure 17.10 Change Event Dialog Box

Scheduler Status dialog box

Scheduler Status monitors and provides status on jobs scheduled (past, current, and future) by Application Scheduler. Scheduler Status also contains a comprehensive logging utility that logs jobs that have been executed.

As Figure 17.11 shows, the Scheduler Status dialog box contains three display areas.

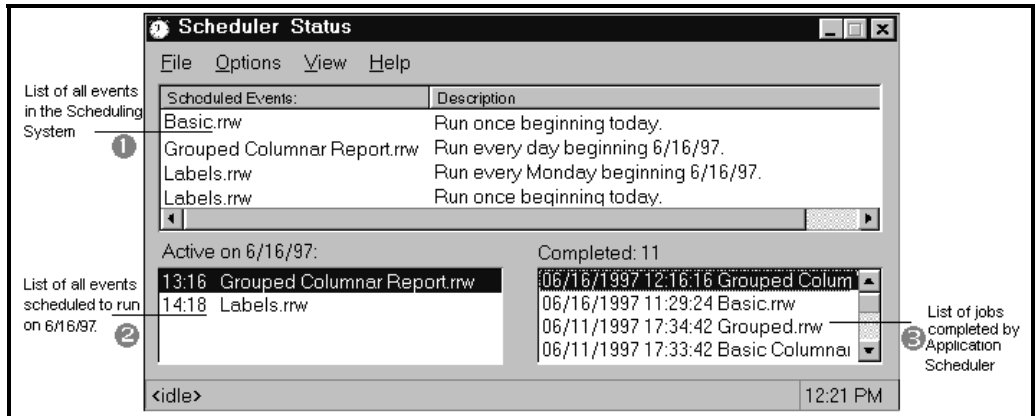


Figure 17.11 Display Areas on Scheduler Status

| Display | Description |
|----------|---|
| 1 | <p>Lists all Report and System events in the scheduling system and details how the event was scheduled. This description defaults to showing the frequency and date of when to run the event in ascending. By clicking on any of the column headers, the list is sorted based on the appropriate column. A second click on the same column header causes the list to be sorted in reverse order. Multiple clicks toggle between ascending and descending sort order.</p> <p>Double-clicking on an event activates the Properties dialog box, which displays event parameters. To change any of these parameters, you use the Application Scheduler.</p> |
| 2 | <p>This display is for informational purposes only. By default, it lists events scheduled to be run on that particular day that have not been started.</p> |
| 3 | <p>Shows the number of completed jobs, sorted with the most recently run job first. The list of completed jobs are ones that have been run since the scheduling system was first invoked. (To clear out this list, select Delete Log Table from the File menu.)</p> <p>Asynchronous events are listed as soon as they are started, regardless of whether they are finished or not. Synchronous events are listed upon completion.</p> |

Selecting from Menus

From Scheduler Status, you select from menus or click buttons and then using dialog boxes to provide additional information as required. Figure 17.12 summarizes the purpose of each menu choice.

| Command | Purpose |
|-----------------------------|--|
| File menu | Provides choices for deleting the log table, starting Application Scheduler, and exiting. |
| Delete Log Table | Display the Delete Log Entries dialog box. Delete Logs removes the list of completed jobs that have been run since the scheduling system was first invoked, or delete logs with certain dates. |
| Start Application Scheduler | Start Application Scheduler or redisplay it, if active. |
| Exit | Leave Scheduler Status. |
| View menu | Provides choices for viewing details about an event or the log of event results, turning the Toolbar and Item Tooltips display on or off, and changing global settings. |
| Event Information | View event parameters. |
| Log Results | View details on any job in the “Completed” list box. |
| Status Bar | Hide or show the status bar. |
| Item Tooltips | Enable or disable ToolTips display. |
| Preferences | Display the Scheduler Options dialog to set global parameters (Fiscal Year, Quarterly, or 13 weeks intervals). Also controls automatic startup of Scheduler Status. |
| Options menu | Provides choices for controlling how and where to display the Scheduler Status. |
| Always on top | Display the Scheduler Status so that it is always on top of other windows. |
| Hide when minimized | Turns the Scheduler Status display on and off. |

Figure 17.12 Scheduler Status Menu Choices

Viewing Log Records

To get additional detail on any event in the “Completed” list box, double-click on the entry or select Log Results from the View menu. The Show Log Record dialog box displays.



Figure 17.13 Show Log Record dialog box.

To view the entire log file, rather than one job at a time, consult the Maintenance tab on the Application Scheduler.

Setting Scheduling Options for Events

The Scheduler Options dialog box, shown in Figure 17.14, enables you to change global settings for the scheduling system.

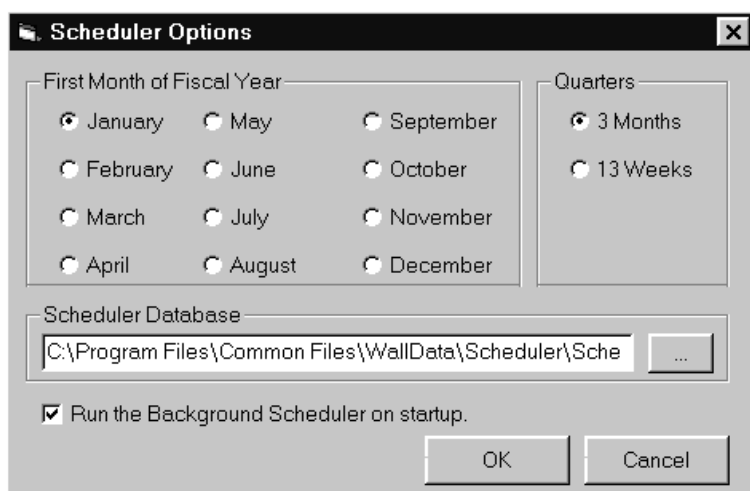


Figure 17.14 Scheduler Options Dialog Box

The most important control on this dialog is the “Schedule Database” edit box. This value must point to a schedule database file or the Scheduler components will not work correctly. The default value for this edit box is dependent on where Application Scheduler was installed.

This dialog box also enables you to select the first month of the fiscal year and the length of a quarter in the fiscal year.

Deleting Log Table Entries

The Delete Log Entries dialog box, shown in Figure 17.15, enables you to remove a log entry for a completed event or the entire table of completed events

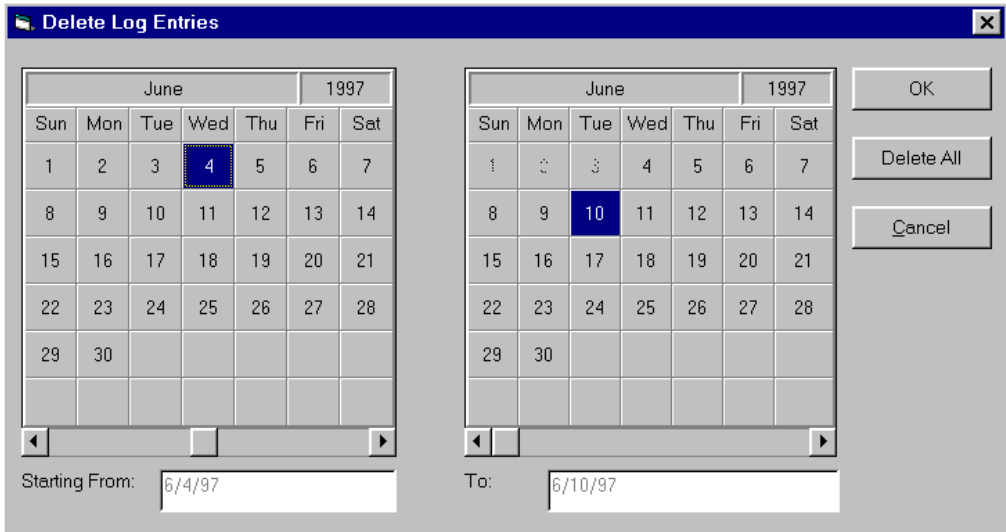


Figure 17.15 Delete Log Entries Dialog Box

To delete an entry in the log table of completed events.

