QUATTRO™

User's Guide

QUATTRO™: THE PROFESSIONAL SPREADSHEET

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QUATTRO®

User's Guide

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Borland International
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Scotts Valley, CA 95066

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Table of Contents

How to Use This Manual

This book is one in a series of three Quattro manuals:

- *Getting Started with Quattro* (which you should read first) tells you how to get Quattro up and running, and introduces you to several of Quattro's basic features.
- The *Quattro Reference Guide* is intended for use after you're more familiar with the program. It includes alphabetic descriptions of basic Quattro operations, @functions, macro commands, and menu-equivalent commands.
- This book, the *Quattro User's Guide*, is intended to be your major source of information about the program. It goes into thorough detail about each area of Quattro.

Before you begin this book, be sure to read *Getting Started with Quattro*. It has chapters specifically geared toward novice users and Lotus 1-2-3- users, and the tutorial is a helpful introduction to Quattro for any level of user.

This user's guide is divided into 13 chapters:

Chapter 1: Quattro Basics describes some of the basic skills required to use Quattro.

Chapter 2: The Main Menu introduces each selection on the main menu.

Chapter 3: Entering and Editing Data explains how to enter labels, numbers, and formulas into your spreadsheet and how to edit entries.

Chapter 4: Making Changes covers the kinds of changes you can make to specific parts of the spreadsheet—from moving data to opening a second window.

Chapter 5: Changing the System Defaults shows you how to change defaults used to determine overall system function and display—from how numbers are displayed to how formulas are recalculated.

Chapter 6: Saving and Retrieving Files explains how to save your spreadsheet in a file for future use. It also covers importing data created with other programs and exporting data for use with other programs.

Chapter 7: Printing covers the details of printing Quattro spreadsheets: setting margins and page lengths, printer setup strings, and so on.

Chapter 8: Building Graphs describes the 10 different kinds of Quattro graphs and how to create, customize, print, and save them.

Chapter 9: Working with Your Database tells you how to set up all or part of your spreadsheet like a database. It describes how to search through and sort information in a database and set up your database for data entry.

Chapter 10: Working with Statistics and Analyzing Data covers more advanced Quattro features, such as performing a sensitivity analysis and creating a frequency distribution table.

Chapter 11: Using @Functions explains how to use Quattro @functions to help calculate data in your spreadsheet.

Chapter 12: Using Macros tells you how to create macros to automate printing, formatting, and other Quattro operations.

Chapter 13: Using Add-Ins describes how to implement supplemental Quattro programs, called *add-ins*. It focuses on the add-ins that come with Quattro: the Menu Builder and Transcript.

Appendix A: Help! offers solutions to common problems encountered in Quattro.

Appendix B: A DOS Primer offers basic information on using the DOS operating system.

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C H A P T E R

1

Quattro Basics

This chapter introduces you to some of the basic skills involved in using Quattro. It tells you how to

- load the Quattro program
- use specific keys with Quattro
- use Quattro menus to issue commands
- create "shortcuts" to enter menu commands with one keystroke
- get on-screen help about whatever you're doing right now
- use the *Esc* key to back out of a menu or prompt
- specify new default directories
- enter data into the spreadsheet and make changes to it
- save and retrieve spreadsheet files
- access DOS from within the spreadsheet
- exit Quattro

After reading this chapter, you should be able to build a simple spreadsheet with Quattro.

Loading Quattro

Before you can work with Quattro, you must copy the Quattro files onto your hard disk, or install Quattro for floppy-drive systems. See Chapter 2 of *Getting Started with Quattro.*

To begin working with Quattro, you must first load it into your computer's memory.

To load Quattro from a hard disk, simply go to the directory that contains your Quattro files (for example, type `CD \QUATTRO`, then press *Enter*), then type `Q` and press *Enter*. This loads Quattro into your computer's memory and displays a blank spreadsheet, ready for you to begin working (Figure 1.1).

To load Quattro from a floppy-drive system:

1. Place the Quattro System Disk in Drive A and the Resource Disk in Drive B. If your screen does not show the A> prompt, type `A:` and press *Enter*.
2. Type `QF` and press *Enter*. This loads Quattro into your computer's memory and displays a blank spreadsheet, ready for you to begin working (Figure 1.1).
3. Remove the Quattro System Disk from Drive A and move the Resource Disk from Drive B to Drive A. In Drive B, put the Help Disk (if you want to access on-screen help) or a data disk for storing and retrieving your spreadsheets.

Note: If you have a floppy-drive system, *always* use the `QF` command (instead of `Q`) to load Quattro.

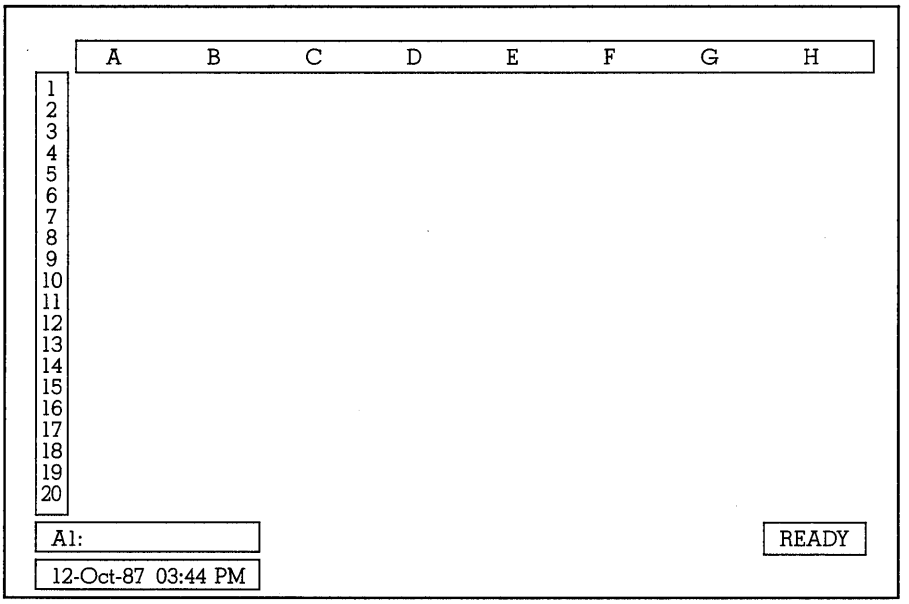


Figure 1.1: A Blank Quattro Spreadsheet

If you have a hard disk, you can automatically retrieve a spreadsheet when you load Quattro. Just specify the file name after QUATTRO on the DOS command line. For example,

```
QUATTRO TAXES
```

loads Quattro and retrieves the file named TAXES. To execute a macro in the spreadsheet at the same time, include the macro name after the file name. For example,

```
QUATTRO TAXES BEGIN
```

loads Quattro, retrieves the TAXES file, and executes the TAXES macro.

If there's a file or add-in you want loaded each time you use Quattro, you can specify them as autoload defaults (see page 147).

Note: Your disk contains an optional file created with Quattro's Menu Builder that tells the Quattro menus to accept Lotus-compatible command names. To load Quattro and install the Lotus-compatible menu names, as well as several Lotus-compatible default settings, enter Q123 on the DOS command line instead of Q. (See page 153 for details.)

The Spreadsheet Screen

The spreadsheet is the core of the Quattro program. It is here that you enter, display, and organize information.

The Spreadsheet Screen has four distinct areas: the spreadsheet window, the input line at the top, and the descriptor and status lines at the bottom. Figure 1.2 shows a typical Spreadsheet Screen.

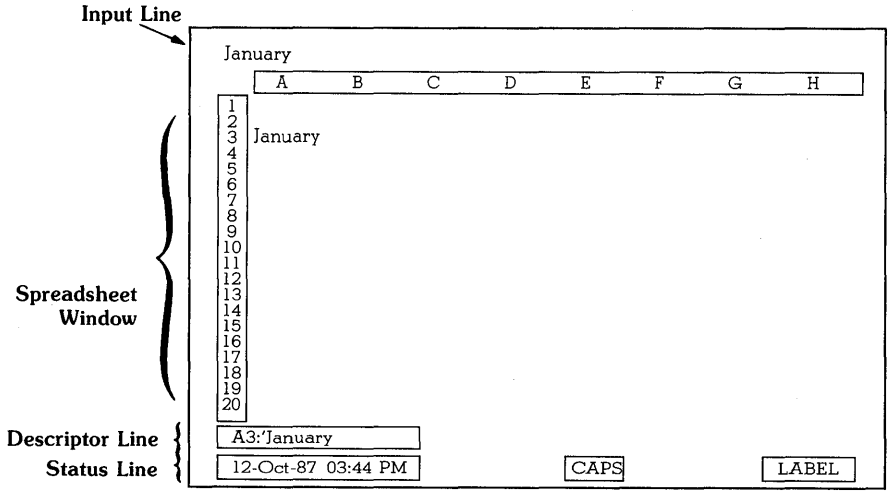


Figure 1.2: A Spreadsheet Screen

If you like, you can move the descriptor line to the top of the Spreadsheet Screen (see page 115).

The Spreadsheet Window

The spreadsheet window takes up most of your display screen. It is the window through which you view and make changes to your spreadsheet.

Only part of the entire spreadsheet is shown in the window at once. To view other areas, you can *scroll* the spreadsheet, using the direction keys described in the next main section, "A Tour of Your Keyboard."

The spreadsheet itself is a rectangular grid made up of numbered rows and columns identified by letters. Each intersection of a row and a column makes up a cell, in which you can store data.

Figure 1.3 shows the various components that make up the Quattro spreadsheet.

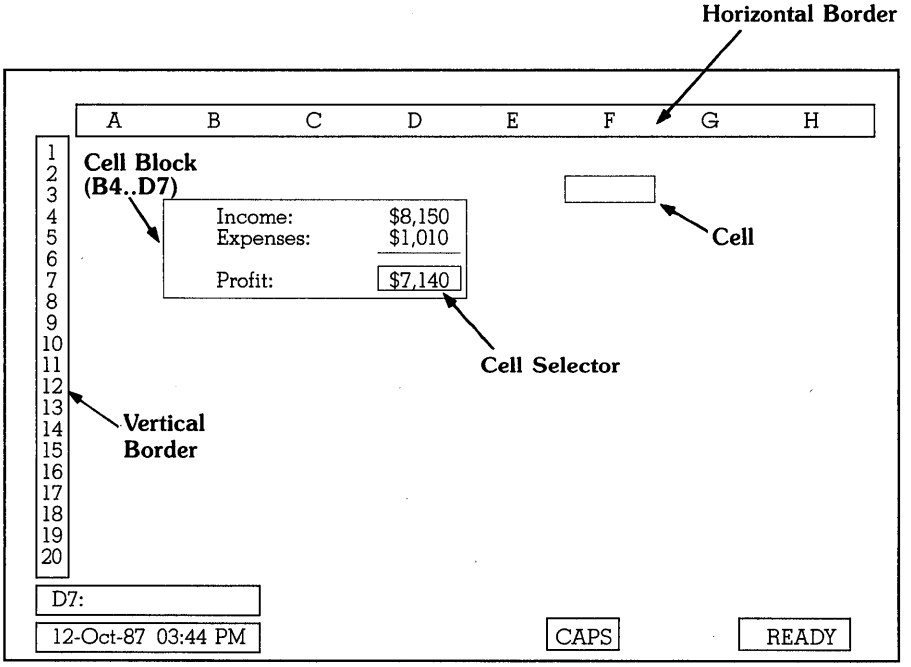


Figure 1.3: The Parts of a Quattro Spreadsheet

Horizontal Border is a row of letters that identifies each column of cells in the spreadsheet. Columns are lettered A-Z, then AA-AZ, BA-BZ and so on, up to IV. The column containing the cell selector is shown in reverse video or a different color.

Vertical Border is a column of numbers (1-8192) that identifies each row of cells in the spreadsheet. The row containing the cell selector is shown in reverse video or a different color.

Cell is a box in the spreadsheet in which you can enter data. Each cell is identified by an *address* determined by the row and column that contain it. For example, the cell in the upper-left corner of the spreadsheet is named

A1. The letter and number that make up the cell address are called the cell's *coordinates.*

Cell selector is the highlighted rectangle that indicates the current cell. This is the cell that will be affected by your next action, such as entering a value. You can move the selector to any cell in the spreadsheet.

Cell Block is a rectangular group of cells identified by the cell addresses of two opposite corners—usually the upper-left and bottom-right cells, in this case, B4 and D7. Blocks are used in commands and formulas to act on several cells at once.

The Input Line

The input line at the top of the Spreadsheet Screen displays various types of information, depending on what you're doing:

- If you're editing or entering data in a cell, the data is shown on the line. If the current entry is longer than your screen is wide, characters continue onto the line below, and, if necessary, the spreadsheet drops down and the entry continues onto a third input line. When you complete the entry, it's written into the current cell and removed from the input line.
- If you're using a menu, the input line displays information about the highlighted menu item: either a description of the command itself or a list of the commands available when you select it.
- If you're executing a command, it displays any system prompts that require a response from you, such as `Enter file name`.

In Figure 1.4, the input line displays a menu description.

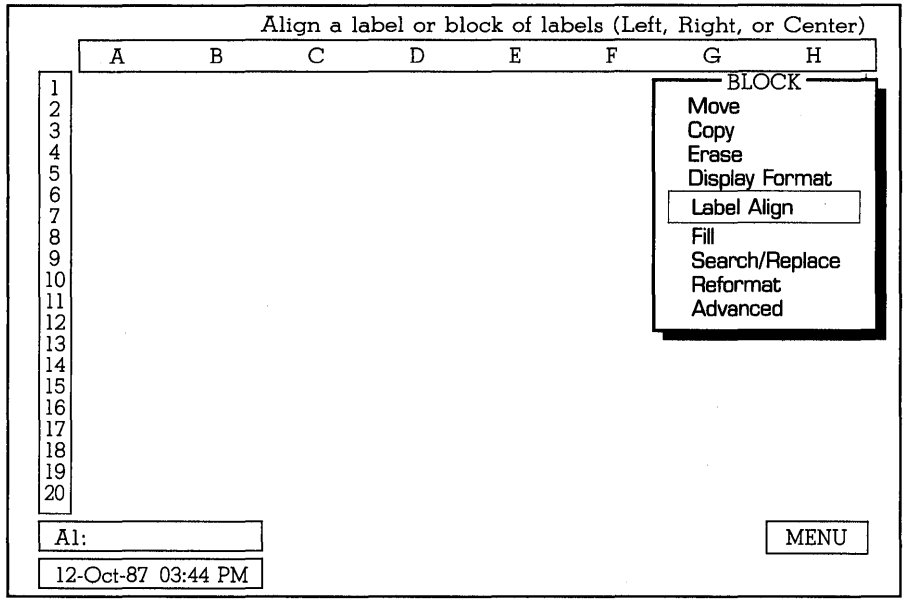


Figure 1.4: The Input line

The Status Line

The bottom line of the Spreadsheet Screen, the status line, displays information about the current state of the program.

Figure 1.5 shows typical information on the status line.

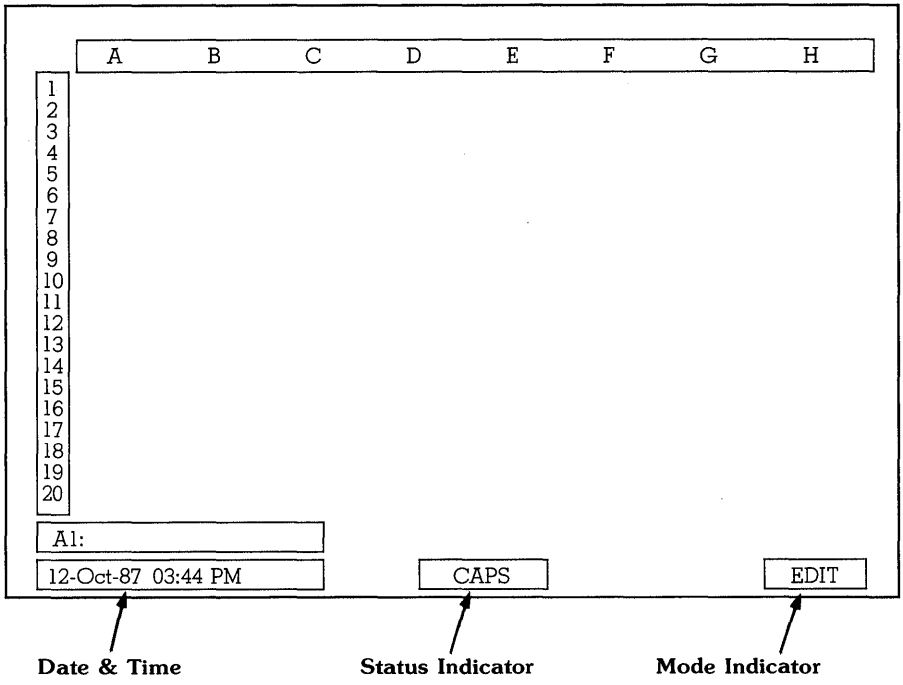


Figure 1.5: The Status Line

Mode Indicator shows the current mode the spreadsheet is in, for example, MENU when a menu is displayed.

Date and Time displays the current date and time. It is updated every 60 seconds. You can change or turn off this display with the Clock setting on the Default Formats menu (see page 139).

Status Indicator names current status conditions in the program. For example, CAPS indicates that the *Caps Lock* key is on.

For tables describing each possible mode and status condition, see Appendix A of the *Quattro Reference Guide*.

The Descriptor Line

The descriptor line displays information about the current cell and any warning messages encountered. Figure 1.6 shows typical information on the descriptor line.

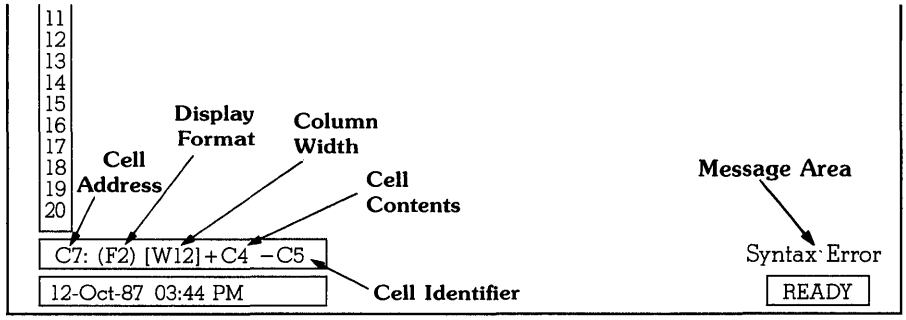


Figure 1.6: The Descriptor Line

Cell Identifier displays information about the current cell. It shows the cell's address and contents (as entered, not as displayed). If its display format or column width is different from the default, this is shown, too.

Message Area displays messages pertaining to any errors that occur while you're working, for example, *Syntax Error*. Appendix E of the *Quattro Reference Guide*, "Error Messages," explains all possible error messages.

A Tour of Your Keyboard

Certain keys on your keyboard have special meaning in Quattro. The cursor keys, or *direction keys*, on the right side of your keyboard let you move to different areas of your screen. The *function keys*, on the left or top of your keyboard (F1-F10), perform Quattro commands. Both of these key groups are discussed in the following subsections. These and other special keys are also defined in Appendix A of the *Quattro Reference Guide*.

Direction Keys

The Quattro direction keys allow you to

- move around a Quattro spreadsheet
- position the cursor in a cell entry during Edit mode
- highlight menu items
- page through help screens

In a menu, you can use the direction keys to highlight different menu items. The *Up arrow* and *Left arrow* keys move you up in the menu; the *Down arrow* and *Right arrow* keys move you down. *Home* takes you to the first item on the menu; *End* takes you to the last.

With help information displayed by pressing *F1*, you use the arrow direction keys to select options from the help screen, for example, *Copying Formulas*. This takes you into another help screen that details the option you selected.

In a spreadsheet, the direction keys have the most varied capabilities. The arrow keys move the cell selector around the spreadsheet. *PgUp* and *PgDn* scroll the spreadsheet upward and downward one screenful at a time. In addition, you can use key combinations to move to more exact areas of the spreadsheet. For example, pressing *End*, then *Right arrow* takes you to the rightmost edge of the current block of data.

Table 1.1 describes the effect of each direction key in a Quattro spreadsheet.

Table 1.1: The Direction Keys in a Spreadsheet

Key	Description
Left arrow	Moves left one cell.
Right arrow	Moves right one cell.
Up arrow	Moves up one cell.
Down arrow	Moves down one cell.
Ctrl-Left arrow or *Shift-Tab*	Moves left one screen.
Ctrl-Right arrow or *Tab*	Moves right one screen.
PgUp	Moves up one screen.
PgDn	Moves down one screen.
End	Must be used with another direction key.
End-Home	Moves to lower-right corner of the non-blank part of the spreadsheet.
End-Up arrow	If the current cell contains an entry, it moves upward to the next non-blank cell beneath an empty one. If the current cell is blank, it moves upward to the next non-blank cell encountered.
End-Down arrow	If the current cell contains an entry, it moves downward to the next non-blank cell above an empty one. If the current cell is blank, it moves downward to the next non-blank cell encountered.
End-Right arrow	If the current cell contains an entry, it moves right to the next non-blank cell followed by an empty one. If the current cell is blank, it moves to the next non-blank cell to the right.
End-Left arrow	If the current cell contains an entry, it moves left to the next non-blank cell preceded by an empty one. If the current cell is blank, it moves to the next non-blank cell to the left.
GOTO (*F5*)	Moves to any cell you specify.

When entering data in a cell, you can use a direction key instead of *Enter* to enter the item *and* move the cell selector in the indicated direction. For example, if you type an entry with the selector in cell B6, then press *Down arrow*, Quattro writes the entry into cell B6, and moves the selector to cell B7.

The GOTO key takes you to whatever cell in the spreadsheet you specify. When you press GOTO (*F5*), Quattro prompts you for a cell address. Enter any valid address. When you press *Enter*, the selector moves to that cell. For example, to go to cell B10, press *F5*, then type `B10` *Enter*.

Some of the direction keys work differently in Edit mode (see "Editing Entries" on page 38).

Taking a Quick Look

To momentarily view a different part of the spreadsheet, and then return to your original position, use the GOTO key, then cancel the command with *Esc*. In other words,

1. Press the GOTO key (*F5*). Quattro prompts you for a cell address.
2. Use the direction keys to take you to the area you want to view. (Do not press *Enter*.)
3. When you're ready to return to your original place, press *Esc*. Quattro cancels the GOTO command and returns you to the cell that was current when you initiated the command.

Using the *End* Key

The *End* key is very useful when used with other direction keys. You can use it to quickly move to the corners of the current block of data, or to move across an expanse of blank cells to the next block of data.

Figure 1.7 demonstrates how the *End* key works from various positions in a spreadsheet.

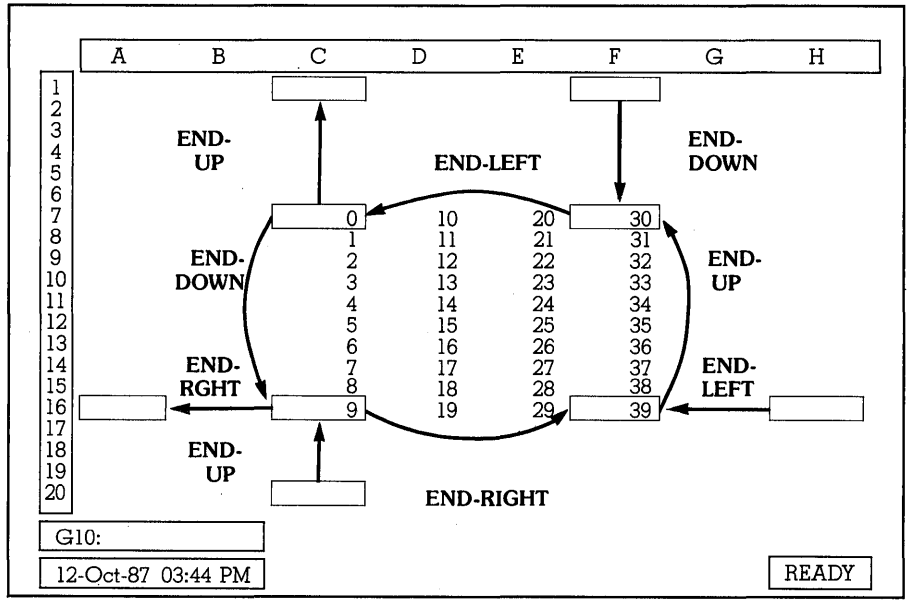


Figure 1.7: How the End Key Works

You'll find the *End* key especially useful in *pointing* out a block of cells in response to a command prompt, for example to indicate a block of cells to move. (See page 57 for more information on pointing out blocks.)

Function Keys

The function keys on the left or top of your keyboard (labeled F1 through F10) perform often-used Quattro commands with one simple keystroke. Some of the keys have more than one function; you press *Alt, Ctrl,* or *Shift* with the key to perform another function.

The Quattro package includes templates to be placed over the function keys that shows each key's special function (see Figure 1.8). One is designed for keyboards that group the function keys at the left side of the keyboard. The other three are a set for keyboards that place the function keys at the top of the board. Use the template that suits your keyboard.

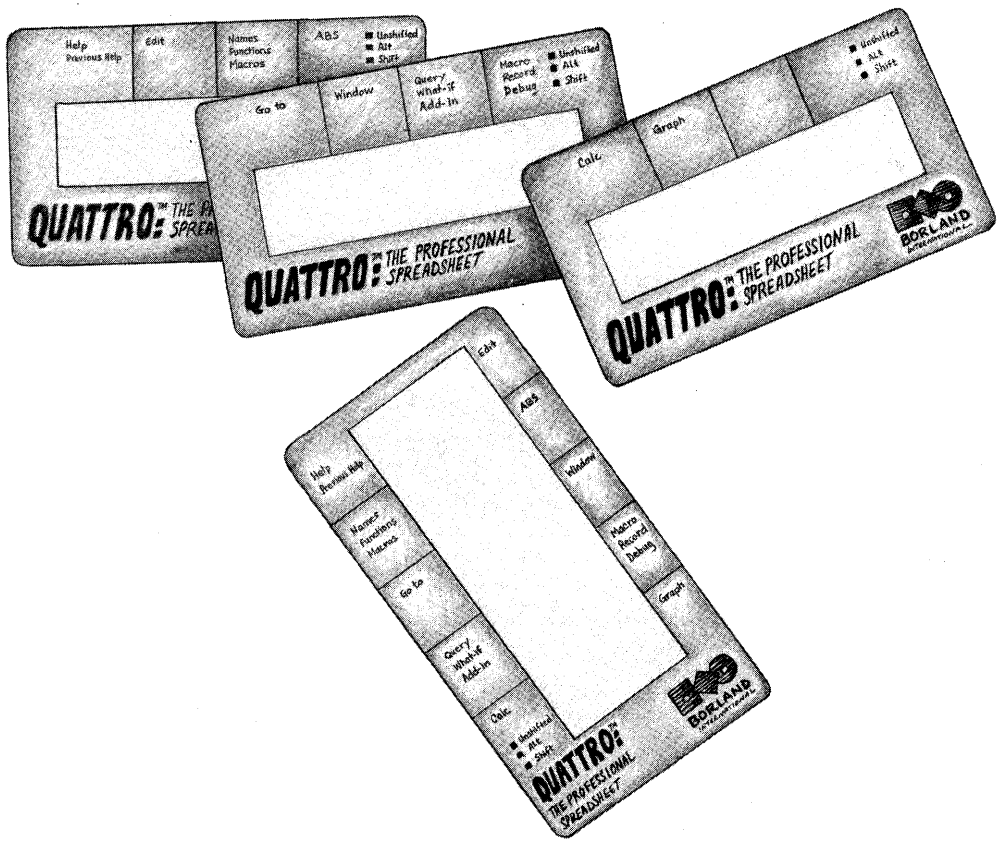


Figure 1.8: The Function Key Templates

For a table describing each of the function keys, as well as other special keys, see Appendix A in the *Quattro Reference Guide*.

Using the Quattro Menus

A menu is a list of commands or options. In Quattro, you initiate commands by calling up a menu or sequence of menus and selecting items from them. All Quattro menus branch from the main menu. To display the Quattro main menu, press the slash key (/).

Once a menu is displayed, you can select a command from it in either of two ways:

- Use the direction keys to highlight the command you want and press *Enter*.
- Type the first letter of the command you want.

To exit a menu without selecting a command, press *Esc*. This returns you to the previous menu or, if pressed from the main menu, removes the menu and returns you to what you were doing.

To return to the spreadsheet directly from a submenu, press *Ctrl* and *Break* at the same time, or select **Q**uit from any menu but the main menu. (**Q**uit on the main menu exits the program.)

For a detailed map of all Quattro menus, refer to the menu maps on the inside front cover of the *Quattro Reference Guide*.

When you select a command from a menu, you are usually prompted for information. For example, the **B**lock **M**ove command prompts you for the cell(s) you want to move. Usually, a default value is given with the prompt. (The **B**lock **M**ove command default is the current cell.) To accept the default value in answer to the prompt, press *Enter*. To enter a different cell range, type it in or point to a different block (see "Pointing Out Cells" on page 57). If the default value is text, you can press *Ctrl-Backspace* to clear it and enter a new value, or press *F2*, EDIT, to edit the existing value. (Once you're in Edit mode, *Esc* clears the entry.) To remove the prompt without entering a value, press *Esc* twice. (See "Entering a File Name" on page 157 for details.)

If there's a particular menu command you use often in your work, you can store that command sequence in a special key. Then, instead of using the menus to execute the command each time, you can simply press the programmed key. (See "Creating Shortcuts" on page 20.)

When you return to a menu you've used since loading Quattro, the last command you used on the menu is highlighted. In other words, Quattro saves your place in the menus, so you can re-use commands easily. (You can turn off this feature with the **C**ompatibility Remember command (see page 151).

Expanding and Contracting Menus

Some commands on Quattro menus have *settings* associated with them. Sometimes the settings are the current default, such as column width.

Other times they are the value that was last specified with the command, such as the block to print. These settings (if any) are shown on the right side of each menu.

To remove the settings from a menu, and shrink the menu's width, press the CONTRACT key (the grey minus key on the numeric keypad). To return settings to a menu, press the EXPAND key (the grey plus key on the numeric keypad.

Figure 1.9 shows the Print menu with settings displayed.

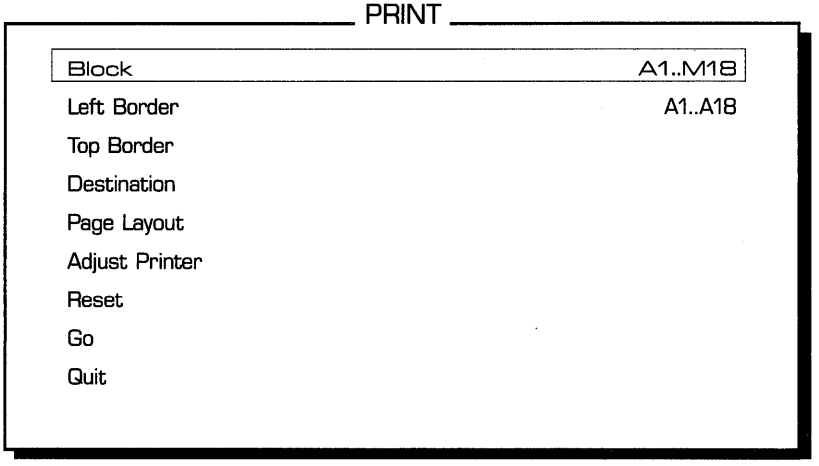


Figure 1.9: A Menu With Settings Displayed

If you'd like to have menus always displayed without settings, set the **Keep Wide** option on the Defaults Startup menu to **No**. (see page 151). The menus will then always be displayed contracted unless you explicitly expand them with the EXPAND key.

Creating Shortcuts

As you become more familiar with Quattro, you'll find there are certain menu commands you use more than others. You may have to work your way through several menus to get to some of them. Quattro offers a special feature, called *shortcuts*, that makes it easier to use your favorite

commands. A shortcut is an abbreviation of a menu command that lets you execute a menu command in a single keystroke.

You can create a shortcut for any command on Quattro's menus. Simply display the menu and highlight the command you want to abbreviate. Then hold down *Ctrl* and press *Enter*. Quattro prompts you for a key to assign the command to. Hold down *Ctrl* and press any alphabetic key. Quattro stores the command with that *Ctrl* key combination and returns to Ready mode.

Note: You can't create shortcuts for submenus (such as that shown for Label Alignment options). Nor can you create shortcuts for menus that only bring up other menus (such as the Default Formats menu).

To execute an assigned shortcut, press *Ctrl* and the assigned key at the same time.

Caution: Shortcuts can be entered only from Ready mode; otherwise, the current task is aborted.

To save the shortcuts you've created for use with *all* spreadsheets, select **U**pdate from the Default menu *(/DU)*.

Getting Help

Whatever you're doing in Quattro, you can get instant assistance by pressing the HELP key, *F1*. A window of information pertinent to what you're doing is displayed over the current screen. For example, if you press *F1* with a menu option highlighted, a description of that option is displayed. If you press *F1* in Edit mode on a spreadsheet, your options in Edit mode are described.

When you press the HELP key from within a general area of Quattro, say in Ready mode on the spreadsheet, the Help Topics Screen is displayed (Figure 1.10). This screen lists several different areas you can display help about. Highlight the area you're interested in and press *Enter*. A more specific help screen is then displayed.

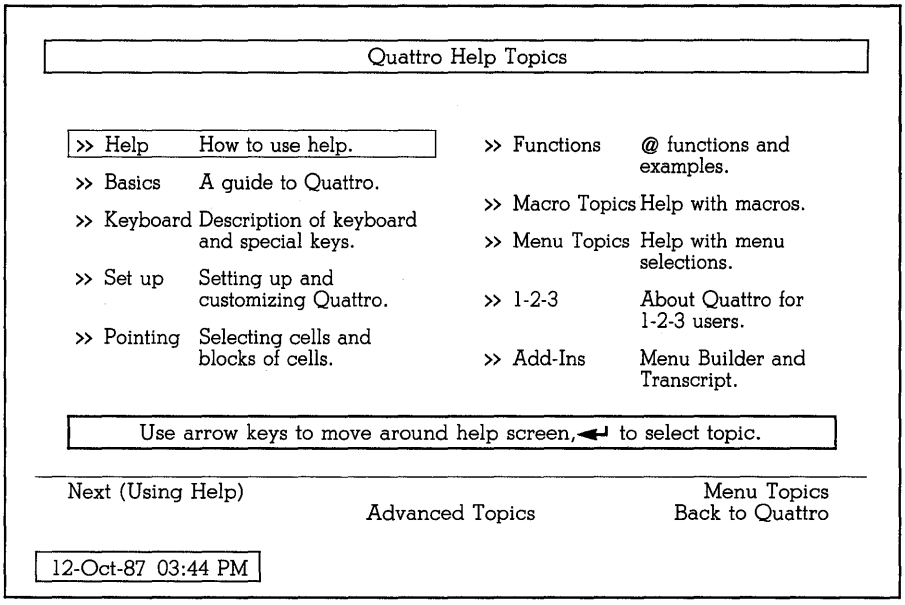


Figure 1.10: The Help Topics Screen

Usually, more than one screenful of information is offered with HELP. Areas on which there is further information are highlighted at the bottom of the screen. To display more information about one of the areas listed, use the direction keys to highlight it, then press *Enter*. If the current help information fills more than one screen, you can select *MORE* or *BACK* to page through the screens.

The help function is similar to the Quattro menu tree in that it branches off into increasingly specific areas. If at any time you feel lost or want to be reminded of your options, press *F1* again, and information on the help function is displayed.

Once you're inside the help function, pressing *Alt-F1* returns you to the Help Topics Screen. Pressing *Esc* returns you to the previous help screen. To return immediately to the spreadsheet from any level of help, press *Ctrl-Break* or select **Q**uit from the Help Topics Screen.

Once you're back in the spreadsheet, you can return immediately to the last help screen displayed by pressing *Alt-F1*.