1. Highlight the entry you want to delete.
2. From the File menu, select Delete Log Table to display the Delete Log Entries dialog box. By default, the calendars for the current month display with the current day highlighted.
3. Either select the date range “Starting From:” through “To:” or select Delete All.
4. Click OK.

Creating Specialized Reports

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Chapter 18

Creating User-SQL Reports

Introduction

This chapter explains how to create a User-SQL report by selecting File ⇒ New User SQL and then entering and modifying a SELECT statement. This information is presented in the following sections:

- Entering the SELECT Statement
- Executing a Stored Procedure
- Modifying the SELECT Statement
- Special Features of User-SQL Reports

A *User-SQL* report is one that you create by entering the appropriate SQL SELECT statement (or a string to execute a stored procedure) instead of by selecting master and related tables from Report Designer menus. If you are an experienced SQL user, this method of creating reports provides some advantages over Auto-SQL reports:

- Since almost all processing of data is done on the network server, User-SQL reports can be faster and more efficient.
- You can perform certain operations (such as creating a report based on a union) through the SELECT statement that you do not have access to in an Auto-SQL report.

You can use the SELECT statement that Report Designer builds for an Auto-SQL report as the starting point for developing a User-SQL report (see the **Copying an Auto-SQL SELECT Statement** section). After you create a User-SQL report, you can edit the SELECT statement, which is saved with the report. Note that you *cannot* convert an Auto-SQL report (one created by selecting master and related tables) into a User-SQL report.

Entering the SELECT Statement

When you create an Auto-SQL report (by selecting master and related tables from menus), Report Designer constructs a SELECT statement for you that it passes to the SQL software when the report is generated. As an alternative to this method, you can create a User-SQL report and enter the SELECT statement yourself. In this type of report, you provide

a SELECT statement, rather than using Report Designer's menus and commands, to specify the data to be retrieved from the database tables.

The general procedure for creating a report by entering a SELECT statement is as follows:

1. Select File ⇒ New User-SQL Report. On the New dialog, select the starting point for your report: Instant Report, Blank Report, or Template. If you select Template, you are also prompted to select the report template to use.
2. If no data source is currently connected, the Data Source Connections dialog appears. Highlight the data source to be used for the report and select OK. (If required, enter the log-on information for your database platform and select OK.)

If one or more data sources are currently connected, the Connected Data Sources dialog appears; highlight the desired data source and choose Select.

A SQL Select dialog like the one in Figure 18.1 appears (this dialog varies depending on the data source).

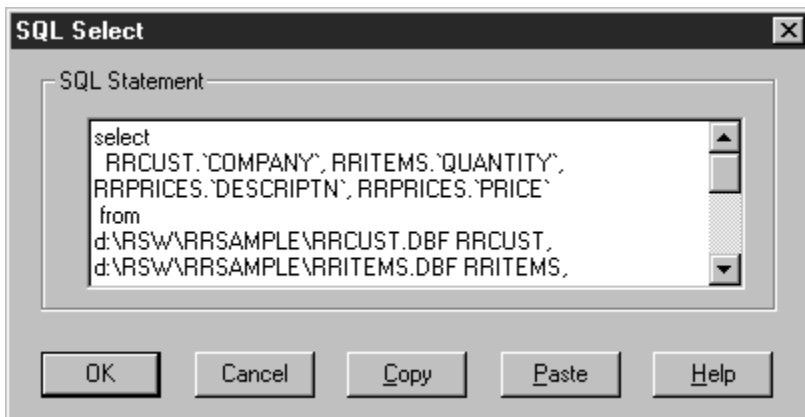


Figure 18.1 SQL Select Dialog

3. In the SQL Select box, enter a SELECT statement (or an EXEC statement to execute a stored procedure).

You can enter any SELECT statement your SQL platform supports. Consult your database software documentation for a description of the SELECT statement syntax. As you enter the statement, you can

format it for better readability by using Ctrl+Tab to indent and Ctrl+Enter to start a new line.

4. When you finish entering the `SELECT` statement, select OK. If the `SELECT` statement contains an error, Report Designer or your SQL software will return an error message identifying the problem.

In most cases, error messages returned by the SQL software include a code and short description of the error. For a more detailed explanation, see your database software documentation. After acknowledging the error, you will return to the SQL Select dialog, where you can make corrections.

5. Develop the report by defining the layout and formatting as necessary. When you finish, select File ⇒ Save to save the report.

SQL SELECT Example

Suppose you have an `EMPLOYEES` table that contains `SALARY` and `DEPARTMENT` fields. You can enter a `SELECT` statement to retrieve just summary information from your database. To do so, you could create a User-SQL report that does a “grouping” `SELECT` by means of the following statement:

```
SELECT
sum(salary) saltot, max(salary) salmax,
min(salary) salmin, department
FROM
employees
GROUP BY
department
```

Copying an Auto-SQL SELECT Statement

Instead of entering a `SELECT` statement “from scratch,” you can copy the `SELECT` statement from a previously developed Auto-SQL report and modify it as necessary.

To copy a `SELECT` from an Auto-SQL report and use it as the starting point of a User-SQL report, follow these steps:

1. Open the Auto-SQL report (select File ⇒ Open or press Ctrl+O) and select Database ⇒ Show SQL.
2. In the Show SQL dialog, select Copy (or press Ctrl+C). The entire statement is copied to the Windows Clipboard. Select OK.

3. Select File ⇒ New User-SQL and select the starting point for your report: Instant Report, Blank Report, or Template. Select the data source to be used for the report.
4. The SQL Select dialog appears. Select Paste (or press Ctrl+V) to paste the statement from the Clipboard to the SQL Select dialog.
5. Modify the statement as necessary; then select OK.

Assigning Field Aliases

When you run a User-SQL report, Report Designer sends the `SELECT` statement you constructed to your database software, which executes the `SELECT` and returns the results to Report Designer. Report Designer requires that each field resulting from the `SELECT` have a valid, unique name. Therefore, field aliases are automatically assigned to any derived or aggregate fields returned by the statement.

The automatically generated fields aliases are in the form **Col<number>**, where **<number>** is the column position of the relevant column in the result set, starting with the number 1.

You can assign your own aliases for such fields by specifying the aliases in the `SELECT` statement. For those databases that do not directly support assigning of field aliases in a `SELECT` statement, Report Designer provides an alternate syntax for entering the statement. The following sections explain how to assign field aliases both in databases that support aliases and in those that do not (consult your database documentation to determine whether your database software supports assigning of field aliases).

Note that if any duplicate field aliases are returned by the statement, you must assign aliases for those fields to ensure that each field has a unique name. Report Designer will not automatically assign aliases for such fields.

SQL Platforms that Support Field Aliases

You can ensure that fields returned by the `SELECT` statement have valid, unique names by assigning an alias to each table field, derived field, or aggregate field.