If Quattro displays an error message in the middle of the screen, press *F1* to display an explanation of it. You can also review short descriptions of error messages that appear on the screen by pressing *F1* and selecting Error

Messages from the Help Topics Screen. For more details on an error message, see Appendix E of the *Quattro Reference Guide*, "Error Messages."

You can also refer to Appendix A, "Help!," if you encounter problems while working with Quattro. This appendix (on page 401) offers possible solutions to common Quattro problems.

Note: If your Quattro files are on a hard disk, you can save file access time by specifying Instant as the Help Access method. This makes it much faster to access help information. (See "Setting the Help Access Method" on page 149.)

Change Your Mind? The Esc Key

In Quattro, the *Esc* key is the all-purpose "uh-oh" key. It can't reverse mistakes already made, but it lets you back out of mistakes before they are recorded.

Suppose you decide while editing or replacing a cell entry that you'd rather keep the old entry. Press *Esc* and the original entry returns—*as long as you press Esc before you press Enter.*

Similarly, if you select a menu command that displays a prompt and decide not to carry out the command, *Esc* cancels the command. With menus displayed, *Esc* exits the current menu and returns you to the previous menu or the spreadsheet.

The general rule is *any sequence that ends with Enter can be interrupted by pressing Esc before you press Enter.*

Note: You can also use *Ctrl-Break* to return immediately to the spreadsheet from within Help or menus.

Setting the Default Directories

There are two different default directories:

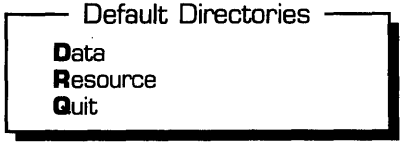
- **the resource directory**, which tells Quattro where to look for graph print files, translators, menu trees, and other supplementary program files
- **the data directory**, which tells Quattro where to look for and store spreadsheet files (when no other directory is specified)

The first time you load Quattro, both directory defaults are set to the directory and drive you loaded the program from. (Unless you installed Quattro for use with a floppy-drive system, in which case both directories are set to Drive B.)

If you have a hard disk and want to keep your spreadsheet files in a different directory than the program files, change the default data directory to indicate that directory.

To change the default directories:

1. Press */D* to select **D**efault from the main menu. The Default menu appears, listing several options.
2. Press *D* to select **D**irectories. The Default Directories menu appears:



3. To change the data directory, select **D**ata. The current directory default appears on the input line. Edit the existing directory path, or press *Esc* and enter a new path. Then press *Enter.*
4. To change the resource directory, select **R**esource and specify a new directory path.
5. Press *Q* to select **Q**uit and return to the Default menu.
6. To save the new directories as defaults, select **U**pdate from this menu.

Caution: If you don't update the defaults after changing directories, the original directories will be in effect next time you use Quattro.

Regardless of the default directory, you can always access any directory on your disk. Simply include the directory path as part of the file name you specify when saving or retrieving a file.

Note: If you have a floppy-drive system, your resource directory will be set to B:, even though you move your Resource Disk to Drive A after loading Quattro. This is because resource access is most important during loading. Quattro will still be able to find your resource files on Drive A after loading, however, because what it doesn't find in the resource directory (Drive B), it will look for in Drive A.

Entering and Editing Data

To enter information in the spreadsheet, move the cell selector to the cell you want to fill and type in the entry. The characters you type appear on the input line above the spreadsheet. The cursor, shown as a flashing line, shows you where the next character will appear. If you make a mistake while typing, simply press *Backspace* to erase the character, then type the correct one.

When the entry is complete, press *Enter* or any of Quattro's direction keys (*Right arrow, Left arrow, PgUp,* and so on). The value is written into the current cell; any previous entry is erased and cannot be recalled. If you entered the data by pressing a direction key, the cell selector moves in the appropriate direction.

If Quattro finds an error (such as incorrect formula syntax) in your entry, it beeps, displays an error message, and automatically enters Edit mode with the cursor positioned near the problem.

In Edit mode, use *Right arrow* and *Left arrow* to position the cursor anywhere in the entry. You can then insert new characters, or use *Del* to remove erroneous ones. When you've corrected the error, press *Enter* to enter the entry again.

You can enter four different kinds of information in a spreadsheet cell:

- **numbers**, such as 3987 or 0.39225
- **text**, such as ADDRESS, '1988 PROJECTIONS, or John Henry
- **dates** (preceded by *Ctrl-D*), such as 3/15/87 or 6/21
- **formulas**, such as 4982+5233 or +C3*B23

Formulas can reference data stored in other cells to calculate new values. Each type of cell entry is described in Chapter 3.

Once you've entered data in a cell, you can always go back and change the entry. Simply highlight the cell with the cell selector, then reenter the data or press *F2* (EDIT), make the desired changes, and press *Enter*. Chapter 3, "Entering and Editing Data," on page 38, discusses editing entries in detail.

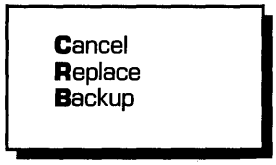
To delete a recorded entry, highlight the cell and press *Del*, or use the **B**lock **E**rase command (see "Erasing a Block" on page 75).

Saving and Retrieving Spreadsheets

You can save the data you've entered in a spreadsheet in a disk *file*. Later, you can access the spreadsheet by retrieving the file it's stored in.

To save a spreadsheet in a disk file:

1. Press */FS* to select the **F**ile command, then **S**ave. Quattro prompts you for the name you want to give the file and displays a list of files existing in the default data directory.
2. Enter a file name or select one from the displayed list. You can use up to eight letters or numbers. Quattro will automatically attach the default extension to the file (initially .WKQ).
3. Press *Enter*. If the file exists, the system displays a menu with three options:



4. Press *R* to overwrite the existing file. Press *B* to rename the existing file with the .BAQ file name extension, then save the new file. Press *C* to cancel the command.

Caution: If you exit Quattro without saving the current spreadsheet, all your work will be lost. Always save before you leave the program or turn off the computer.

If you're entering a lot of data in a spreadsheet, it's a good idea to save your work periodically. That way, if something happens to your system memory (such as a power failure), you will lose only what you entered since last saving the spreadsheet. You can protect against data loss, however, with the Transcript add-in (see page 393).

After you've saved a spreadsheet in a file, you can bring it back up on the screen any time by retrieving it:

1. Press */FR* to select **F**ile, then **R**etrieve. The system prompts you for the name of the file you want and displays a list of files in the default data directory.
2. Select a file from the list, or type in the exact name (if the file-name extension is the same as the default, initially .WKQ, you can omit it). To display a list of files in a different directory, type the directory path, followed by *.*, then press *Enter*.

The file you specify is immediately displayed in the Quattro spreadsheet.

Caution: When you retrieve a file, any existing data in the spreadsheet is overwritten. If you don't want to lose the current data, save it in a file before retrieving another spreadsheet.

You can also retrieve spreadsheet files that have been created with other programs and save spreadsheets for use with other programs. (For more information on working with spreadsheet files, see Chapter 6, "Saving and Retrieving Files," on page 155).

Note: If privacy is a concern, you can assign a password to your spreadsheet when you save it. Then no one will be able to retrieve the file without first supplying the correct password (see page 162).

Accessing the Operating System

When you're working in Quattro, you can access the operating system (DOS) without having to exit the program:

1. Press */FO* to select **OS** from the File menu. The spreadsheet disappears and the DOS prompt is displayed.
2. Work within DOS for as long as you want. You can even go into another program, as long as it fits into system memory.
3. When you're ready to return to Quattro, type `EXIT` on the DOS command line. The spreadsheet reappears exactly as you left it.

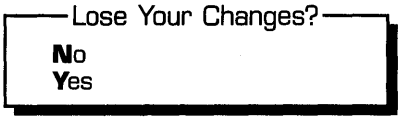
Your DOS manual describes the commands available to you within DOS.

Note: If you're using a floppy-drive system, replace the Resource Disk in Drive A with your DOS disk before using the **OS** command. Return the Resource Disk to Drive A afterwards.

Exiting Quattro

When you're finished working with Quattro, you can exit the program:

1. If you want to save the work you've done, press */FS* and specify a file name to store the current spreadsheet on disk.
2. Press */Q* to select **Quit** from the main menu. If your spreadsheet contains data that you haven't yet saved, Quattro displays an exit confirmation menu:



3. Select **No** to stay in Quattro. Select **Yes** to exit Quattro, discarding any unsaved changes.

The spreadsheet disappears and the DOS prompt returns. To return to Quattro, you can reload the program by typing *Q Enter*.

To have Quattro always ask for confirmation when quitting, regardless of whether or not data will be lost, set the Borland Style confirm option to **No** (see page 152).

C H A P T E R

2

The Main Menu

All Quattro commands are accessed through the main menu, which you display by pressing the slash key (/). Figure 2.1 shows the main menu displayed over the spreadsheet.

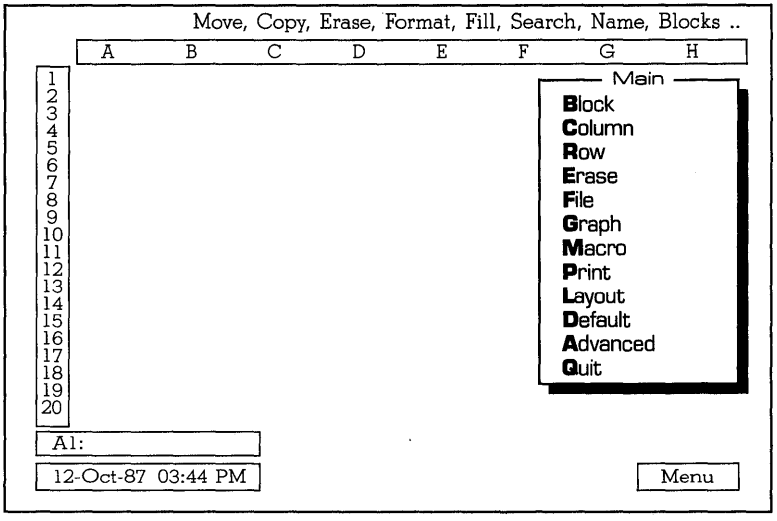


Figure 2.1: The Quattro Main Menu

Most of the commands on the main menu display another pop-up me nu when selected. Each menu accesses a different branch of the Quattro command tree.

This chapter gives an overview of the Quattro main menu commands. Further chapters detail the command branches available through each of the main menu commands.

Block

The Block menu contains commands that affect a block of cells you specify within the spreadsheet. The block can be a single cell or any rectangular group of cells. You can use the commands on the Block menu to

- Copy data from one part of the spreadsheet to another.
- Move the contents of one or more cells to another part of the spreadsheet.
- Erase the contents of a block of cells.
- Change the display format of a block of cells.
- Change the alignment of one or more labels.
- Automatically generate a customized series of value entries in a block.
- Search for specific data and replace it with new data.
- Reformat one or more long labels to fill the space you want.

In addition, the Block menu contains an option called **Advanced**, which gives you access to advanced block commands. With these commands, you can

- Convert all formulas within a block to their end values.
- Reverse the positions of columns and rows in a block of the spreadsheet.
- Protect a block of cells so that it can't be edited, deleted, or replaced.
- Give a block of cells a name, so you can later reference the block by name instead of by coordinate cell addresses.

Each of these block functions is described in detail in Chapter 4, "Making Changes."

Column

The Column menu contains commands that allow you to

- Insert blank columns in the spreadsheet.

- Delete existing columns in the spreadsheet, including any data contained in them.
- Change the width of an individual column in the spreadsheet.
- Return individually widened or narrowed columns to the default width.
- Temporarily remove columns from display without losing the data contained in them.
- Change the default width used for all columns

When you insert or delete columns in your spreadsheet, all other columns are relettered, and formula references are automatically adjusted.

The Column commands are described in Chapter 4, "Making Changes," beginning on page 100.

Row

The **R**ow command displays the Row menu, with which you can insert and delete rows in your spreadsheet. A row is a horizontal block of data that extends across the entire spreadsheet. The **R**ow command is discussed in Chapter 4, "Making Changes," on page 63.

Erase

The **E**rase command deletes all data from the current spreadsheet, leaving you with a blank spreadsheet with global default settings. You can use it to clear the spreadsheet (*after saving your work*) to begin a new file.

Caution: Erasing the spreadsheet deletes any data you enter or changes you made since last saving the file. If you want to keep your work, save the file before erasing the spreadsheet (press */FS* and specify a file name).

Erasing the spreadsheet is described in Chapter 4, "Making Changes," on page 106.

File

The File menu contains commands that let you work with the files stored on your disk or access your computer's operating system without losing your place in the spreadsheet. For example, you can

- Retrieve an existing spreadsheet file.
- Save the current spreadsheet on disk.
- Combine two spreadsheets to make one file.
- Load a file created with another spreadsheet program.
- Extract data from the current spreadsheet and save it in a file.
- Delete a file from your disk.
- Temporarily change the the default directory to access files in other directories.
- Break down into columns long labels created by importing a text file.
- Access the DOS operating system.

All File commands except the one to access DOS are described in Chapter 6, "Saving and Retrieving Files." The command to access DOS is described in Chapter 1, "Quattro Basics," on page 27.

Graph

The Graph menu contains commands that let you create, view, save, and print graphs using data from the current spreadsheet. You can choose from several types of graphs, including line graphs, bar graphs, and pie charts.

Graphs are discussed in detail in Chapter 8, "Building Graphs."

Macro

The Macro menu is used for both macros and program add-ins. A *macro* is a set of one or more commands stored within a spreadsheet and which can be executed with a single command. *Add-ins* are program supplements that can be used with Quattro. Quattro provides two add-ins: the Menu Builder, which lets you alter Quattro menus, and Transcript, which records all your actions in Quattro.

With commands on the Macro menu, you can

- Name, execute, and delete macros you create within your spreadsheet.
- Load, run, and unload Quattro add-ins.

Macros are described in Chapter 12, "Using Macros." Add-ins are described in Chapter 13, "Using Add-Ins."

Print

The Print menu allows you to print data from your spreadsheet files. You can specify numerous options and settings, such as to

- Add headers and/or footers to your printout.
- Adjust the page margins and/or page length.
- Print columns or rows as headings on every page.
- Print only a specified block of a spreadsheet.
- Print the formulas in cells as opposed to their displayed values.

Printing is described in detail in Chapter 7, "Printing." Printing graphs is done through the Graph command (see Chapter 8).

Layout

The Layout menu contains commands that let you change the general way in which the spreadsheet is presented. You can use them to

- "Freeze" specific columns and/or rows on the screen to be used as *titles*, which stay in place no matter how you scroll the screen (see page 109).
- Split the screen into two windows, so that you can view two different parts of the spreadsheet at once (see page 112).
- Change the colors used to display the spreadsheet on the screen. This is a duplicate of the **D**efault Spreadsheet Colors command (see page 125).
- Move the descriptor line to the top or bottom of the screen.

Default

The Default menu contains commands that let you change default settings for eight categories:

- **Hardware** indicates the type of screen you're using, and lets you specify information about the text printer.
- **Colors** specifies the colors used to display menus, graphs, and different parts of the spreadsheet.
- **International** determines how currency, time, and dates are displayed and which punctuation characters are used in numbers and as argument separators.

- **Formats** determines display format, label alignment, column width, and zero display for the entire spreadsheet. Unless specified otherwise, these defaults are used to display data in your spreadsheet.
- **Directories** specifies default directories for the Quattro resource program files and spreadsheet (data) files.
- **Recalculation** determines how Quattro recalculates formulas in a spreadsheet.
- **Protection** turns cell protection on or off for the entire spreadsheet.
- **Startup** specifies general information that Quattro uses to start up the program.

You can also update the defaults, storing your changes as the new default settings.

All defaults are described in Chapter 5, "Changing the System Defaults."

Advanced

The Advanced menu contains commands that work on the data stored in a spreadsheet. You can use these commands to

- Search through a database for records that meet specified conditions.
- Sort data entries according to numeric or alphabetical order.
- Set up the spreadsheet like a form for easy data entry.
- Create "what-if" or sensitivity tables using hypothetical data in formulas.
- Set up a table that shows how often values in a block of cells fall within specific numeric ranges.
- Invert or multiply a data matrix.
- Perform regression analysis on data to show how one variable is affected by others.

The Database commands are described in Chapter 9, "Working With Your Database."

All other **A**dvanced commands are covered in Chapter 10, "Working with Statistics and Analyzing Data."

Quit

This command puts away the Quattro program and returns you to DOS. Once you've quit Quattro, you cannot return to it without reloading it.

Before you quit Quattro, be sure to save any work you have done first (*/FS*). Otherwise, any changes you've made since last saving the file will be lost.

Exiting Quattro is described in Chapter 1, "Quattro Basics," on page 27.

C H A P T E R

3

Entering and Editing Data

Although entering and editing data in a spreadsheet is simple and straightforward, Quattro offers numerous options in this area. For example, you can include prefixes in text entries that specify alignment. And you can reference a cell in a formula by typing its address, pointing to it, or entering a block name.

This chapter describes how to enter both values and text into the spreadsheet, how to build formulas to calculate values, and how to edit existing spreadsheet data. It also covers some of the general skills you'll rely on consistently when you use Quattro:

- specifying blocks of cells for use in formulas or with commands
- "pointing" to specify cells blocks
- naming blocks for future reference
- using choice lists to review and/or enter @functions, macro commands, and block names

Entering Data

To enter data in a spreadsheet cell, use the direction keys to move the cell selector to it and type the entry. The characters you type appear on the input line above the spreadsheet. Use the *Backspace* key to erase mistakes as you type. When you press *Enter* or one of the direction keys, the data is written into the highlighted cell.

If the entry you made is a formula, Quattro automatically evaluates it and displays the results. If any other cells in the spreadsheet contain formulas referencing the current cell, Quattro recalculates them.

If **R**ecalculation is set to **M**anual (see page 142), formulas affected by the new data are not recalculated until you press the CALC key, *F9*. You can also use the CALC key to calculate a value before you enter it. For example, if you type `8*9` on the input line, then press *F9*, the formula is replaced by the result: 72. The formula used to calculate the value is erased.

Quattro will automatically go into Edit mode if it discovers a problem with your entry, such as an illegal character. It won't accept the entry until you've corrected the problem. To cancel the entry, press *Esc*.

Editing Entries

Once you've written an entry into a cell (by pressing *Enter*), you can *erase* it simply by moving the selector to it and pressing *Del*. You can *alter* its contents in two ways:

- Move the cell selector to the cell and enter a new value. When you press *Enter* (or any of the direction keys), the new value replaces the old. (To avoid accidental deletion, Quattro won't erase an entry if you just select it and press *Enter*).
- Make changes to the existing entry using Edit mode.

In Edit mode, you can insert or delete characters in an entry without retyping the whole thing. Begin by moving the cell selector to the cell you want to change. Then press the EDIT key (*F2*) to enter Edit mode. The EDIT mode indicator appears at the bottom right of the screen, and the contents of the current cell appear (as they were entered) on the input line with a blinking underline as the cursor. You can use the direction keys to move the cursor to any part of the entry. *Backspace* deletes characters to the left of the cursor.

When you first enter Edit mode, Quattro is automatically placed in Insert mode, and characters you type are inserted at the cursor. To write over characters, press the *Ins* key to enter Overwrite mode. The OVR mode indicator appears at the bottom right of the screen. Press *Ins* again to return to Insert mode.

Any entry displayed on the input line is shown as it was typed in, which is not necessarily how it is displayed in the cell. For example, if a cell contains a formula that produces a value, you edit the formula, not the value. If the

cell contains a number, you edit the underlying number, regardless of the display format.

Table 3.1 shows the functions of certain keys in Edit mode.

Table 3.1: Special Keys in Edit Mode

Key	Function
Esc	Discards any changes you made to the cell and exits Edit mode.
Enter	Enters the data and exits Edit mode.
Left arrow	Moves the cursor one space to the left.
Right arrow	Moves the cursor one space to the right.
Backspace	Deletes the character to the left of the cursor.
Ins	Toggles between Insert and Overwrite modes. (Insert mode is the default.)
Del	Deletes the character above the cursor.
Tab or *Ctrl-Right arrow*	Moves the cursor five spaces to the right.
Shift-Tab or *Ctrl-Left arrow*	Moves the cursor five spaces to the left.
Home	Moves the cursor to the first character in the cell.
End	Moves the cursor to the last character in the cell.
Up arrow	Enters the data, exits Edit mode, and moves selector up one cell, *unless* the cursor is after an operator at the end of the entry, in which case it enters Point mode, during which you can input cell references by pointing to them (see page 57).
Down arrow	Enters the data, exits Edit mode, and moves selector down one cell, *unless* the cursor is after an operator at the end of the entry, in which case it enters Point mode.
PgDn	Enters the data, exits Edit mode, and moves selector 20 lines down, *unless* the cursor is after an operator at the end of the entry, in which case it enters Point mode.

Table 3.1: Special Keys in Edit Mode, Continued

Key	Function
PgUp	Enters the data, exits Edit mode, and moves selector 20 lines up, *unless* the cursor is after an operator at the end of the entry, in which case it enters Point mode.
EDIT (*F2*)	Exits Edit mode and returns to Label or Value mode.
NAMES (*F3*)	If cursor is at the beginning of the entry or in front of an operator, a list of existing block names is displayed. Selecting an item from the list inserts it in the input line.
FUNCTIONS (*Alt-F3*)	If cursor is at the beginning of the entry or in front of an operator, a list of @functions is displayed. Selecting an item from the list inserts it in the input line.
MACROS (*Shift-F3*)	If cursor is at the beginning of the entry or in front of an operator, a list of macro commands is displayed. Selecting an item from the list inserts it in the input line.
ABS (*F4*)	Adds dollar signs to the cell address under the cursor, making it an absolute reference (see page 68.)
GOTO (*F5*)	Does not work in Edit mode.
CALC (*F9*)	Calculates the formula on the input line and replaces the formula with the result.
GRAPH (*F10*)	Displays the current graph.

Note: None of the changes you make are recorded until you press *Enter, Up arrow, Down arrow, PgUp,* or *PgDn.* Until then, pressing *Esc* removes the changes and returns the cell to the way it was before.

In Edit mode, you can also use pointing and block names to help you correct an entry. See "Pointing Out Cells" and "Naming Blocks" at the end of this chapter. See "Using Choice Lists" (also at the end of this chapter) for more details on using F3.

Data Types

There are two basic types of data that you can enter in a spreadsheet: values and labels.

- A *value* is any numeric value, entered either as a number, a date, or a formula that calculates a number. Formulas usually use numbers you've entered in other cells to calculate values, for example, the difference between two cells or the total of values in a column.
- A *label* is a text entry such as *Total*.

Quattro determines the data type of a cell entry by the first character you type. It then replaces the READY indicator in the bottom right corner of the screen with LABEL for text, or VALUE for numbers, dates, or formulas. After you enter the data, the READY mode indicator reappears.

Figure 3.1 shows a spreadsheet with four cell entries: a number, a formula, a date and a label. The number, formula, and date are all value entries.

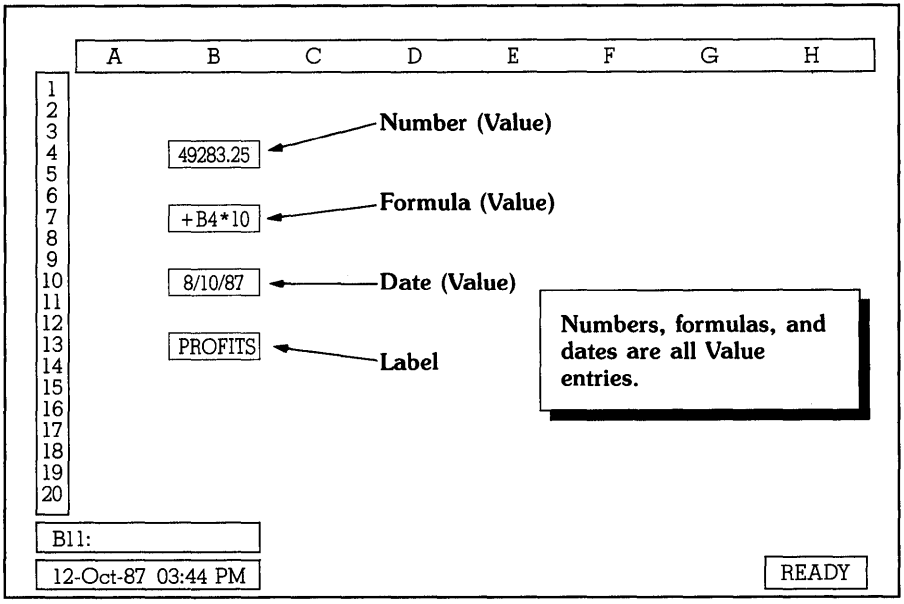


Figure 3.1: Different Types of Data in a Spreadsheet

The following sections describe entering labels and the different kinds of numeric values (numbers, formulas, and dates).

Labels

A label is a text cell entry usually used for descriptive information, such as a column or row heading, or for textual data such as a name or address. It can begin with any letter or punctuation mark other than the following:

```
/ + - $ ( @ #
```

Although numbers can be included *within* labels, labels are not normally used in numeric calculations.

When you begin typing a label, the LABEL mode indicator appears in the bottom right corner of the screen. When you press *Enter*, the label is written into the cell, and the mode indicator returns to READY.

Label Alignment

When you enter a label into a cell, it is positioned according to the spreadsheet's default alignment. This default is initially left, but can be changed to right or centered.

Figure 3.2 shows three labels in a spreadsheet, aligned left, right, and centered.

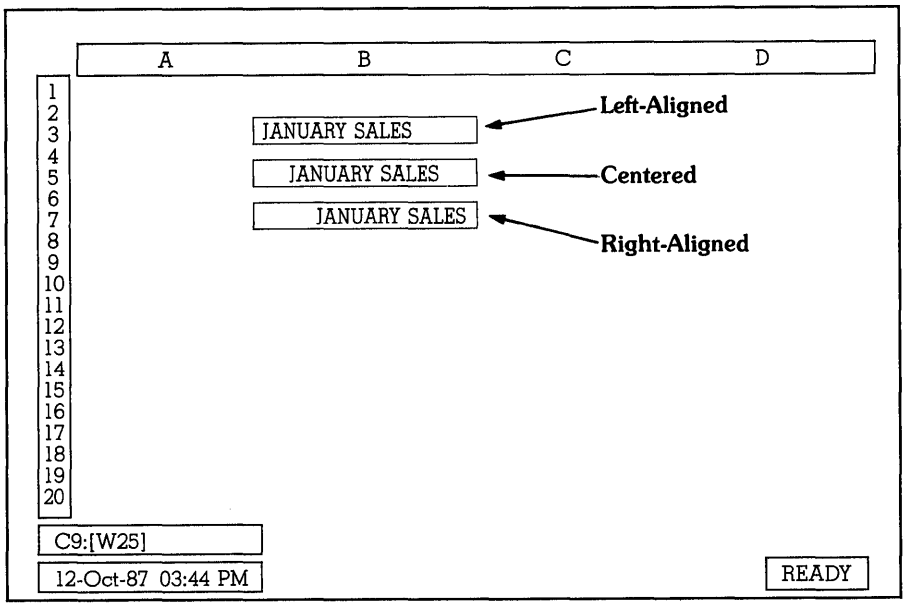


Figure 3.2: Label Alignment

If you want to align a label differently than the alignment default, you can precede the label with a *label-prefix character*, either when entering it or by editing it. The label-prefix character is one of three special punctuation marks that tell Quattro how to align that label (see Table 3.2).

Table 3.2: Label-Prefix Characters

Label-Prefix Character	Alignment
' (apostrophe)	Left
" (quotation mark)	Right
^ (caret)	Centered

Label-prefix characters are not displayed in the spreadsheet, but they do appear on the input line when a label cell is selected. If you don't include a label prefix with a label, the default prefix is automatically assigned and can be seen when you edit the label.

To begin a label with one of the label-prefix characters used as a punctuation mark and not a prefix, precede it with another label prefix indicating the alignment you want. For example, to enter the label

"Harry" Harrison

type

```
'"Harry" Harrison
```

to align the label with the left side of the cell.

After you've entered a label, you can enter Edit mode and change the label prefix to alter its alignment. If you want to change alignment for several labels at once, you can use the **B**lock **L**abel Align command described on page 80.

The **B**lock **L**abel Align command affects only labels that have already been entered. If you want to change the way labels are aligned as you enter them, use the **D**efault **F**ormats **A**lign command (see page 138). This command doesn't affect labels already entered, so the labels you entered with the previous default won't be realigned.

Including Numbers in Labels

A label can include any amount of numbers as long as the label *begins with* a letter or punctuation mark. To enter a label that begins with a number, such as `145 Howard Ave.`, precede it with a label prefix (`'`, `^`, or `"`). Otherwise, Quattro will perceive it as an illegal value entry (values cannot contain text); it will beep and go into Edit mode so you can correct it.

Some numeric entries cause problems unless entered as labels. For example, the phone number 458-1233 appears as `-775` in the spreadsheet, because Quattro interprets it as a formula; it subtracts 1233 from 458 and displays the result. And Quattro displays value entries in the current display format, so that zip codes may appear as decimal numbers or percentages. In cases like these, you need to precede the entry with a label prefix, so that Quattro will treat the numbers as labels.

Repeating Characters

You can automatically repeat one or more characters across the length of a cell by preceding the character(s) with a backslash (\). For example, to fill a cell with hyphens, type

```
\-
```

There's no need to use a label prefix; since the entire cell will be filled, alignment is irrelevant.

To begin a label with a backslash without repeating the characters after it, precede the label with a label prefix.

Labels Wider than One Cell

Labels can be up to 240 characters long (26 times longer than the default column width). When you enter a label that exceeds the width of the cell, Quattro automatically displays the "spillover" text in blank cells to the right. When the label runs into a cell that contains an entry, it is truncated, but the entire label is still stored as entered. In other words, only characters that fit in the cell(s) are shown.

When you edit a label, you see the entire entry on the input line above, even if it doesn't all fit in the spreadsheet cell. If necessary, the spreadsheet drops down a line to make room for the entry.

To edit a label that spills over into other cells, you must highlight the first, or leftmost, cell. Only then does the entry appear on the input line, letting you know it is the cell that actually contains the entry. Cells to the right, *spillover* cells, are used for display only and do not actually contain data. You can even enter new information in any of the spillover cells without disturbing the original label. The label will simply appear truncated. If you later erase the contents of that cell, it will redisplay the spillover part of the label.

To avoid cutting off a lengthy entry, you can widen the column containing it with the Column **W**idth command (see "Setting Column Width" on page 103).

Numbers

Numbers are a type of value entry. When you begin typing a number, the VALUE mode indicator appears in the bottom right of the screen. When you press *Enter*, the number is entered and aligned with the right side of the cell. You cannot change the alignment of value entries.

Although entering numbers in a cell is fairly straightforward, there are several rules to keep in mind:

- A number entry basically contains only numerals (0-9), although you may include a leading negative or positive sign (- or +), or follow a number with a percent sign (%). You can use a single decimal point.

- Don't use parentheses to indicate a negative number. Use a minus sign (-) instead. If you change the display format to Currency or Financial (,), negative numbers will be displayed in parentheses.
- Never include dollar signs or commas in your numbers. They can later be displayed automatically by changing the display format.
- Do not include spaces in the entry.
- Never substitute a lowercase *L* for 1 nor an uppercase *o* for 0.

You may use scientific notation (for example, 2.35E+8) to enter a number. If the calculated number fits in the cell (and the display format makes it possible), it will be displayed in full.

Length

A number can be up to 240 characters long. Unlike labels, however, if a number doesn't fit in the current cell, it won't run into adjacent cells. Instead, it displays either in scientific notation or as a row of asterisks (*********), depending upon the cell's display format. The number appears in full if you widen the column sufficiently with the **Column Width** command (see "Setting Column Width" on page 103).

Display Format

You can choose from eleven different *display formats* to display numbers. The formats do not change the number itself, only how it is displayed. For example, the **Fixed** format limits the number of decimal places displayed. The original number, however, is still stored in Quattro and it is this complete number that is used in all calculations.

The initial default format for numbers is **General**, which displays numbers more or less as you entered them. Following are all your format choices:

- **Fixed** limits the number of decimal places displayed.
- **Scientific** translates numbers into scientific notation.
- **Currency** displays numbers as the specified currency (dollars, pounds, yen, etc.).
- **, (Financial)** inserts commas every three digits.
- **+/-** translates numbers into bar graphs, using + for each positive integer, – for each negative, and . for zero.
- **Percent** displays numbers as percentages.

- **Date** displays numeric values as dates, or time, in the selected format.
- **Text (Show Formulas)** displays the formulas entered, not their values.
- **Hidden** suppresses display of entries.

You can specify a new default format with the **D**isplay command on the Default Formats menu (see "Default Display Format" on page 136). You can also change the way numbers in individual cells or blocks of cells are displayed with the **B**lock **D**isplay Format command (see "Changing Display Format" on page 75). That section also includes detailed information on each of the display formats.

Entering Numbers Automatically

An easy way to enter a series of numbers in the spreadsheet is with the **B**lock **F**ill command (*/BF*). This command automatically enters numbers in the block of cells you specify. You indicate the beginning and ending numbers and the interval you want between numbers. For example, a beginning number of 3, ending number of 21 and interval of 3 enters the numbers 3, 6, 9, 12, 15, 18, 21 in the given block.

For more information on this command, see page 81.

Dates

Another type of value entry is a date. To enter dates in most spreadsheet programs, you need to use a special date @function, such as @DATE, then set the display format for that cell to **D**ate. Quattro greatly simplifies the use of dates in your spreadsheet by including a special *date prefix*.

To enter a date, hold down *Ctrl* and press *D*, then enter a date in any of the following formats:

- DD-MMM-YY (04-Jul-87)
- DD-MMM (04-Jul) (assumes the current year)
- MMM-YY (Jul-87) (assumes the first day of the month)
- the Long International date format—initially MM/DD/YY (07/04/87)
- the Short International date format—initially MM/DD (07/04) (assumes the current year)

You can change the International date formats with the **D**efault **I**nternational command (*/DI*).

A date prefix essentially translates the date value you enter into a date serial number, counting from January 1, 1900, as 1. (These serial numbers are used in calculations.) It then changes the display format for that cell to **D**ate, using the default date format (initially MM/DD/YY). You can change the date format to any of those listed above with the **B**lock **D**isplay Format command (see page 76) or the **D**efault **F**ormats **D**isplay command (see page 136).

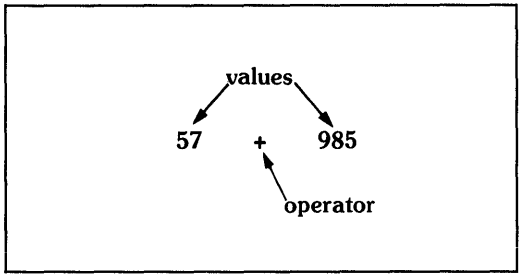
Date values can also be used in spreadsheet calculations. For example, subtracting 10/1/87 from 10/8/87 would result in a value of 7.

Formulas

Another way to enter a display value in a cell is with a *formula.* Formulas allow you to take advantage of one of the most powerful and time-saving functions of Quattro: automatic calculation.

Quattro instantly calculates all kinds of information for you. Using data entered in the spreadsheet, it can total columns of figures, calculate monthly profit, even determine the future value of an investment. And if the figures involved are changed, Quattro automatically recalculates the formula.

Quattro formulas are like any basic algebraic formula. They combine *values* and *operators* to calculate a single end value, for example:



As values, you can use actual numbers or the addresses of cells that contain numbers. For example,

```
+A1 - A2
```

tells Quattro to subtract the value in cell A2 from the value in cell A1.

The result is displayed in the cell, just as if you had typed it in. The formula appears on the descriptor line when the cell is selected and on the input line when you're editing the entry.

Formulas can be up to 240 characters long. You can include spaces between operators and values, but they will be deleted automatically. A formula must begin with one of the following characters:

0 1 2 3 4 5 6 7 8 9 . + - (@ # $ *

To begin a formula with a letter, such as for a cell address or text entry, precede it with a plus sign (+). Otherwise, Quattro interprets the entry as a label instead of a value and does not calculate the formula.