For example, the following statement retrieves the “fname” and “lname” fields from the “instrctr” table and assigns them the aliases “first” and “last” respectively:

```
SELECT fname first, lname last
FROM instrctr
```

You can accomplish the same thing for a derived field. The following statement retrieves from the “instrctr” table a single derived field with the alias “both”:

```
SELECT fname+lname both
FROM instrctr
```

If you do not explicitly assign field aliases, Report Designer automatically assigns them if necessary. The automatically generated fields aliases are in the form **Col<number>**, where <number> is the column position of the relevant column in the result set.

SQL Platforms that Do Not Support Field Aliases

Since some SQL platforms do not support assigning field aliases in a SELECT statement, Report Designer supports the following alternate syntax for creating a User-SQL report:

```
DEFINE REPORTVIEW <reportview> (<col-name-list>)
AS <select-stmt>
```

In this syntax, *reportview* represents the set of data returned to Report Designer as a result of executing the statement. When entering such a statement in the SQL Select box, substitute a name for Report Designer to assign to the resulting data set for <reportview>; substitute a parenthesized list of field aliases, separated by commas, for (<col-name-list>). In the <select-stmt> section, enter the SELECT statement itself.

For example, in the following statement “names” is the name Report Designer assigns to the resulting data set; “upfirst” and “uplast” are the aliases assigned to the two derived fields specified in the <select-stmt> portion of the entry:

```
DEFINE REPORTVIEW names (upfirst,uplast) AS
SELECT upper(fname), upper(lname) from instrctr
```

This statement returns two derived fields that will have the names “upfirst” and “uplast” in Report Designer.

If you do not explicitly assign field aliases, Report Designer automatically assigns them if necessary. The automatically generated fields aliases are in the form **Col<number>**, where <number> is the column position of the relevant column in the result set.

Providing for Overrides with Report Viewer

If you are preparing a User-SQL report for use with Report Viewer, you can provide for overrides of any part of the SELECT statement except the initial command (SELECT, EXEC, or DEFINE REPORTVIEW). To allow for one or more portions of the statement to be overridden when a report is run with Report Viewer, enclose each portion in double angle brackets (<< and >>).

For example, each of the bracketed portions of the following SELECT statement can be overridden with a different value when the report is executed with Report Viewer:

```
SELECT <<lname>> FROM accts
WHERE <<status>> = <<"Overdue">>
<<ORDER BY custno>>
```

You can mark any portion of the SELECT for override. Note, however, that you cannot “nest” bracketed sections — that is, you cannot include a bracketed section within another bracketed section.

To enable the specified portions of the User-SQL report to be overridden, you must include an RI_REPLACE entry in your Report Viewer control file or table. This entry consists of a comma-separated list of values to override the bracketed sections of the report’s SELECT statement. For a full explanation of RI_REPLACE, see the *Developing Applications* documentation.

When you run such a report with Report Designer, the brackets are ignored and the report is run with the supplied values. For reference purposes, the brackets are included in the Database ⇒ Show SQL display of the statement.

Executing a Stored Procedure

If the SQL platform you are using supports the use of stored procedures, you can enter a statement to execute a stored procedure to retrieve data for a report. Report Designer will use *only* the results

returned by the first SELECT in the stored procedure and will ignore any subsequent return values from the stored procedure.

Executing a Stored Procedure

To execute a stored procedure to provide data for a report, enter a statement in the SQL Select dialog using syntax required by your database platform. When you execute the report, Report Designer will pass the stored procedure statement directly to your database software. Consult your database software documentation for more detailed information about stored procedures.

If you have upgraded from a previous version of R&R for SQL, a setting is available in the RSWSQL.INI file to provide compatibility.

Improving Performance with Stored Procedures

If you have a User-SQL report that calls a SQL Server stored procedure, you may notice a delay when reading the report, especially if the stored procedure is complex. This delay occurs because Report Designer must execute the stored procedure to extract the resulting column definitions.

You can avoid this overhead and reduce report-reading time by providing Report Designer with field definitions. For each stored procedure you use with Report Designer, create a table in the same database with a name that consists of your stored procedure name preceded by the characters **RSW_**. For example, if your stored procedure is named **myproc**, create a table named **RSW_myproc**. This table's column definitions must match exactly in name, number, and data type the columns that will be returned by the stored procedure.

When Report Designer reads a report that uses a stored procedure, it will first look for a table with that name in the database. If the table exists, Report Designer will use it for column definitions. Otherwise, it will execute the stored procedure to get the resulting column definitions.

Modifying the SELECT Statement

After you enter a SELECT statement, you can use Database ⇒ SQL Select to edit it as necessary. If you are creating many similar reports, you can create and save a “template” report containing the basic SELECT statement, edit the SELECT statement, and then save the report with a different name.

To modify a previously entered SELECT statement:

1. Select Database ⇒ SQL Select (or the SQL button on the Standard Toolbar).
2. In the SQL Select box, edit the SELECT statement as necessary. You make changes here as you do in any edit box — to insert text, place the edit cursor where you want the text to start and begin typing; to delete text, press Backspace or Delete.
3. When you finish making changes, select OK. If the changes you made result in any fields being eliminated from the report, Report Designer will delete those fields and prompt for confirmation.

Special Features of User-SQL Reports

In a User-SQL report, the following menu items (and their associated buttons) are disabled:

- Database ⇒ Sort (sorting is controlled by any ORDER BY clause in the SELECT statement itself).
- Database ⇒ Joins (table joins are specified in the SELECT statement).

Also, the Database ⇒ Master menu choice is replaced by Database ⇒ SQL Select. You can use this command (or the SQL button on the Standard Toolbar) to edit the SELECT statement.

Note that you can define a filter in a User-SQL report, but it will not be passed to the SQL software. Instead, Report Designer will apply the filter to the result of the user-specified SELECT.

Chapter 19

Creating Form Letter Reports

Introduction

This chapter explains how to create reports that merge data from your tables into memos stored in text files. Report Designer's merge feature is useful for applications such as "mail merge" form letters. This explanation is presented in the following sections:

- Introduction to Merging
- Preparing Text for Merging
- Attaching Files for Merging
- Creating Merge Report Layouts
- Features Affecting Merge Reports

Introduction to Merging

A merge report is like any other report: you create it by selecting a master table that provides data such as names and addresses, by defining database joins as necessary to make information from other tables available, and by creating a layout.

The unique feature of these reports is that in addition to having database fields, they also include memo fields drawn from text files. These memo fields can be straight text or, more commonly, they can be text combined with data drawn from your tables.

The text used in a merge report comes from one or more memos stored in an unformatted text file (most word processing programs provide a "Text" or "Text Only" option for saving files). In order to provide text for a report, the memos stored in the text file must follow the conventions explained in this chapter. The file must also be associated with the report by using Insert ⇒ Text File.

After a text file has been associated with a report, the text it contains becomes one or more memo fields available for use in the report.

The following sections explain how to prepare text for merging, associate text files with your report, and insert the resulting memo fields on your report layout.

Preparing Text for Merging

Text included in a report, for example the text that provides the body of a form letter, is provided by a single, unformatted text file that can contain one or more sections of related text, each of which is referred to as a *memo*. If your file contains only a single memo to be included in your report, you need not observe any special conventions in entering it. If your file contains more than one memo, you must follow these conventions in order for Report Designer to identify each memo:

- ❑ Identify each separate memo in the file by a name up to ten characters long. Precede the name with a period and enter it on a separate line before the text.
- ❑ Use the left brace, {, to mark the beginning of each memo and a right brace, }, to mark the end. The left brace must be the first character on the line that follows the memo field name.

For example, the first few lines of the FIRST memo might look like this:

```
.first  
{This is the text that will be used as the first memo  
of a form letter. The text can be as long as you like.}
```

You can have any number of separate memos of any length in a text file. Be sure to give each memo a unique name.