The results of formulas are always aligned with the right side of the cell (unless the result is a string value). Their alignment cannot be changed.

Formula Values

Values in a formula can be any of the following:

- numbers (for example, 948, –84, 43.23)
- text surrounded by double quotation marks (for example, "PROFIT" or "Dear Mr. ")
- addresses of other cells that contain either values or labels (for example, B12, G29)
- cell block names (for example, EXPENSES)
- Quattro @functions (for example, @SUM(B1..B24))

When you use a cell address as a value, Quattro refers to the value contained in that cell. For example, the formula B6 + C1 adds the values in those two cells and displays the result.

You can also include blocks of cells in formulas by inserting two periods between cell addresses, for example, B1..B15. This tells Quattro to refer to B1 and B15 and all the cells in the block created by those coordinates. If you have assigned a name to a certain block of cells, you can refer to that block by name. Cell blocks and naming blocks are described more fully in the section "Specifying Cell Blocks" on page 55.

Quattro @functions are a set of standard formula commands used to simplify more complex calculations. For example, @SUM is used to total values of specified cells. @DATE calculates and enters the current date. Using @functions is described in detail in Chapter 11, "Using @Functions,"

on page 345. The individual @function commands are described in Chapter 2 of the *Quattro Reference Guide*.

Operators

Formulas use *operators*, or mathematical symbols, to express a relationship between two or more values, for example, C5 – D12. Often formulas contain several operators. For example:

+C5 – D12 + F24 * 0.123

The result of a formula depends on the order in which the arithmetic operations are performed. To help Quattro know where to start, each operator is assigned a *precedence*, and operations in a formula are performed in order of precedence. For example, because multiplication has greater precedence than addition:

5 + 1 * 3 = 8, *not 18*.

Operations with equal precedence are performed from left to right.

Table 3.3 lists the operators allowed in Quattro formulas and the precedence assigned to each.

Table 3.3: Quattro Operators

Operator	Description	Precedence
&	String combination	1
#AND# #OR#	Logical AND, Logical OR	1
#NOT#	Logical NOT	2
= <>	Equal, Not equal	3
< >	Less than, Greater than	3
<=	Less than or equal	3
>=	Greater than or equal	3
* /	Multiplication, Division	4
– +	Subtraction, Addition	5
– +	Negative, Positive	6
^	To the power of (exponentiation)	7

You can override the precedence of operators by including parentheses in your formula. Any operation surrounded by parentheses is given highest priority.

Using Parentheses

To ensure that a formula is evaluated in the order you want, use parentheses to enclose the portion you want calculated first. Parentheses can be nested inside other parentheses; the innermost part is calculated first. For example:

```
4 * 2 + 3 = 11
4 * (2 + 3) = 20
(4 * 2) + (3 + 5) * 4 = 40
((4 * 2) + (3 + 5)) * 4 = 64
```

If no parentheses are included, Quattro performs the calculations in the order (precedence) shown in Table 3.3.

Types of Formulas

Quattro works with three different kinds of formulas: arithmetic, text, and logical.

Arithmetic formulas, such as +B3 * 1.3, calculate numeric values. These are the most commonly used formulas. They can use most of the @functions and accept any of the following operators:

```
- + * / ^ = < > <= >= <>
```

Text formulas are any formulas that result in a textual entry. For example, +C4 & " Review" enters the entry in cell C4 and adds a space and the word *Review*. Text formulas include those created with string functions (see page 351) or an @IF function that results in a string (see page 353). Text formulas accept any of the following operators:

```
& < > <= >= = <>
```

Logical formulas are true/false statements concerning values in other cells, for example, +C3 < 10. Quattro checks the spreadsheet to see if the statement is true or not. If true, it enters a 1 in the cell; if false, it enters a 0. In some cases, you can specify different values to be entered depending on the condition. For example, the following formula could be used to calculate an employee's eligibility for a bonus:

@IF(COMMISSION > 1000 #AND# EXPENSES < 300, 100, 0)

If commission is greater than $1,000, and expenses are less than 300, Quattro enters 100 in the cell; otherwise it enters 0.

Logical formulas accept any of the following operators:

< > <= >= <> = #NOT# #AND# #OR#

If a logical formula results in a textual value, such as

@IF(C3>10,"Profit","Loss")

it is also considered a text formula.

Pointing in Formulas

Suppose you are in the middle of building a formula and you forget the address of a cell you want to include. There's no need to abandon the entry to search for the forgotten address. Quattro has an easier way, called *pointing*.

Pointing lets you enter a cell address in a formula by moving the cell selector to the cell you want to include.

For example, to enter the formula +B3*(B4-B5) into cell B6 by pointing:

1. Move the cell selector to cell B6.
2. Press + to begin the formula.
3. Press *Up arrow* until the cell selector is in cell B3. (The mode indicator changes to POINT.) The address of the current cell is displayed on the input line as you move the selector.
4. Press the asterisk key (*). Quattro enters an asterisk after "+B3" and returns the selector to the entry cell, B6.
5. Press the open parenthesis key [( ].
6. Move the cell selector to cell B4.
7. Press the minus key (–).
8. Move the cell selector to cell B5.
9. Press the close parenthesis key [ )].
10. Press *Enter*. The formula is written into the entry cell and the input line is cleared.

Quattro automatically enters the cell addresses into the formula you point to. All you need to enter are the operators and punctuation.

You can also enter cell blocks by pointing to them. And you can edit existing formulas using pointing. For more information on pointing, see "Pointing Out Cells" on page 57.

Tracking Cell References: Relative Versus Absolute Addresses

Quattro does very well keeping track of the cells you refer to in formulas:

- If you move the cells specified in a formula to another place in the spreadsheet, Quattro automatically adjusts the reference in the formula.
- If you move a formula from one cell to another, the cell references in the formula are unchanged.
- If you insert a column or row within a specified block, the block in the formula is automatically increased to include it.
- If you delete a column or row within a specified block, the block in the formula is automatically decreased (*unless* you delete a column or row that contains one of the corner cells, in which case ERROR is entered in the formula's cell).
- If you copy a block of cells that includes a formula *and* the cells referenced in the formula, the formula will be updated to reference the new cell locations.

This last characteristic can save you a great amount of time when replicating sections of a spreadsheet. However, it can also cause complications when you choose to copy a formula without copying the cells it references. This is because, during the copy process, Quattro temporarily abandons the addresses of referenced cells. Instead, it keeps track of them by remembering their positions in relation to the formula's cell. Cells viewed this way are called *relative* cells.

For example, if you copy the formula B3+C4 from cell C3 to cell D7, the copied formula appears as C7+D8, as shown in Figure 3.3. The original formula results in a value of 15. The sum of the new formula is 25.

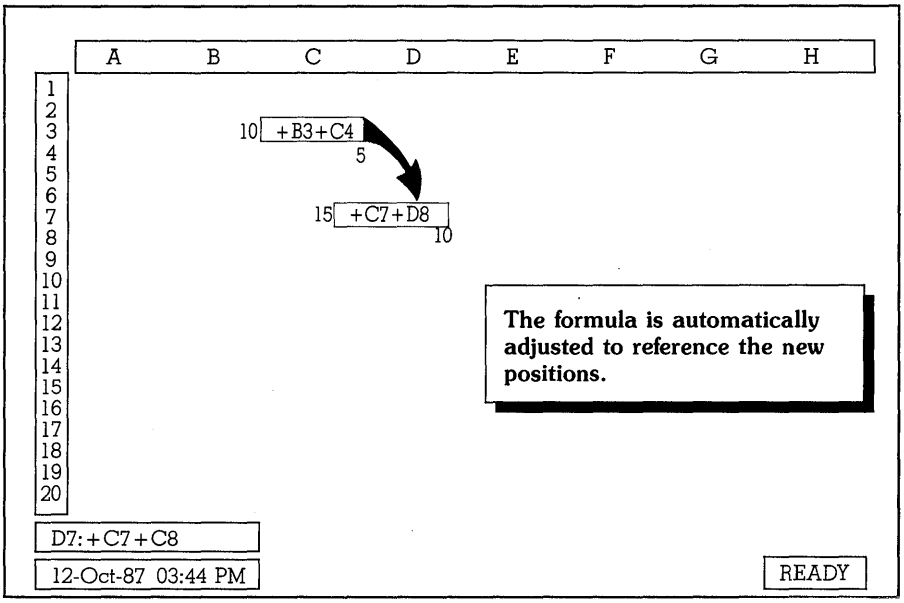


Figure 3.3: A Copied Formula

If you want to copy a formula and maintain the original cell references, you must specify those references as *absolute* before copying the formula. This is done with the ABS key (*F4*), or by inserting dollar signs before the address coordinates.

You can make part or all of an address absolute. For example:

$C$5	makes the entire address absolute
$C5	makes only the column absolute
C$5	makes only the row absolute

Using the example shown in Figure 3.3, adjusting the absoluteness of the cell reference B3 would have the following results when the formula is copied to cell D6:

+$B$3+C4	→	+$B$3+D8
+$B3+C4	→	+$B7+D8
+B$3+C4	→	+C$3+D8

For detailed information on absolute and relative addresses, see "Copying Formulas" on page 67.

Recalculation

Formulas in a spreadsheet are automatically calculated when you enter them and are recalculated each time the data involved is changed. In very large spreadsheets with numerous interconnecting formulas, this can sometimes be time-consuming, since you must wait while the formulas are being recalculated. If you find the waiting time tedious, you can turn off automatic recalculation with the **R**ecalculation command on the Default menu (see "Manual versus Automatic Mode" on page 142).

When automatic recalculation is turned off, formulas are still calculated when entered or edited, but are not recalculated when values in the cells they reference change. When a formula in the spreadsheet needs to be recalculated, the CALC status indicator appears in the bottom right corner. You can then initiate recalculation manually by pressing the CALC key, *F9*.

To recalculate a single cell while recalculation is turned off, select the cell, press EDIT (*F2*), then *Enter*. The cell is recalculated without recalculating the rest of the spreadsheet. This can save you time if you have a large spreadsheet with many formulas that you don't need recalculated just yet.

Note: In manual mode, Quattro has to keep track of all calculations yet to be made. Sometimes this slows system performance somewhat. If you find this happening, just press *F9* to calculate formulas. Quattro will then perform at usual speed.

Specifying Cell Blocks

Many formulas that include @functions (and many menu commands as well) operate on more than one cell at once. Rather than entering the address of each cell involved, you can specify a *block* of adjacent cells by entering a *range of cells*. This not only saves time when entering the formula, but saves spreadsheet space as well. For example, to total the values in a row, you could enter

```
@SUM(A1..A7)
```

instead of

```
A1+A2+A3+A4+A5+A6+A7
```

In other words, a cell block is any rectangular group of cells on the spreadsheet. A few examples are shown in Figure 3.4.

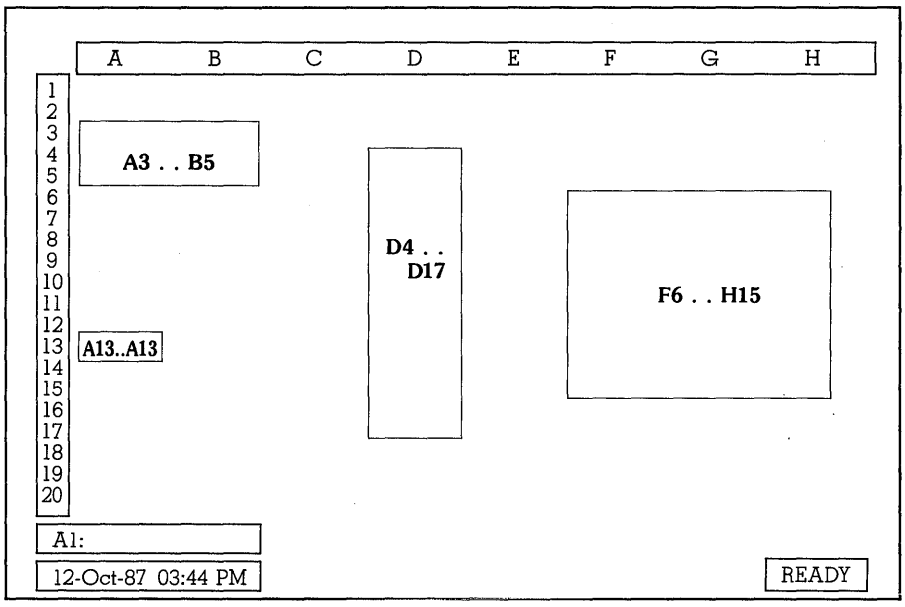


Figure 3.4: Examples of Cell Blocks

To specify the cell range of a block, enter the address of the top left cell (the *anchor cell*), followed by one or two periods (..) and the address of the bottom right cell. For example, the block

F6..H15

refers to the rightmost block of cells shown in Figure 3.4. (You can actually enter the addresses of any two cells that are in opposite corners in any order. However, Quattro will translate the address into the top left cell of the block followed by the bottom right.)

Caution: If you delete the contents of or move data into a specified block's coordinate cell, the block reference becomes ERR, and the formula itself will result in ERR. This is meant to prevent you from accidentally erasing data referenced by a formula.

You can also specify a cell block by pointing it out or by entering the name you've assigned a block (see the following sections).

Pointing Out Cells

An easy way to specify a cell block, either within a formula or in response to a command prompt, is to *point* it out with the cell selector. This is a very simple process, and once you use it, you may never want to type in coordinates again.

To point out a single cell, move the selector to it and press *Enter*.

To point out a multiple-cell block:

1. Move the cell selector to one corner of the block you want to specify.
2. Press the period key (.) to *anchor* the block.
3. Move the selector to the opposite end of the block. The block is highlighted as you extend it.
4. Press *Enter* or enter an operator, comma, or close parenthesis.

The following subsections discuss the specifics of each step involved in pointing: entering Point mode, anchoring a cell, extending the block, and exiting Point mode.

Entering Point Mode

You can enter Point mode in three situations:

- in response to a command prompt
- while entering a formula
- while editing a formula

When Quattro prompts you for a cell block, it usually offers a default block. Usually this is the current cell; when appropriate, it is the block that was previously specified with the command. To accept the default block, just press *Enter*. To specify a different block, press any of the direction keys to begin pointing.

To enter Point mode while typing in a formula, the formula must be ready to accept an address. (In other words, the cursor must be after a mathematical operator (+ – / *), an open parenthesis [( ], or a comma (,). Otherwise, pressing a direction key will enter the formula in the cell and return Quattro to Ready mode.) Press any direction key to begin pointing. To begin a formula with a cell reference, type + , then point.

To enter Point mode while editing a formula, press *Up arrow, Down arrow, PgUp,* or *PgDn* while the cursor is after an operator, comma, or open parenthesis at the end of the entry.

While Quattro is in Point mode, the POINT mode indicator is displayed below the spreadsheet.

Anchoring a Cell

To specify a cell as the first corner of a block, you need to *anchor* the cell. This tells Quattro that the cell is the first coordinate of the block.

To anchor a cell, move the selector to it and press the period key (.). (If you press *Esc* before you press the period key, the selector returns to the cell that was current when you began pointing and erases the reference from the input line.)

If you're pointing in response to a command prompt, Quattro usually provides an anchor for you, using as a default either the current cell or the first cell of the last block specified with the command. If the default is anchored, it appears after the prompt as a cell range (such as A1..A1). If it's unanchored, the current cell appears as a single cell address (A1).

To "unanchor" a cell, press *Esc.* You can then move the selector out of the current cell without extending the block.

To unanchor a cell *and* return to the cell that was current when you began pointing, press *Backspace.*

Extending the Block

Once a cell is anchored, either by you or Quattro, moving the selector away from the anchor *extends* the block. The anchor remains as the first coordinate of the block, and the selector indicates the last coordinate. Everything between the two is highlighted.

To specify the block you want to use, move the selector to the far end of the block until everything you want included is highlighted.

To indicate an entire filled block, use the *End* key in conjunction with the arrow keys to speed up block extension. For example, in Figure 3.5, the quickest way to get from the anchor to the opposite end of the block would be to press *End-Down arrow* to move to cell C10, then press *End-Right arrow* to move to cell F10. If you press *End* and an arrow key from within a filled cell,

Quattro moves the selector in the direction of the arrow until it reaches a blank cell. It stops the selector immediately before the blank cell.

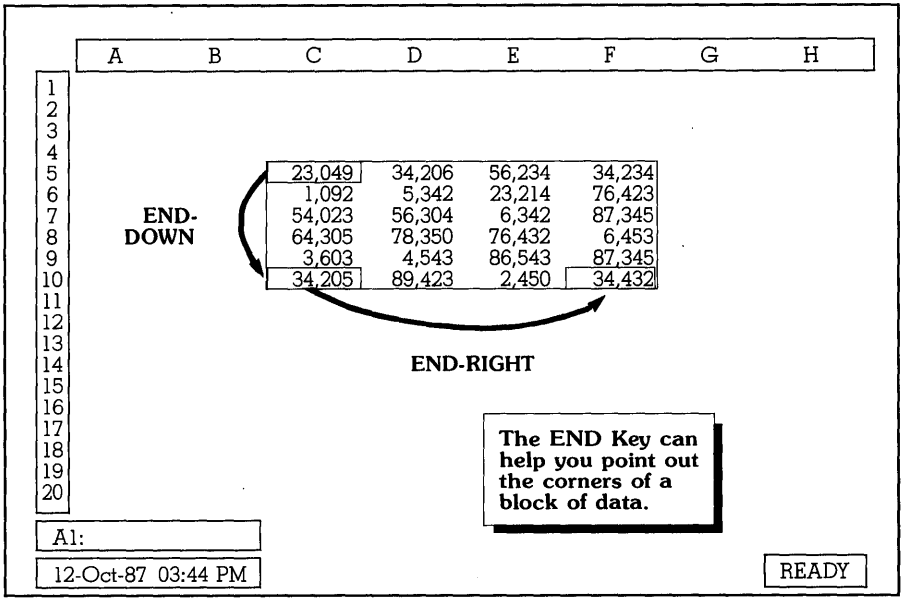


Figure 3.5: Using the *End* Key to Extend a Block

If you change your mind after anchoring and extending a block, press *Esc* or *Backspace* to remove the highlighting and unanchor the first cell. *Esc* returns the selector to the cell that was the anchor. *Backspace* returns the selector to the cell that was current when you first began pointing.

To extend the selection from a different corner of the highlighted block, press the period key. This moves you counterclockwise around the corners.

Exiting Point Mode

The block you pointed out on the spreadsheet is indicated by coordinates on the input line. The pointing process is not complete, however, until you *exit* Point mode, thereby entering the highlighted block as a response or cell reference.

To enter the highlighted block in response to a prompt and exit Point mode, just press *Enter*.

To enter a block in a formula (and exit Point mode), press any character key, such as an operator or comma. Quattro remains in Edit or Value mode. To enter the block in the formula *and* enter the formula in the cell (returning to Ready mode), press *Enter*. You can then add to or finish editing the formula.

If the character you enter creates an invalid formula, Quattro beeps and places you in Edit mode so you can correct it. For example, if you press *Enter* after pointing out the block in the formula:

@SUM(A1..C10

Quattro refuses the entry because a close parenthesis was required.

Confirming an Existing Entry

When you initiate a command that requires a block, Quattro usually uses the current cell as the default block. When appropriate (as with the **P**rint **B**lock command), it uses the block that was last specified with that command and moves the selector to the bottom right corner of that block. To use the same block, simply press *Enter*. To erase the block and show the current cell as the anchor, press *Backspace*. To erase the block and use the top left cell of it as the anchor, press *Esc*.

If you can't see the entire block on the screen and you want to check it out to make sure it's what you want, use the period key (.) to move counter-clockwise around the corners of the block. If it's what you wanted, press *Enter* to confirm the block. If it wasn't exactly what you wanted, use the direction keys to adjust the block from any corner.

Naming Blocks

If there's a block you expect to refer to later, either within a formula or macro or in response to a command prompt, you can make it easier to reference the block by assigning a name to it, such as JAN_SALES. Then, to later reference the block, use the name instead of entering the coordinates or pointing out the block. You can type the name or select it from a choice list of existing block names (see "Using a Choice List" on page 61).

Naming a block not only makes it easier to remember, but if the position of the block changes (for example, if you move the block to another part of the spreadsheet) the block name still refers to the same data, updated to reference its new location.

You may also want to name single-cell blocks for use in formulas. Referencing a name instead of a cell address makes building, viewing, and debugging a formula much easier—especially more complex formulas. Consider the following formula used to calculate the monthly payment on a house:

@PMT(B3,B4/B6,B5*B6)

Unless you've memorized the format for the @PMT function, it's hard to make much sense of this formula. However, if each of the cells involved were named according to its contents, the formula could reference the names instead of the addresses and would be much easier to read:

@PMT(PRICE,INTEREST/MONTHS,TERM*MONTHS)

Not only would you be much less likely to make mistakes while entering the formula, but any problems with the formula would be easier to pinpoint.

For detailed information on naming cell blocks, see "Using Named Blocks" on page 94.

Using a Choice List

Quattro makes entering data easier by offering *choice lists* that display your options. You can select information from a choice list to enter it into the input line.

To display a choice list, use the *F3* function key. You can display three types of choice lists with this key:

Block Names (*F3*)
Functions (*Alt-F3*)
Macros (*Shift-F3*)

Block Names displays a list of all existing block names for the current spreadsheet. When the list is expanded (with the plus key), the block coordinates are shown for each.

Functions displays a list of all Quattro @functions. Expanding the list displays the syntax required by each @function.

Macros displays a menu of macro command categories. Selecting a category displays all macro commands within it.

Choice lists not only remind you of your current options or command syntax, but can also be used to enter parts of a formula or macro, or to

answer a command prompt. With a choice list displayed, use the *Up arrow* and *Down arrow* keys to highlight the choice you want. Then press *Enter*. The item is automatically written into the input line, at the cursor.

C H A P T E R

4

Making Changes

Once you've entered data in a spreadsheet, you can change not only the data in individual cells, but the placement and appearance of the data as well. For example, you can

- move or copy blocks of data to other areas of the spreadsheet
- insert or delete columns and rows
- change the display format or label alignment for a designated block of cells
- display the formulas themselves instead of their calculated values
- change the column width for individual columns
- divide the screen into two windows, displaying different parts of the spreadsheet in each
- write-protect certain cells so that their contents can't be changed
- temporarily remove, or *hide*, columns from the spreadsheet

This chapter discusses each of these display options, organized basically as they appear on the main menu:

- *Altering Blocks of Cells* discusses **B**lock commands—how to copy and move data, erase data, automatically fill a block with numbers, change display format, align labels, reformat text, search for and replace data, transpose columns and rows, convert formulas to their results, protect cells, and name cell blocks.
- *Working with Columns* discusses commands on the Column menu—how to insert and delete columns, change column width, and temporarily remove columns from the screen.

- *Inserting and Deleting Rows* deals with the commands on the Row menu—how to insert and delete spreadsheet rows.
- *Erasing the Spreadsheet* discusses the Erase command.
- *Changing the Screen Layout* includes information on screen display options: how to freeze rows and/or columns of data on the screen, split the screen into two windows, and change the location of the descriptor line.

Changes that affect the entire spreadsheet, such as default settings, are discussed in Chapter 5, "Changing the System Defaults" (see page 117).

Altering Blocks of Cells

A *block* is any rectangular group of spreadsheet cells (including a single cell). Quattro includes a whole set of commands that operate on cell blocks. These commands are all accessed through the **B**lock command on the main menu. When you select this command, the Block menu is displayed (Figure 4.1).

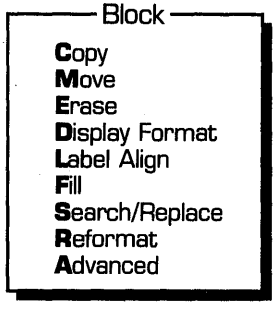


Figure 4.1: The Block Menu

- **Copy** duplicates the contents of a cell block and writes them one or more times into another area of the spreadsheet.
- **Move** moves a cell block from one part of the spreadsheet to another.
- **Erase** deletes the contents of a cell block.
- **Display Format** lets you display numbers and dates in different formats and hide cell entries from view.
- **Label Align** determines how labels in a block are positioned: right, left, or center.
- **Fill** enters a sequence of numbers in a cell block.

- **Search/Replace** lets you search through the spreadsheet for all instances of a certain label or value and change them automatically.
- **Reformat** rearranges the text entered in long labels so that it fills the specified block.
- **Advanced** displays a menu of advanced block operations, including transposing columns and rows, converting formulas to their results, protecting cells, and naming blocks.

To exit the Block menu without selecting a command, press *Esc* to redisplay the main menu or select **Q**uit to return to the spreadsheet.

The following sections tell you how to specify a cell block and describe each of the **B**lock commands in the order in which they're displayed on the menu.

Specifying a Cell Block

When you select any of the **B**lock commands, Quattro asks you to specify a cell block to be affected. It presents a default block, which is either the current cell or the last block the command was used with. You can press *Enter* to operate on the default block, or specify another block using one of the following methods:

- Enter the addresses of two cells in opposite corners (usually the top left and bottom right cells), separated by two periods, for example, A3..C10.
- Enter the name of a cell block you previously named with the **B**lock **A**dvanced **C**reate command, or press *F3* (NAMES) and select a block name from the displayed list. Naming blocks is discussed in "Using Named Blocks" on page 94.
- Use the direction keys to point out the block, highlighting it on the screen.

When you point out a cell block in response to a block command, Quattro assumes that the current cell is a corner cell of the block you want to specify. It uses this cell as an *anchor*, and when you move the selector around the spreadsheet, the block is extended from the anchor. All cells between the anchor cell and the current cell are highlighted. Move the selector to the opposite corner of the block you want to indicate and press *Enter*. The coordinates of the block are entered in response to the command prompt.

If you want to use a different cell as the anchor, press *Esc* or *Backspace* to unanchor the current cell. Then move the selector to the cell you want to use as the anchor and press the period key (.).

To type in a different block instead of pointing, just begin typing. The default block is immediately erased. If you then decide to return to pointing, press *Esc* twice. You're then in Point mode again.

For more specifics on pointing, refer to "Pointing Out Cells" in Chapter 3 (see page 57).

Copying a Block

The Copy command duplicates the contents of one or more cells. You can use it to

- Copy one cell to many cells.
- Copy one block to another block.
- Copy one column to many columns.
- Copy one row to many rows.

To copy a block of cells:

1. Press */BC* to select Copy from the Block menu. Quattro prompts you for the block you want to copy (the *source block*). The default block is the current cell.
2. Press *Enter* to copy the contents of the current cell, or specify a different block. Quattro now prompts you for a destination.
3. Specify the upper left corner cell of the block you want to copy the data to. Or, if you're making multiple copies of the source block, specify a block of cells.

Quattro copies the data contained in the source block to the destination block. Any cell-formatting information is copied as well, for example, alignment, display format, or cell protection. The contents of the source block are unaffected.

To copy a block of data *and* transpose the columns and rows of the block, use the Block Advanced Transpose command (see page 92).

Copying in Reverse

To copy a block of data from another part of the spreadsheet to the current area:

1. Press */BC* to select Copy from the Block menu.
2. Press *Esc* to delete the address of the current cell from the input line.
3. Move the selector to point out the block you want to copy.
4. Press *Enter*. The selector returns to its original position on the input line, and Quattro prompts you for the destination block.
5. Press *Enter*.

The block is copied to your original position in the spreadsheet.

Copying Formulas

If you copy a cell block containing both a formula and any cells referenced by that formula, the formula is automatically updated to reference the new cell positions. This is very helpful when duplicating parts of a spreadsheet, or when you want to copy a formula to, say, add the figures in each column. But things aren't so simple when you want the references outside the copy block to remain the same.

Normally, cell references in a formula are considered to be *relative*. This means that Quattro keeps track of each cell reference by remembering its position in relation to the formula cell, *not* by its address. The difference between relative and absolute cell addresses is much like the difference between these two directions to a house:

- "Go to the next corner, turn left, go two more blocks, turn right, and stop at the second house on the left."
- "Go to the blue house on the corner of Clinton and Darwin: 319 Clinton St."

The first set of directions is valid only from the point at which you received it; try using it from a different direction and you'll probably get lost. The second set of directions, though not as explicit, will always take you to the same house.

For example, if the formula *B3+C2 were entered in cell B2, Quattro would interpret it (during copying) as "Add the value in the cell directly below this one to the value in the cell to the right." If you copied all three cells as a block to another part of the spreadsheet, the formula would still be valid

and would not need adjusting. But if you copied the formula alone to cell H6, the formula would be changed to H7+I6 and would evaluate to zero, which would probably not be what you had intended (see Figure 4.2).

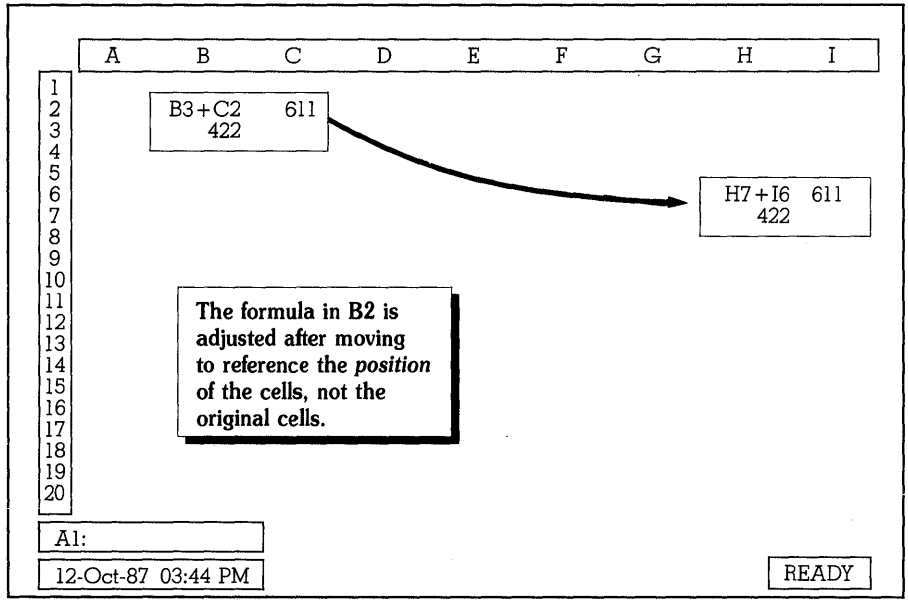


Figure 4.2: Copying a Formula and its Cell References

You can avoid this problem by specifying the cells in a formula as *absolute* before copying the formula. An absolute cell reference always refers to the original cell address, regardless of where the formula is copied to.

You can specify all or part of a cell address as absolute. Simply insert a dollar sign ($) before the coordinate you want to remain fixed. For example,

- $B$6 makes both coordinates of address B6 absolute.
- $B6 locks the address into column B, but lets the row coordinate be relative.
- B$6 locks the address into row 6, but allows the column coordinate to be relative.

The ABS key (*F4*) makes inserting dollar signs in an address very easy. After entering an address in a formula, press *F4* once to make the whole address absolute. Press it again to make only the row absolute, again to make only the column absolute, and a fourth time to make it relative again. Table 4.1 shows the effects of the ABS key.

Table 4.1: Using the ABS Key (F4)

Number of Times Pressed	Example Result
1	$B$6
2	B$6
3	$B6
4	B6

The ABS key can also be used in POINT mode without disturbing the position of the cell selector.

Cell blocks are also relative, whether they are named or not. You can specify a named block as absolute by preceding its name with a dollar sign. You cannot, however, make a block name partially absolute. To specify a named block as partially absolute, you would have to refer to the block by address.

To copy only the *value* of a formula without copying the formula or to replace a formula with its calculated value, use the **B**lock **A**dvanced **V**alues command (see page 91).

Making Multiple Copies of Cells

You can make multiple copies of cells in a single column or row using a single Copy operation. Simply extend the destination block to include more than one row or column.

For example, to enter a line of hyphens (----------) across a row, you could fill the first cell in the row with hyphens (enter \-), then use the **C**opy command to enter hyphens in the rest of the cells in the row. Simply specify the block of cells you want to copy to as the destination block.

This is an easy way to enter many similar formulas in one sweep. For example, to produce a total at the end of each column of the spreadsheet shown in Figure 4.3, you could enter

B17

as the source cell, and

C17..E17

as the destination cells. Because the formula in B17 contains *relative* cell references, they are adjusted to reference similar cells in each column.

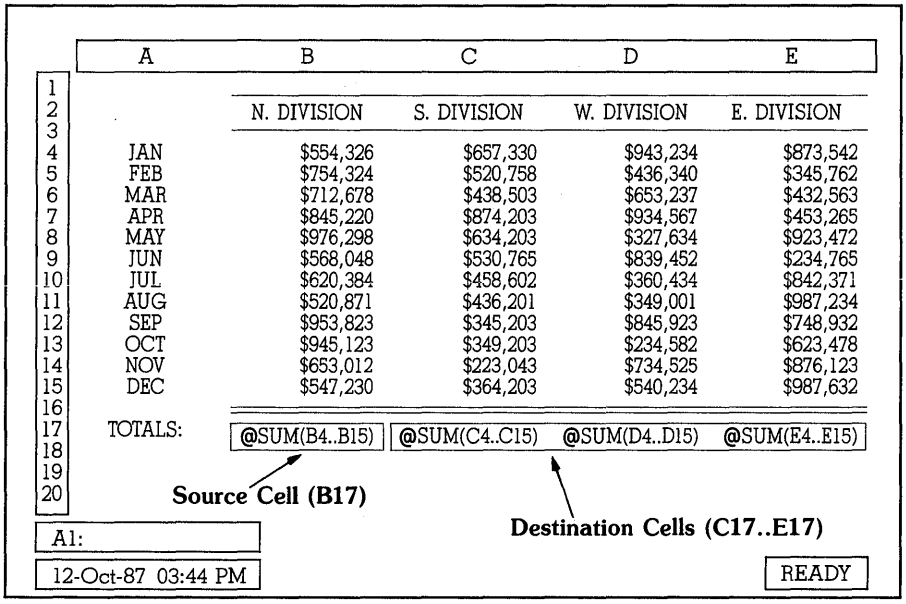


Figure 4.3: Copying a Formula into Several Cells

Similarly, you can make multiple copies of several cells in a single row or column. For example, to copy the column headings in row 1 into rows 3, 4, and 5, you would enter

B2..E2

as the source block, and

A3..E5 or A3..A5

as the destination block (specifying the first column of the block is sufficient). The headings are then copied three times as shown in Figure 4.4.

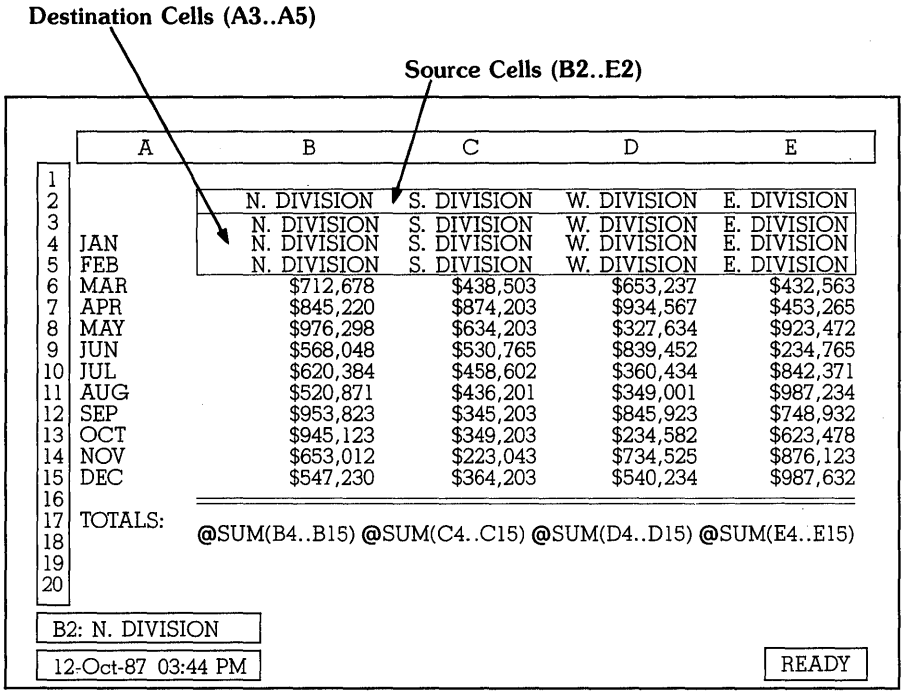


Figure 4.4: Making Multiple Copies of Headings

Moving a Block

The Move command moves the contents of a block of cells to another part of the spreadsheet. Any existing data in the new location is overwritten.