Including Field Data in Text

You can merge data from your tables into your memo text by including field names. You can also include the names of most calculated or total fields created in the report to which you will be attaching the memo file.

For example, the text for a form letter based on a customer table can include a reference to each customer's state of residence in the body of the letter, as long as the composite record contains a state field. A form letter based on orders, items, and prices tables can include a reference to the total amount of each customer's orders, as long as the amount is a field in one of the report tables or a calculated or total field.

To include a field name in a text file, type the field name where you want the data to appear. Enclose the field name within backslashes (e.g. \STATE\) to distinguish field names from the text. If you have

more than one field with the same name, precede the name of each field with the table alias (for example, \CUSTOMER.STATE\).

For example, to include the city and state name from a customer table in text that will be used in a form letter report, you might create a memo like the one illustrated in Figure 19.1 (the embedded field references are shown in bold for clarity).

In July, Eastern Computer Supply is offering a series of training seminars for all corporate customers in the **\CITY**, **\STATE** area. The seminars will be held at the Hynes Convention Center in Boston on July 1-5. Each session will provide an introduction to one of our PC software products. For more information about the seminars, please fill out and return the enclosed information request form.

Figure 19.1 Sample Text with Field Names

When you include this text in your report, the name of each customer's city will replace \CITY\ and the state name will replace \STATE\. By creating a filter that selects only those customers who live in or near Boston (STATE in the list ("MA", "CT", "RI", "VT", "NH", "ME")), you can send personalized form letters to those customers. Figure 19.2 shows the type of form letter that will result.

Eastern Computer Supply, Inc.
04/29/96

William Hickock
18 Cambridge Avenue
Waltham, MA 01254

Dear William,

In July, Eastern Computer Supply is offering a series of training seminars for all corporate customers in the Waltham, MA area. The seminars will be held at the Hynes Convention Center in Boston on July 1-5. Each session will provide an introduction to one of our PC software products. For more information about the seminars, please fill out and return the enclosed information request form.

Sincerely,

Joseph Wilson
Training Coordinator

421 Park Avenue Worcester, MA 01615 508-345-6686

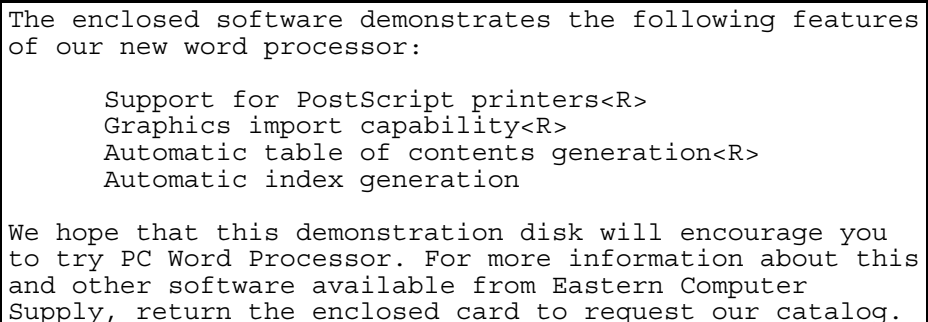
Figure 19.2 Sample Merge Report

Formatting Text: Line Endings

Unless you indicate where line endings should occur in your text, Report Designer will word-wrap your text within the width of the memo field, determining its own line endings. To preserve the line endings in your text, you must precede each carriage return with a line ending code, <R> or <r>. The initial carriage return and any that immediately follow it will cause Report Designer to begin a new line.

For example, the memo field excerpt illustrated in Figure 19.3 produces the form letter excerpt illustrated in Figure 19.4. Notice that the <R> code is not required when a carriage return is immediately followed by another carriage return to indicate a blank line.

You can also indicate where you want line endings followed by blank lines by including *multiple* carriage returns. For example, in Figure 19.3, the series of two carriage returns following the first sentence results in a line ending and a blank line. (Note that Report Designer preserves blank lines only when the memo field is word-wrapped.)

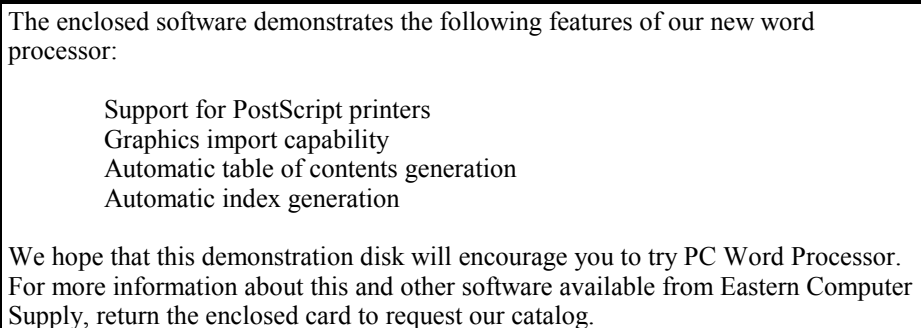


The enclosed software demonstrates the following features of our new word processor:

Support for PostScript printers<R>
Graphics import capability<R>
Automatic table of contents generation<R>
Automatic index generation

We hope that this demonstration disk will encourage you to try PC Word Processor. For more information about this and other software available from Eastern Computer Supply, return the enclosed card to request our catalog.

Figure 19.3 Text with Line Ending Codes



The enclosed software demonstrates the following features of our new word processor:

Support for PostScript printers
Graphics import capability
Automatic table of contents generation
Automatic index generation

We hope that this demonstration disk will encourage you to try PC Word Processor. For more information about this and other software available from Eastern Computer Supply, return the enclosed card to request our catalog.

Figure 19.4 Text as Printed in Report

Formatting Text: Horizontal Spacing

If you want Report Designer to preserve horizontal spacing such as paragraph indentations in your text, use the spacebar or the tab key depending on what kind of word processor or editor you use:

- Use the spacebar if your word processor or editor represents a tab as the tab character. Report Designer treats a tab character as a single space, so that space represented in your memo text as one or more tab characters will not be preserved in your report.
- Use the tab key if your word processor or text editor represents a tab as a number of spaces. Report Designer preserves spaces inserted in your memo text when these spaces are at the beginning of a paragraph (as in a paragraph indentation). Spaces that are inserted elsewhere in your text are preserved, unless Report Designer's word-wrap places them against the left margin of your report. In this case, the spaces are eliminated.

Formatting Text: Fonts and Styles

You can include special codes that apply fonts and/or styles to portions of the text or to data fields included in the text. Any fonts or styles specified in the text itself will override fonts or styles applied to the memo field on the report layout.

Note that Report Designer does *not* preserve any fonts or styles you have applied in your word processor or text editor.

Fonts Codes in Text

You can apply any font available on the currently selected Windows printer. Applying a font will not affect the style currently in effect. To apply fonts to text and/or data fields, follow these guidelines:

- To turn on a selected font, include the font code `<Ftypeface>` or `<ftypeface>` in your text, where *typeface* is the typeface name (for example, Times) of the font you want applied. You can enter the typeface name in upper, lower, or mixed case.
- To turn off a selected font, specify another font with another font code or use `<D>` or `<d>` to return to the font and attribute applied to the memo field on the report layout.