To move a block of cells:

1. Press */BM* to select Move from the Block menu. Quattro prompts you for the block of cells you want to move. The current cell is shown as the default.
2. Press *Enter* to move the contents of the current cell, or specify a new block of cells. Quattro now prompts you for a destination.
3. Specify the upper left corner cell of the block you want to move the data to.

Quattro moves the data in the source block to the cells in the destination block and automatically adjusts any affected formulas in the spreadsheet. Any cell-formatting information, such as alignment or display format, is moved with the data and removed from the cells in the source block.

Caution: If you move data into a cell that is referenced by a formula, the reference in the formula is replaced by an ERR value and the formula results are displayed as ERR in the cell. Any formulas referencing the ERR cell also become ERR. ERR values indicate an error and can't be used in calculations. This protects you from accidentally writing over a cell referenced by a formula. This and other side effects of moving data are explained in detail in the next three subsections. If you're new to working with electronic spreadsheets, you may want to save your spreadsheet before moving data. Then, if necessary, you can retrieve the file as it was before the move.

Effects on Formulas

If you move a cell that contains a formula, its cell references remain intact, regardless of whether they are absolute or relative. Only when you copy a formula are the cell references adjusted. (Absolute and relative addresses are discussed on page 67.)

If you move a cell that is individually referenced by a formula, the formula is automatically updated to reference the new location, even if you've specified the reference as absolute. For example, if you move the contents of cell B4 to B6, any formula referencing B4 will automatically be revised to reference B6.

If you move a cell *contained within* a block that is referenced by a formula, the formula still references the same block. However, if you move any of the block's corner cells, the block is extended or contracted to reflect the new location. For example, if A2 contains the formula `@sum(B4..F12)` and you moved the data in B6, the formula in A2 would remain the same. If you moved the data in cell F12 to G14, however, the formula would change to `@sum(B4..D14)`. (See Figure 4.5.)

If you move data into a single cell that is individually referenced by a formula (either as a single cell or as one of the block's coordinates), the formula cell reads ERR, and ERR appears in the formula where the cell was referenced.

Note: Because this last side effect doesn't occur when you *copy* data, it's sometimes safer to use the Copy command to copy data into cells referenced by a formula, then erase the originals. However, any references to the cells being copied will not be adjusted to reference the new location.

Effects on Blocks

When you move data in the spreadsheet, *established blocks* (that have been named or referenced within a formula) can be affected. If you move an established block to a new location, the block name or reference is automatically updated to reflect the new location. If you move only part of an established block, however, complications can arise.

The critical cells of any block are the *coordinate* cells (the upper left and lower right cells). If either one of these cells is moved, the block is extended (or contracted) to use the address of the new location as a coordinate. For example, if the block PRINT2 is defined as B4..F12, and cell F12 is moved to D14, the new block for PRINT2 is changed to B4..D14. Figure 4.5 illustrates this.

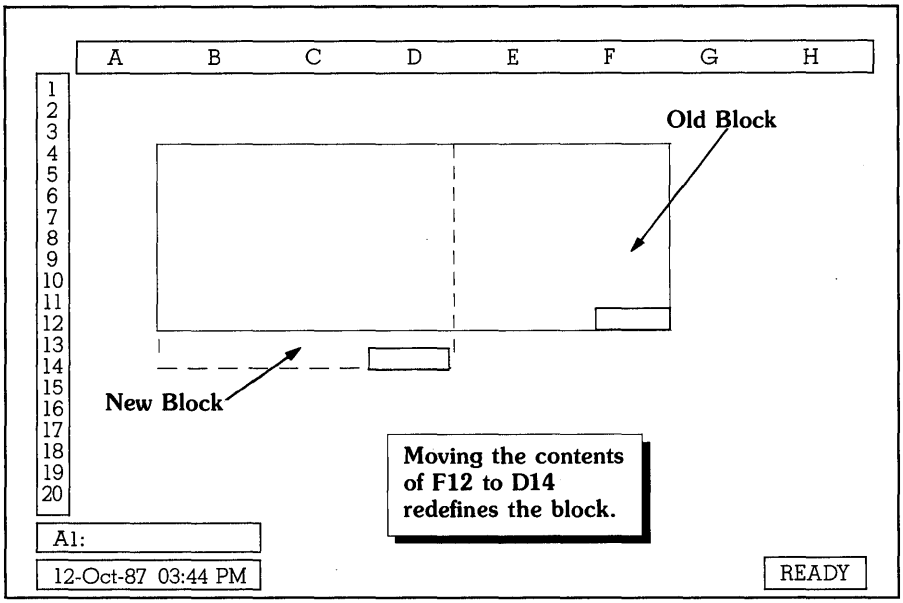


Figure 4.5: Moving the Coordinate of an Established Block

Moving any of the non-coordinate cells of a block to anywhere except the coordinate cells doesn't affect the block's definition or any references to it.

If you move data into one of the coordinate cells of an established block, the references to the block display ERR (see the next section, "Effects on Cell References").

Effects on Cell References

If you move data into a cell that has been explicitly referenced by a formula or block name, the reference is rendered invalid. This includes both references to single cells and to coordinates used to define a block. All references to the block in formulas are replaced with ERR, and therefore the cell displays ERR. If the block was named, the block coordinates listed for it in the block names list are shown as ERR.

For example, in Figure 4.6, cells C5..D8 are referenced by the formula in cell F5. When the contents of A3 are moved to C5, the formula in B5 becomes @SUM(ERR) and displays ERR in the cell. The block names list would also show INPUT as ERR. If data were moved into cell C8 or D5, there would be no problem, because although they are corner blocks, they are not used as *coordinates* to define the block (C5 and D8 are the coordinates).

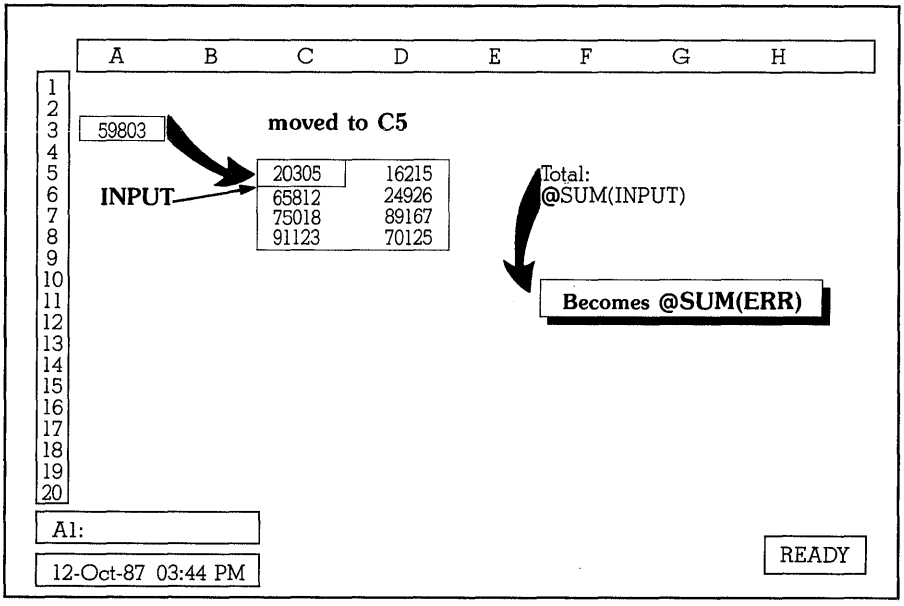


Figure 4.6: Moving Data to a Block Coordinate

This feature ensures that formulas do not display the wrong values if you accidentally move data into their reference cells. The ERR values are easy to spot and can be immediately corrected.

You cannot salvage the formulas by moving the data back to where it was. You must edit any formulas containing ERR individually. Or, if you recently saved your work, you can retrieve the current file again to return

the spreadsheet to its previous condition. (However, any other changes you made since last saving the spreadsheet will be lost.) If you have Transcript loaded, you can run it to undo the changes (see page 393).

If you need to move data into a cell that is referenced by a formula or named, use the **Block Copy** command, then erase the original data. Cell or block references will not be turned into ERR by the **Copy** command.

Erasing a Block

To erase the data within a single cell, simply move the cell selector to it and press *Del*. To erase the contents of a *block* of cells, use the **Block Erase** command:

1. Press */BE* to select **Erase** from the Block menu. Quattro prompts you for the cell range of the block you want to erase. The current cell is shown as the default.
2. Specify the block you want to erase.
3. Press *Enter*.

The contents of the specified block are deleted. However, the display format and label alignment specifications remain with the blank cell.

Caution: Once you erase data, you cannot bring it back, unless you retrieve the file from disk again. However, if you do this, you will lose any changes you made to the file since last saving it. If you have Transcript loaded, you can use it to bring back the spreadsheet (see page 393).

If **Default Protection** is set to **Enable** (*/DPE*), you won't be able to erase any block unless all its cells have been explicitly unprotected with the **Block Advanced Unprotect** command (see page 145).

To delete entire rows or columns of the spreadsheet, use the **Row Delete** and **Column Delete** commands (see pages 106 and 100).

To delete the entire spreadsheet, select **Erase** from the main menu. To delete a spreadsheet file, use the **File Erase** command (see page 167).

Changing Display Format for a Block

Numbers are entered and stored in a Quattro database as a series of numerals, for example, 295842.42949 and –0.45611. They can have up to 15

significant digits (including both integers and decimal places), and do not include commas, dollar signs, or percent signs.

When you enter a number in a cell, it is automatically formatted according to the default display format setting. Initially, this setting is **G**eneral, which displays numbers more or less like you enter them. You can change this to any of 10 other display formats.

Quattro displays commas, dollar signs, percent signs, or other characters according to the display format you choose. It also lets you change the way dates and time are displayed.

Display format does not affect the way numbers are stored in Quattro, only the way they are displayed. For example, many formats limit the number of decimal places displayed. This does not diminish the accuracy of Quattro calculations, however, which still rely on the original number (up to 15 significant digits). This original number is also what is displayed on the input line or descriptor line when a cell is selected.

When you enter a number into the spreadsheet, it is displayed in the format specified with the Default Formats Display menu (initially "**G**eneral"). (See page 136). You can overwrite this default by assigning a different format to a block of cells.

To change the format of numbers or dates in a block:

1. Press */BD* to select **D**isplay Format from the Block menu. The Display Format menu is displayed (see Figure 4.7).
2. Select the format in which you want numbers or dates in this block displayed.

    a. If the format you choose allows a variable number of decimal places, Quattro prompts you for the number of decimal places you want displayed. Press *Enter* to use the default precision setting (2), or enter another number (0-15). Remember that whatever you specify, Quattro will still use up to 15 significant digits in calculations.

    b. If you select the **D**ate or **T**ime format, you must select a specific **D**ate or **T**ime format from the displayed menu.

3. When you've specified all the format details, Quattro prompts you for the block to be modified. Press *Enter* to change the format of the current cell only, or specify a different block.

Quattro immediately adjusts the display of numbers or dates within the specified block. Label entries in the block are affected only if you specified

Hidden format. Any numbers you now enter in the block will appear in the chosen format.

If the format you choose makes a number too long to be displayed in the current column, a string of asterisks appears in the cell. You can redisplay the number by widening the column (see page 103).

When you select a cell that has been formatted with the **B**lock **D**isplay Format command, the format is indicated in parentheses on the descriptor line. The first letter of the format name appears next to the number of decimal places specified. For example, (C2) indicates the **C**urrency format with two decimal places.

Caution: Although it is tempting to pre-format large areas of the spreadsheet in the format you intend to use, doing so consumes quite a bit of memory space. It is much more efficient to format only the cells you are currently using. Or better yet, change the default display format to the format you use the most (see page 136).

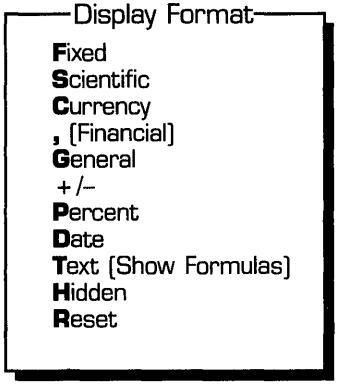


Figure 4.7: The Display Format Menu

Table 4.2 describes each of the format choices listed on the Display Format menu.

Table 4.2: Examples of Display Formats

Format	Description	Examples
Fixed	Displays no more than the specified number of decimal places. Leading zeroes appear.	46 0.56 -34.00
Scientific	Uses scientific notation. Allows only one digit in the integer portion of the number.	2.35E+2 476E+9
Currency	Displays numbers as currency, in the format specified with the **Default International** command (see page 132).	$3,467.00 £35 ($56.24)
Comma (Financial)	Separates thousands with commas, and shows negative numbers in parentheses.	15,120.25 (2,456)
General	Displays numbers basically as entered (deleting trailing or leading zeroes). If too long to fit current cell, they are rounded (if fractional) or translated into scientific notation. Trailing zeroes are suppressed; leading zeroes are displayed.	456.9452 -365 0.41 1955E+6 (4.3000) (0.124)
+/-	Transforms values into a bar graph, with + for each positive integer, - for each negative integer, and . for zero.	——— +++++
Percent	Displays numbers as percentages.	13.40% -56.44%
Date	Displays numbers as dates or time in the format you choose: DD-MMM-YY DD-MMM MMM-YY Long Intn'l (see page 47)	 09-Apr-87 09-Apr Apr-87 04/09/87 87-09-94 04.09.87

Table 4.2: Examples of Display Formats, Continued

Format	Description	Examples
	Short Intn'l (see page 47)	04/09 04.09 09-04
	HH:MM:SS AM/PM HH:MM AM/PM Long Intn'l (see page 134)	11:31:28PM 05:15AM 15:23:55 15.23.55 15,23,55 15h23m55s
	Short Intn'l (see page 134)	14:56 14.56 14,56 14h56m
Text (Show Formulas)	Displays formulas instead of their results. Numbers entered in the block are displayed in **G**eneral format.	B6*C3 @SUM(B1..B10)
Hidden	Suppresses display of both value and label entries. Entries will still appear on descriptor line when the cell is selected.	
Reset	Returns the display format for this block to the default format (specified with the **D**efault **F**ormat **D**isplay command). Redisplays entries hidden with the **H**idden format.	

To display a value as a time, you must first select **D**ate, then **T**ime, then the time format you want.

Dates can be entered directly in date format when preceded by the date prefix *(Ctrl-D)*. If you enter dates using the @DATE, @DATEVALUE, or @NOW function (described in the *Quattro Reference Guide*), you must reformat the cell(s) to a **D**ate format. Otherwise, the results will be displayed as a date serial number.

If you've hidden the contents of cells with the **H**idden format, you may want to use the protection commands to prevent the cells' entries from being accidentally overwritten (see page 93).

Numbers are rounded off to the specified decimal place in the case of **F**ixed, **S**cientific, **C**urrency, **C**omma, **P**ercent, and **+/-** formats. **G**eneral format rounds off fractional numbers as necessary to fit in the cell. The original numbers (as entered) are still displayed on the descriptor line when selected, and it is these numbers that Quattro uses in all calculations.

The format you assign to a cell stays with the cell, even if you delete its contents. If you move the contents, however, the format moves with the data and is removed from the original cell. If you copy a formatted cell, the copy takes on the format of the original cell.

To return to the Block menu without changing the format of a block, select **Q**uit.

To change the display format setting for the entire spreadsheet, use the **D**efault **F**ormats **D**isplay command (see page 136).

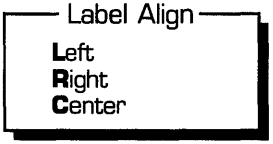
Aligning Labels in a Block

When you enter a label in a cell, it is automatically aligned according to the default alignment setting. Initially, this setting is **L**eft, but you can change it to **R**ight or **C**entered with the **A**lign command on the Default Formats menu (see "Default Label Alignment" on page 138).

To align a label differently than the default, you can precede it with a label-prefix character when you enter it. A label prefix tells Quattro how to align a particular label (' for left, " for right, ^ for centered). The prefix does not appear on the spreadsheet, but is displayed on the descriptor line when a cell is selected. Label prefixes are described in Chapter 3 (see "Label Alignment" on page 42).

To change the alignment of labels you've already entered, use the **B**lock **L**abel Align command:

1. Press */BL* to select **L**abel Align from the Block menu. The Label Align menu appears, listing three options:



2. Select the alignment you want. Quattro prompts you for the block to align. The current cell is shown as the default block.
3. Press *Enter* to align only the current cell, or specify a different cell block.

Quattro immediately aligns all labels in the specified block as you instructed. Numeric values (including formulas resulting in string values) remain right-justified. You cannot change the alignment of value entries.

When you change the alignment of a block, only those labels already existing in the block are affected. If you then enter new labels in the block, they will be aligned according to the default alignment setting.

To alter the alignment of a single label, it may be easier to enter Edit mode and change the label-prefix character at the beginning of label. For example, changing the label

```
'JANUARY
```

to

```
^JANUARY
```

centers the label instead of aligning it left.

Filling a Block with Sequential Values

With the **B**lock **F**ill command (*/BF*), you can automatically fill a cell block with a sequence of values. You can use this command to automatically enter invoice numbers, account numbers, purchase order numbers, and even dates.

When you select **F**ill from the Block menu, Quattro prompts you sequentially for four things:

- a cell block to fill with numbers
- a start value
- a step (interval) value
- a stop value

All three values requested can be supplied with formulas as well as numbers.

Quattro fills the block with values until either the stop value is reached or the cell block is full. For example, if you specify A1..A10 as the fill block, 2 as the start value, 2 as the step, and 30 as the stop value, Quattro will stop with number 20, since that is the end of the block (see Figure 4.8).