For example, in the text illustrated in Figure 19.5, the `<FTimes>` code applies the Times font to the entire text.

```
<FTimes>In July, Eastern Computer Supply is offering a series of training seminars for all corporate customers in the \CITY\, \STATE\ area. The seminars will be held at the Hynes Convention Center in Boston on July 1-5. Each session will provide an introduction to one of our PC software products. For more information about the seminars, please fill out and return the enclosed information request form.
```

Figure 19.5 Embedded Font Codes (1)

When this memo field is inserted in a report, the text will print in the normal attribute of the Times font (if this font is available on the current printer). This font will override any font applied to the memo field on the layout. However, if a style is applied to the memo field on the layout, Report Designer will try to combine that style with the specified font.

In the text illustrated in Figure 19.6, Times has been applied to the entire text, but Helvetica has been applied to the embedded data fields. Note that font codes supersede each other, and that Times must be respecified for the text that follows the embedded data fields. A font remains in effect until Report Designer encounters a font off code (`<D>` or `<d>`), a code for another font, or the end of the memo.

```
<FTimes>In July, Eastern Computer Supply is offering a series of training seminars for all corporate customers in the <FHelvetica>\CITY\, \STATE\ <FTimes>area. The seminars will be held at the Hynes Convention Center in Boston on July 1-5. Each session will provide an introduction to one of our PC software products. For more information about the seminars, please fill out and return the enclosed information request form.
```

Figure 19.6 Embedded Font Codes (2)

To specify point size, insert a second entry consisting of the letter “p” or “P” followed by a number indicating the point size. For example, to apply the Times font in a 10-point size, include the following codes in your text: `<FTimes> <P10>`.

The point size code can also be used by itself to change the point size of a previously specified font. For example, including `<P14>` in your

text would change the size of the font currently in effect to 14 point. Point sizes can have up to three integer places and one decimal place.

Style Codes in Text

To apply styles to words and/or fields in your text, follow these rules:

- ❑ To turn on a selected style, include one of the following style codes in your text:

 or for bold

<I> or <i> for italic

<U> or <u> for underscored

<N> or <n> for normal

You can also combine codes other than N within angle brackets, for example <BI> for bold and italic.

- ❑ To turn off a selected style, specify another style with another style code or use <D> to return to the font and style applied to the memo field on the report layout.

You can apply the underscore style to words and/or fields that print in any font. You should apply the normal, bold, italic, and bold/italic styles only to text and/or fields that print in fonts for which these styles are available.

In the text illustrated in Figure 19.7, Times has been applied to the entire text and the bold style has been applied to the embedded data fields. Note that style codes supersede each other, and that the Normal style must be specified for the text that follows the embedded data fields.

Applying a style will not change the font currently in effect.

```
<FTimes>In July, Eastern Computer Supply is offering a series of training seminars for all corporate customers in the <B>\CITY\, \STATE\ <N> area. The seminars will be held at the Hynes Convention Center in Boston on July 1-5. Each session will provide an introduction to one of our PC software products. For more information about the seminars, please fill out and return the enclosed information request form.
```

Figure 19.7 Embedded Font and Style Codes

As long as no other style is applied to the memo field on the report layout, this memo field will print in the normal style of the Times font.

However, the embedded data fields will print bold style, assuming this style is available for Times.

Note that you can include style codes without using font codes. In this case, Report Designer will combine the specified style with the font that is applied to the field on the report layout.

Formatting Text: Control Characters

Note that Report Designer ignores control characters (such as form feeds) included in your text. As previously explained, Report Designer converts both the tab character (character code 9) and a single carriage return into a space.

Attaching Files for Merging

After you prepare a text file, you are ready to create your form letter report. As with any report, you must first select a master table (often the one that will provide names and addresses for the form letters) and then optionally set database joins to any other tables that will provide information for the report. As an additional step, you must then attach the text file containing the memo(s) that will provide the text of the letter.

Attaching a Text File

To attach a text memo file to provide memo fields for your report:

1. Select Insert ⇒ Text File to display the Text File dialog.

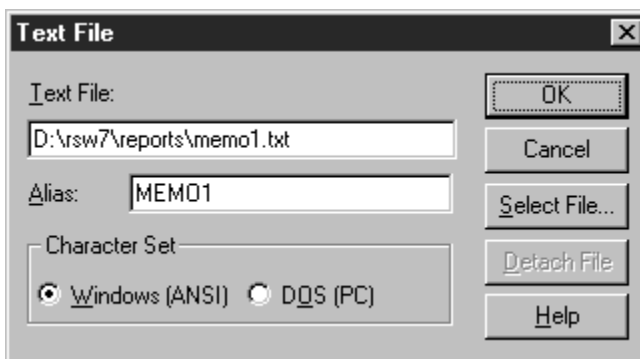


Figure 19.8 Text File Dialog

2. Choose Select File to display the Text File selection dialog.
3. Enter or select the name of a text file that contains one or more memos. Report Designer assigns a default alias to the file; you can retain the default as long as no table used by the current report has the same alias. If the alias conflicts with a table alias, type a different alias in the Alias edit box.
4. Select OK. The path, name, and alias of the text memo file are displayed.
5. If the text file uses extended characters (such as currency symbols or foreign characters), select either Windows (ANSI) or DOS (PC) from the Character Set group box. In general, you should select Windows (ANSI) for text files created with a Windows word processor and select DOS (PC) for text files created with a DOS-based word processor or text editor.
6. Select OK to return to the report layout. The name of each memo in the text file will now appear in the field list (under the name of the master table) when you select Insert ⇒ Field or press Ins.

You can select only one text memo file at a time, so all the memos you want to include in a report must be in the same file. Within this file, you may have many named memos, one or more of which can be included in your report. See the section in this chapter on preparing memo files for information about including more than one memo in a memo file.

When you save your report, your memo file selection will be saved just like your database joins.

Detaching a Text File

To detach a text memo file from a report:

1. Select Insert ⇒ Text File to display the Text File dialog. The currently attached text memo file and its alias are displayed.
2. Select Detach. Report Designer displays the names of all fields that will be removed from the report when you detach the memo file.
3. Select OK to detach the file and remove the listed fields or select Cancel to leave the memo file attached and retain the fields.

Creating Merge Report Layouts

You create the layout for a merge report just like you create the layout for any other report. You insert blank lines of the appropriate types on the report layout; then you fill in the lines with text and fields. For example, the report layout that produced the letter in Figure 19.2 is illustrated in Figure 19.9.

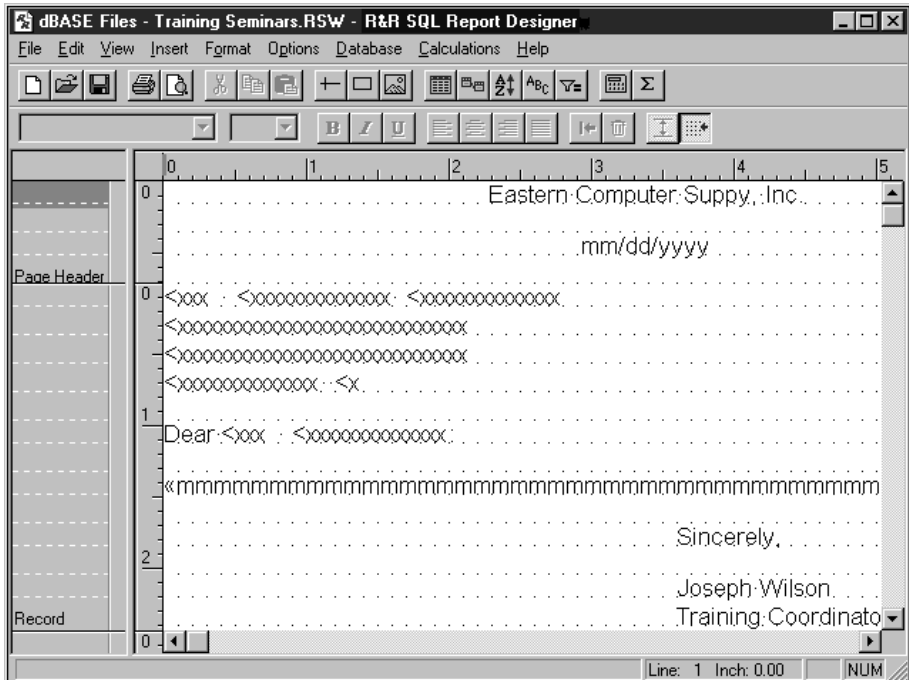


Figure 19.9 Sample Form Letter Layout

Memo Field Symbol

Note the line of **m**'s marking the memo field location. These **m**'s represent a memo field that will appear as a paragraph of text.

Each memo field appears on your screen as a single line of **m**'s. The default format of the memo field (indicated by the « that precedes the **m**'s) is left-justified word-wrap. This format causes all the text in the memo field to word-wrap within the maximum report width, 254 columns (when Ruler Spacing is set to 10). After you insert a memo field, use Format ⇒ Properties to set an appropriate width.

Generating Merge Reports

To generate a merge report such as a series of form letters, simply click on the Print button on the Standard Toolbar or use the Print dialog. Before you print, you can use the Database ⇒ Sort Order and Filter dialogs to sort the report and print only selected records, if necessary.

Features Affecting Merge Reports

A number of Report Designer features have special relevance to merge reports. Although each of these features is discussed at length elsewhere in the manual, this section briefly explains five important features:

- Word-wrap format and width of memo fields;
- Field width and format of embedded data fields;
- Functions that conditionally include memo fields;
- Options that control printing of blank lines;
- Page breaks.

Word-Wrap Format of Memo Fields

When you first insert a memo field in a report, it defaults to left-justified, word-wrap format. While you can change the justification of the field to right or full, you will probably not want to change the word-wrap format. (Only if the field is word-wrapped can you be sure to print all the text from the memo field.) As you insert the memo field on your report layout, you should be aware of the characteristics of this format, which are summarized in the following paragraphs.

- If you place a word-wrapped memo field in a Page Header/Footer or swap Header/Footer band, Report Designer wraps the text only until it encounters the end of the area, as these areas are fixed in length. Any data that does not fit in the area will not print.
- If you place a word-wrapped memo field in any band *other than* a Page Header/Footer or swap Header/Footer, Report Designer wraps the text until the entire contents of the memo field have been printed, causing these areas to vary in length.

For more information on word-wrapping and justification, see Chapter 4, “Working with Fields.” For a definition of swap Headers/Footers, see Chapter 10, “Sorting and Grouping Data.”

Field Width of Memo Fields

The width of the memo field determines the horizontal area within which Report Designer wraps the text. The maximum width of a memo field is 254 characters. If you want to indent the memo text on the report, you can use the Format ⇒ Field dialog to specify memo field width in characters or inches; then move the field into position on the layout. For more information on controlling field width, see Chapter 4, “Working with Fields.”

For example, the layout shown in Figure 19.10 produces the report shown in Figure 19.11.

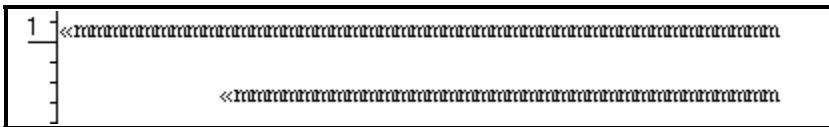


Figure 19.10 Report Layout with Two Memo Fields

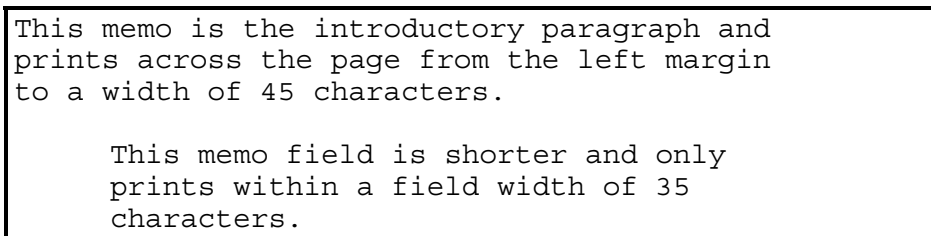


Figure 19.11 Report Output with Two Memo Fields

Field Width and Format of Embedded Fields

Numeric, date, and logical fields embedded in a memo field appear with the same width and format that has been assigned to the fields in the report. To change the field width or format of a numeric, date, or logical field that has been embedded within a memo field but not inserted on the report layout, insert the field anywhere on the report. Use the Width/Format tab on the Properties tabbed dialog (select the field and press F9) to change the field width or format. Then erase the

field from the report layout. When the field is merged with the memo field in your report, it will have the width and format you assigned it.

For any embedded character field, leading and trailing spaces are removed when the field value is printed with the memo text.

Including Memo Fields Conditionally

If your merge report is composed of several memo fields, you can use the IIF or CASE function to include memo field text conditionally. For example, if you want to print the PAYUP memo field only if the addressee balance is past due, you can create a calculated field with the following expression:

```
IIF(PASTDUE,PAYUP,"")
```

This expression means that if the value in the PASTDUE field is true, the PAYUP memo field will be printed. Otherwise, nothing will be printed. The empty quotation marks return an empty memo field without the need for you to have such a field in your memo file.

Note that the quotation marks indicating the empty memo field must be the second return value in the expression.

Once you create this field, you can insert it in your form letter where you want the memo text to appear. Customers with a past due balance will receive letters including the text of PAYUP; paid up customers will receive letters without this text.

You can use the CASE function in a similar way to select from a series of memo fields. For example, to print different memo fields depending on the length of time customers' bills are overdue, you might proceed as follows. First, create an OVERDUE field that contains a 0 if the bill is not overdue, 1 if it is between 30 and 60 days overdue, and a 2 if it is more than 60 days overdue. Next, create corresponding memos named THIRTY and SIXTY in a text file.

Finally, create a calculated field with the following expression:

```
CASE(OVERDUE,2,SIXTY,1,THIRTY,"")
```

This expression means that if the value in the OVERDUE field is 2, print the SIXTY memo field; if the value in the OVERDUE field is 1, print the THIRTY memo field; if the value is 0 or any other value, print no memo field. Note that the quotation marks indicating the empty memo field must not be the first result in the expression.

Note also that you can use the Format ⇒ Band Line Properties dialog to assign a logical condition that will conditionally print lines in any report. See Chapter 3, “Working with Bands,” for more information.

Blank Lines

You can include blank lines in any report simply by inserting them on the layout. In the Title, Record, Group Header/Footer, or Summary bands, Report Designer always places blank lines where you have inserted them relative to word-wrapped fields. For example, if a layout contains two memo fields separated by a blank line, as shown in Figure 19.10, Report Designer prints all the text in the first field, leaves a blank line, and then prints the second memo field, as shown in Figure 19.11.

You can control the printing of lines in which all fields are empty by using the Compress Record/Group Lines setting in the Format ⇒ Record Layout dialog. Turning this setting Off forces the printing of a Record, Group Header, or Group Footer line in which all fields are empty. Report Designer initially sets this option to On, which suppresses printing of lines in which all fields are empty. If you have used an IIF or CASE expression as explained above to conditionally exclude memo fields, you should retain the default of On.

Page Breaks

When you are printing a merge report such as a series of form letters in which you want to start a new page for each record or group, insert a new-page line as the last line on the report layout before the Page Footer (if any). For more information on inserting new-page lines, see Chapter 3, “Working with Bands.”

Chapter 20

Embedding or Linking Objects

Introduction

This chapter explains how to embed or link information, or *objects*, from other applications in reports.

You can embed or link objects from any OLE server-enabled application. When you embed an object, the object becomes a part of the report and is not affected by changes to the source data. When you link an object, the report contains a link to the source; if the source changes, those changes are reflected in the report.

Explanations of object linking and embedding in Report Designer are presented in the following sections:

- Embedding Objects
- Linking Objects

Embedding Objects

When you embed an object created in another application (such as a graphic, a chart, or a text selection), the object becomes part of the report. You can edit the object “in place” in the report; when you double-click on the object, Windows launches the source application. When you finish editing and return to Report Designer, the changes are reflected in the embedded object. (Note that embedding increases the size of a report, since the object is saved with the report.)

You can embed an object using any of the following methods:

- Select Insert ⇒ Object and either create or select an object;
- In the source application, highlight the information you want to embed and select either Cut or Copy; in Report Designer, select Edit ⇒ Paste Special;
- Drag an object from another application or from the Windows Explorer.

The following sections explain these procedures in detail.

Embedding an Object Using Insert Object

Follow these steps to embed an object in a report using the Insert Object dialog (see Figure 20.1):

1. Place the edit cursor at the place on the layout where you want the top left corner of the embedded object to be positioned. Select Insert ⇒ Object.

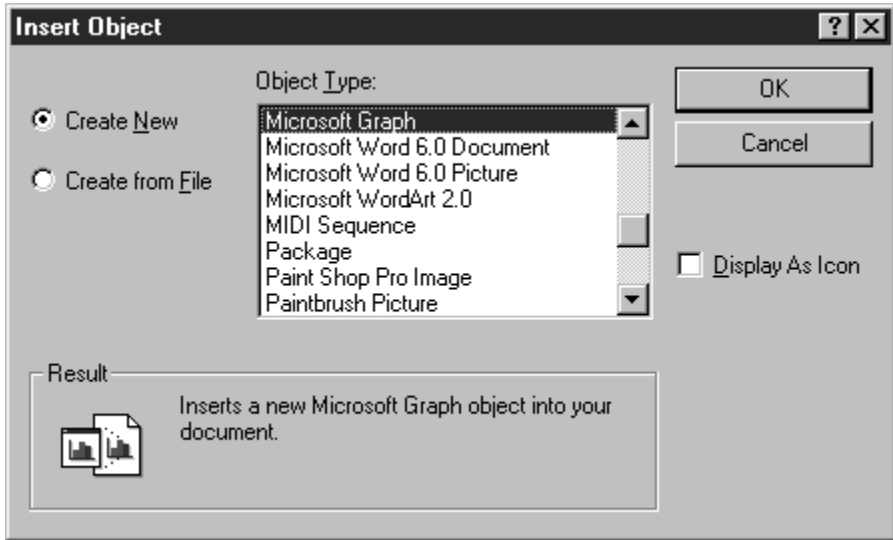


Figure 20.1 Insert Object Dialog

2. By default, the Create New option button is selected, and the OLE-enabled applications available on your system are shown in the Object Type box.

You can either create a new object to be embedded or turn on the Create from File option button to embed an existing object.

- To create a new object to embed in the report, leave the Create New button selected. In the Object Type box, highlight the source application for the object to be created and select OK to launch that application.
- To embed an existing object, select the Create from File button. Enter the name (and path, if necessary) of the object to be embedded and select OK. You can use the Browse button to search for the file to be embedded.

3. If you created a new object and the source application was launched in a separate window, select File ⇒ Exit in that application to return to Report Designer. If prompted to update the object, select Yes.

If you created a new object and the source application simply replaced some of Report Designer's menus and toolbars, click anywhere outside the object (or press Esc) to return to Report Designer.

As noted previously, an embedded object does not reflect any changes made in the source application to the file or object; however, you can directly edit the object from within Report Designer (as explained in the **Modifying an Embedded Object** section of this chapter).

Embedding an Object Using Paste Special

Follow these steps to embed an object in a report using the Paste Special dialog (see Figure 20.2 for an example; actual contents of the dialog will depend on the type of information on the clipboard):

1. In the source application, open the file that contains the information to be embedded. Highlight the portion that you want to embed and select Edit ⇒ Copy.
2. In Report Designer, place the edit cursor where you want to place the embedded object and select Edit ⇒ Paste Special.

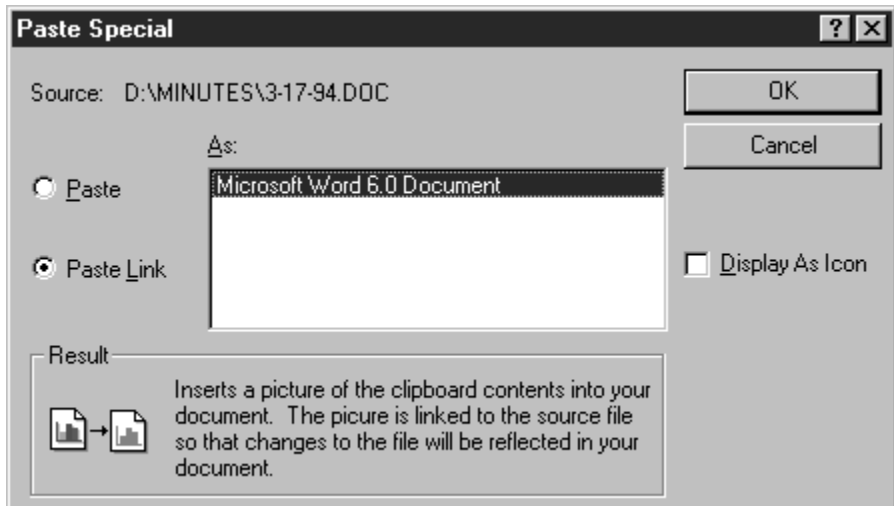


Figure 20.2 Paste Special Dialog

3. On the Paste Special dialog, make sure the Paste option button is on (the Paste Link option is used to link objects and is available only for applications that are OLE linking servers, such as Microsoft Excel). To embed the object, select OK.

Modifying an Embedded Object

After you have embedded an object in a report, you can modify the object in place using the source application. You can also re-size the object using the Object Properties dialog.

Modifying the Content of an Embedded Object

To modify the content of an embedded object, do the following:

1. Double-click the object. Depending on the source application used to create the object, either the application is launched in a separate window or some of the menu and toolbar items in Report Designer are temporarily replaced by those from the source application.
2. Modify the object as necessary.
3. If you are editing the object in a separate window, exit the source application and return to Report Designer; if prompted to update the object, select Yes.

If you are editing the object “in place” on the layout, click on the layout anywhere outside the embedded object (or press Esc) to return to Report Designer and restore its menus and toolbar items.

Note that you can also edit an object by right-clicking and selecting the object name (for example, “Bitmap Image Object”) at the bottom of the menu. If both an Edit and an Open command appear, select Edit to edit the object directly on the layout; select Open to edit the object in the source application window.

Changing the Size of an Embedded Object

You can change the size of an embedded object either directly on the layout or with the Object Properties dialog (see Figure 20.3) Note that with the exception of the static text in the Object Information box identifying object type and source application, the Object Properties dialog is the same as the Picture Properties dialog explained in Chapter 13, “Inserting Bitmapped Images.”

To change the size of an embedded object directly on the layout, first select it. Then click and drag one of the “handles” at the corners of the object to increase or decrease the object dimensions as necessary.

To change the size of an embedded object using the Object Properties dialog, do the following:

1. Use any of the following methods to open the Object Properties dialog:
 - Select the object and choose Format ⇒ Properties;
 - Select the object and press F9;
 - Right-click the object and select Properties

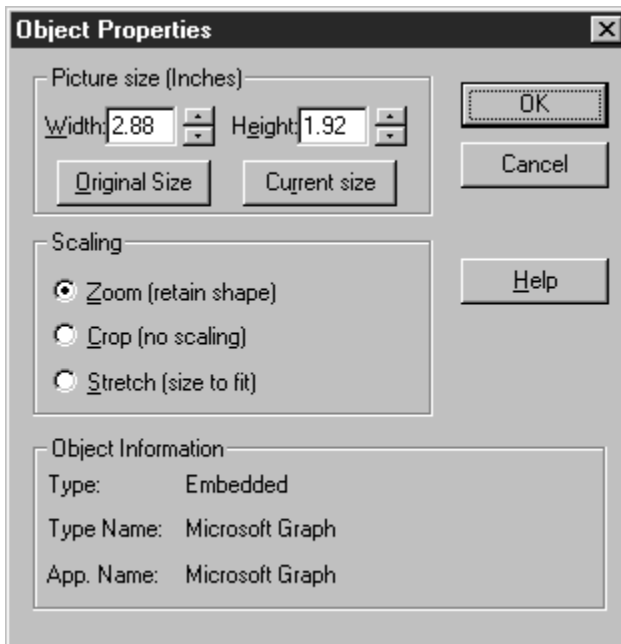


Figure 20.3 Object Properties Dialog

2. Enter or select settings for Width and Height as necessary.
3. Optionally change the scaling setting as explained in the **Selecting a Scaling Setting** section of Chapter 13, “Inserting Bitmapped Images.”
4. When you are finished making changes, select OK.

Linking Objects

As noted previously, when you link an object, the report contains a link to the source that is updated when the source changes. You can create a link between Report Designer and any OLE server-enabled application.

The procedures for editing or re-sizing a linked are the same as those for editing or re-sizing an embedded object.

You can use either of the following methods to create a link to an object:

- Select Insert ⇒ Object and select an object;
- In the source application, highlight the information you want to embed and select either Cut or Copy; in Report Designer, select Edit ⇒ Paste Special.

Note that when you use the first method (selecting Insert ⇒ Object), you can create a link only to an entire file; with the second method, you can create links to a selected portion of the source file.

The following sections explain these procedures in detail.

Creating a Link Using Insert Object

Follow these steps to create a link using the Insert Object dialog (see Figure 20.1):

1. Place the edit cursor at the place on the layout where you want the top left corner of the linked object to be positioned. Select Insert ⇒ Object.
2. Turn on the Create from File option button. In the File Name box, enter or select the name of the object to be linked.
3. Click the Link to File check box; then select OK.

By default, the link is created as an Automatic one — that is, the object will automatically updated if the source changes. You can also choose to update links manually; see the **Updating Links** section of this chapter for information.

Creating a Link Using Paste Special

Follow these steps to create a link using the Paste Special dialog (see Figure 20.4 for an example; actual contents of the dialog depend on the type of information on the clipboard):

1. In the source application, open the file that contains the information to be linked. Highlight the portion to be linked and select Edit ⇒ Copy.
2. In Report Designer, place the edit cursor where you want to place the linked object and select Edit ⇒ Paste Special.

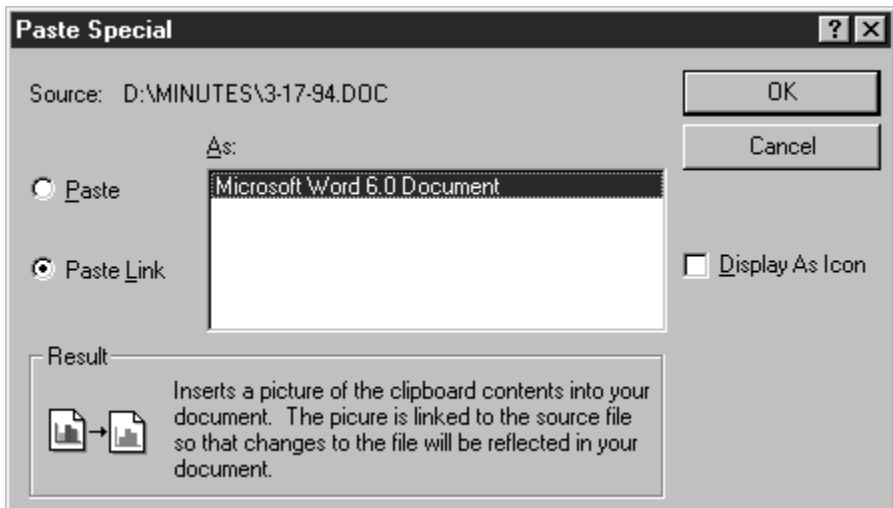


Figure 20.4 Paste Special Dialog (Linking)

3. On the Paste Special dialog, click the Paste Link button. To create the link, select OK.

Updating Links

Initially a link is created as Automatic — if a source changes, those changes are automatically reflected when you open a report that contains a link to that source.

Follow these steps to change the update setting to Manual so that the link will be updated only when you specify:

1. Select Edit ⇒ Links. The Links dialog (see Figure 20.5) lists all links to the current report and identifies the object type and update setting for each.

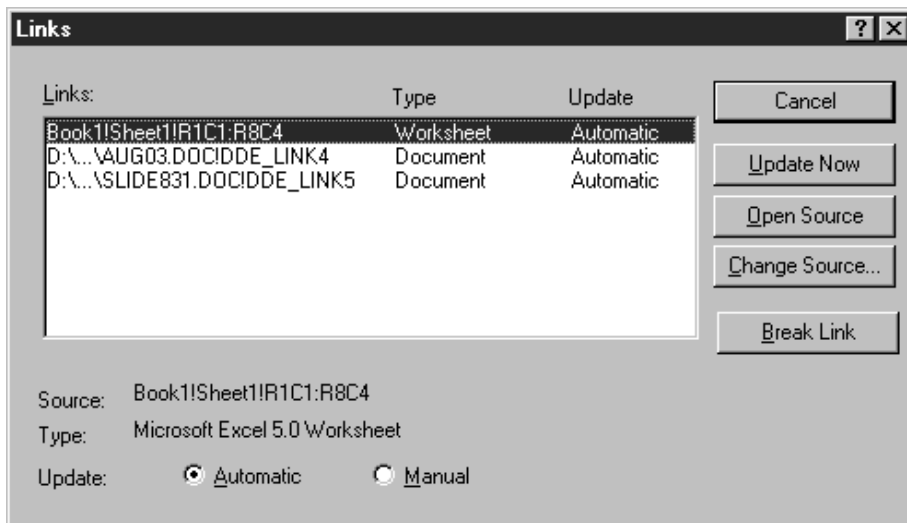


Figure 20.5 Links Dialog

2. To change the Update status, highlight one or more links (to highlight multiple links, either click and drag or Ctrl-click on each link). To change an Automatic link to Manual, click the Manual option button.
 - If Update is set to Automatic, changes to the source will be reflected when you open the report;
 - If Update is set to Manual, changes to the source will *not* be reflected in the report unless you select Update Now on the Links Dialog.
3. Select OK.

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