Figure 4.8 shows a two-column block (D7..E11) filled with the same sequence of values. When you specify more than one column as the fill block, Quattro begins in the upper left corner and writes numbers down the column, then moves to the top of the next column.

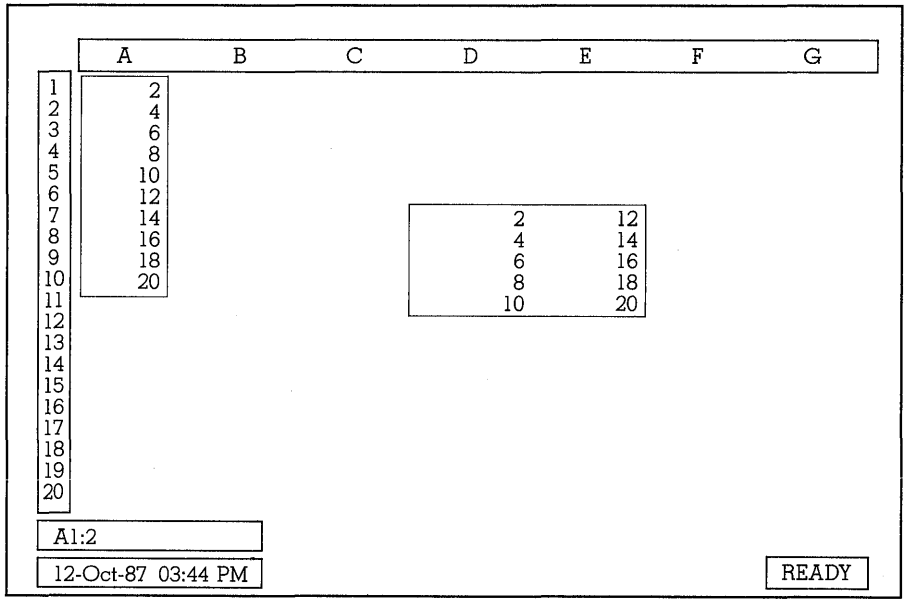


Figure 4.8: Two Blocks Filled with Values

To fill a block with sequential values:

1. Press */BF* to select **F**ill from the Block menu. Quattro prompts you for a block.
2. Indicate the block you want to fill with values. Quattro prompts you for a start value and offers a default value of 0.
3. Press *Enter* to start the sequence with 0, or enter another value. Quattro prompts you for a step value and offers a default value of 1.
4. Press *Enter* to display every value in the sequence, or enter another number. A step value of 2 displays every other value; 3 displays every third value, and so on. Quattro prompts you for a stop value and offers a default value of 8192.
5. Press *Enter* to display all values in the series up to 8192 or until the cell block is filled, or enter another number.

Quattro enters the values in the cells specified as the fill block. If there are more cells than values, the entire block isn't filled. If there are more values than cells, not all the values are entered.

You can generate values in either descending or ascending order. To indicate descending order, enter the high number as the start value, the low number as the stop value, and a negative number as the step value. For example, the values

Start = 20
Step = –2
Stop = 10

create the following series of numbers:

20, 18, 16, 14, 12, 10

To generate dates with the **Fill** command, use any of the date @functions (*Ctrl-D* doesn't work with **Fill**). For example, to fill a block with a sequence of 100 weekly dates beginning with today's date, specify @NOW as the start value, 7 as the step value, and @NOW+700 as the stop value. Quattro fills the block with dates shown as date serial numbers. To display the values as dates, change the block's display format to **D**ate (*/BDD*). Be sure to increase the stop value significantly, since date serial numbers are usually greater than 8192 (the stop value default). (See "Dates" on page 47 for more information on working with dates.)

Searching for and Replacing Data in a Block

Quattro's **S**earch/Replace command lets you alter numerous cell entries instantaneously. It automatically searches through a block for the value or string you specify, then replaces each instance it encounters with the new value.

You can also use **S**earch/Replace to quickly search for all instances of a value or text, without replacing them.

You can use **S**earch/Replace on numbers and formulas as well as labels. A typical application is to change all reference to a cell or block to a defined block name.

When you select **S**earch/Replace from the Block menu, the Search/Replace menu is displayed (Figure 4.9).

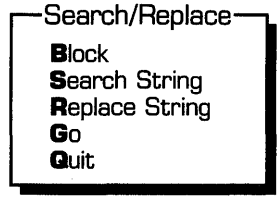


Figure 4.9: The Search/Replace Menu

Block specifies the cell block to search through for the given value.

Search String specifies the string or value to search for, for example, $A$1.

Replace String specifies the string or value to insert in place of each found value or string, for example, INFLATION.

Go begins the search and replace operation.

Quit exits the Search and Replace menu and returns to the Block menu.

To replace one value with another:

1. Press */BS* to select Search/Replace from the Block menu. The Search/Replace menu appears.
2. Press *B* to select **B**lock, then indicate the block you want to search through.
3. Press *S* to select **S**earch String, then enter the text or value you want to search for and change.
4. Press *R* to select **R**eplace String, and enter the text or value you want to replace found values with.
5. Press *G* to select **G**o and begin the operation.

Quattro searches through each cell in the given block for the value given with the **S**earch String command. Each time it finds the search value or text, it displays it in a box with the Replace This String menu (Figure 4.10). The search box shows the Search String, the cell in which the match was found, and the character at which the found string begins.

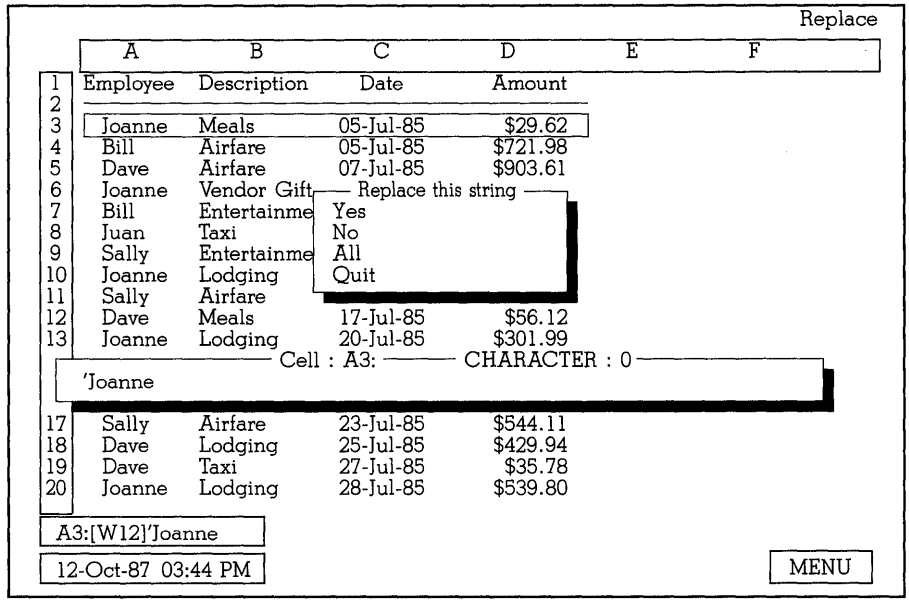


Figure 4.10: The Search/Replace Screen

Select **Yes** to replace the string, **No** to leave the string as is, or **All** to automatically replace all found strings with the replace string. Select **Quit** to exit the search procedure.

If you select **Yes** or **No**, Quattro continues the search, stopping at each instance it finds. When it is done, the spreadsheet returns to Ready mode.

Reformatting Text Entries in a Block

As mentioned before, your spreadsheet can store all kinds of information, including text. The **Block Reformat** command simplifies text entry by emulating the most important features of a word-processing program: adjustable "margins" and paragraph reformatting. With it, you can enter text as a long label or a series of labels, then reorganize the text as a paragraph, taking up as many cells or columns as you specify.

For example, Figure 4.11 shows a textual paragraph entered as three long labels in cells A1 through A3. Although the text is displayed across eight columns, it is actually entered only in column A. Because the cells to the right are empty, the text spills over into them for display only.

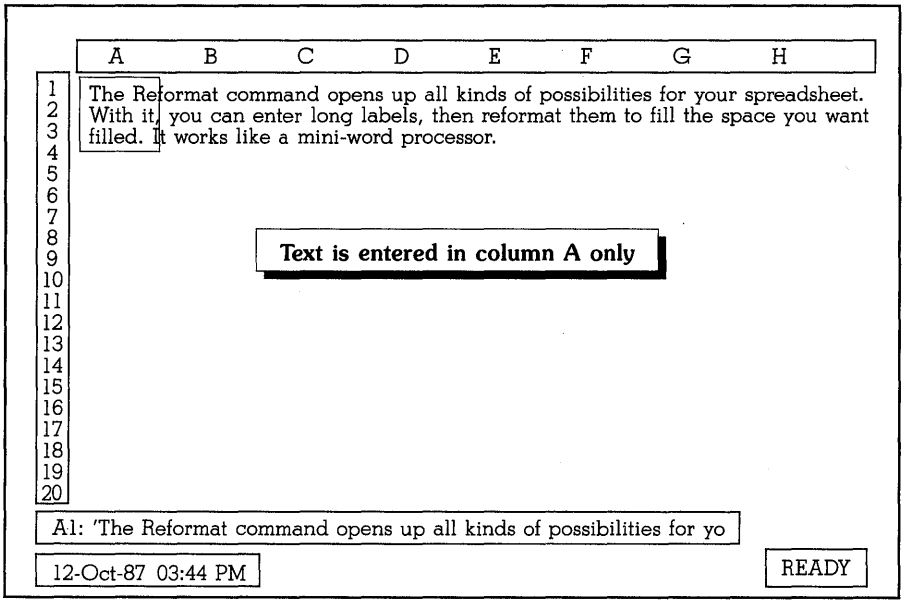


Figure 4.11: Text Entered as Long Labels

Figure 4.12 shows the same text reformatted to fit into three columns: A through C. Because the "margins" are narrower, the display takes up more rows (now 1 through 9). Note that the text is still "contained" only in Column A, even though it spills over into B and C.

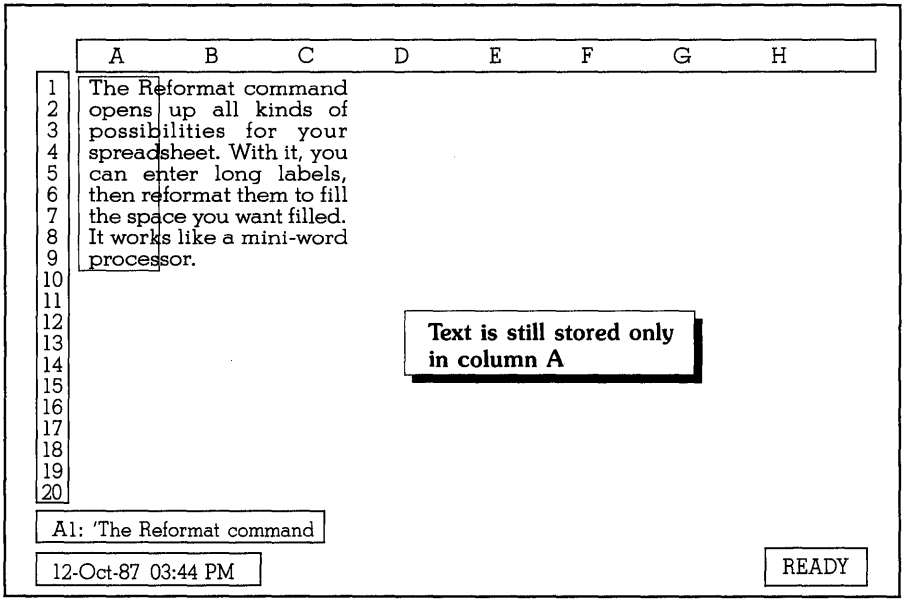


Figure 4.12: The Same Text Justified within Three Columns

To reformat text in a block of cells:

1. Enter the text you want to reformat in one or more cells of the same column. You can include up to 240 characters in a single cell. The cells containing the text to be justified must be adjacent with no blank cells in between and must begin in the same column.
2. If any of the cells you intend to reformat are protected, turn off default protection temporarily (press */DPD*). You cannot reformat a protected cell. (Protection is discussed on pages 93 and 144.)
3. Move the cell selector to the cell containing the first label to be reformatted.
4. Press */BR* to select **R**eformat from the Block menu. Quattro prompts you for a block of cells.
5. Specify the columns and/or rows you want the reformatted text to be displayed in. If you specify columns within the current row only, the text will fill up as many rows as necessary to display the text within those columns. If you specify both columns and rows, the text will be reformatted only if it can fit within the block you specify.
6. If you turned off protection before reformatting, turn it back on again (press */DPE*).

The text is reformatted to fit the space you indicated. Sentences are broken as necessary. If a word is longer than the column width, it is truncated or run into the cell to the right (if it's empty).

Caution: If you specify the reformat block by indicating the first row only, be sure there are enough blank rows underneath for the reformatted text. If Quattro runs into existing text while reformatting labels, it pushes data in the first column down to make room. But data in other columns remains in place, preventing "spillover" display of the reformatted text. Figures 4.13 and 4.14 show a spreadsheet before and after the labels in cells A1..A3 are reformatted to block A1..C1.

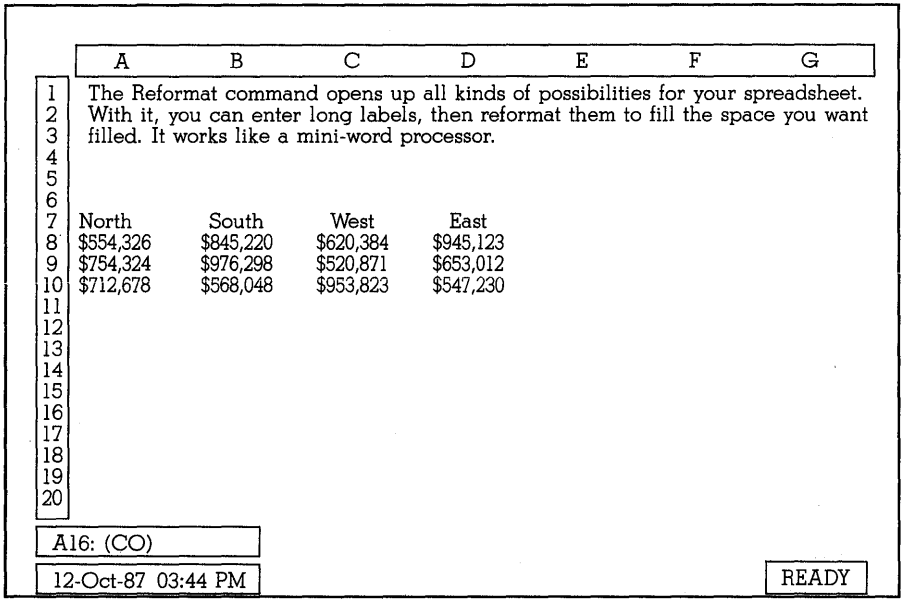


Figure 4.13: Data Before Reformatting

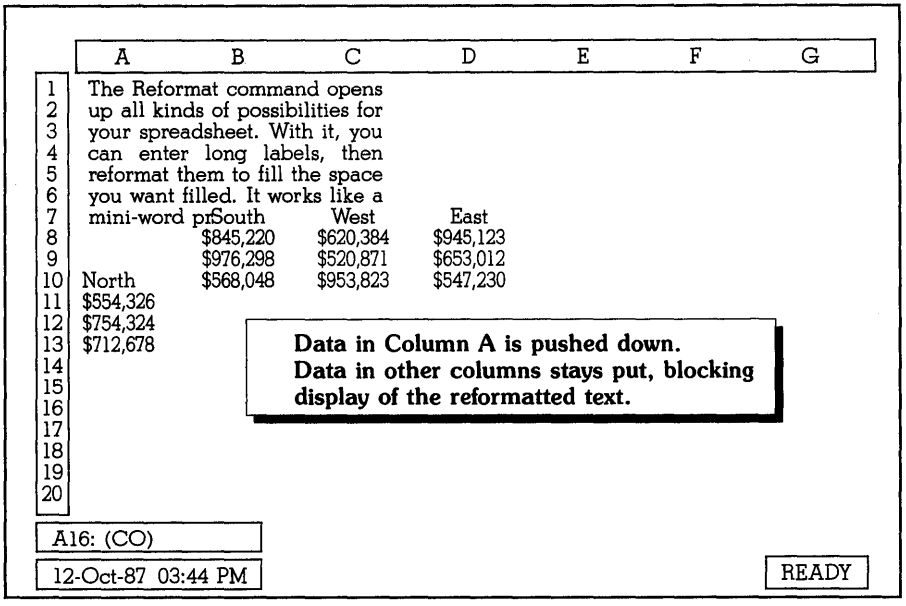


Figure 4.14: Data After Reformatting

You can avoid this type of problem by specifying a reformat *block* rather than row (see step 5 on page 87).

Remember, even though the reformatted text may be displayed in several columns or rows, the data is actually *stored* in the leftmost cells of each row. To edit the text, you need to go to these cells and press the EDIT key (*F2*).

Caution: If any of the cells in your reformat block are protected, the **R**eformat command will cause an error. Before you reformat a block that may contain protected cells, turn off spreadsheet protection with the **D**efault **P**rotection command (\DPD).

Once you've reformatted a label, you cannot actually *undo* the command. You can reformat the text again, though, so that it fills the same space as it did before (although some of the line breaks may change).

The **R**eformat command works only on existing text. You cannot reformat an empty block, then enter the data.

The **R**eformat command makes it easy to include instructions, memos, and descriptive text in your spreadsheet. However, it is not a word processor. To manipulate large areas of text, you might want to use an actual word-processing program. You can save text from the spreadsheet in a text file by

printing it to a disk file, then use the file with a word-processing program (see "Printing to a Disk File" on page 195). You can also load files created with other programs into the spreadsheet with the File Import command (see "Importing a File" on page 176).

To break down long labels into two or more cells, use the File Parse command (see page 180).

Advanced Block Commands

Additional block commands are available on the Block Advanced menu (Figure 4.15). To display this menu, select Advanced from the Block menu (*/BA*).

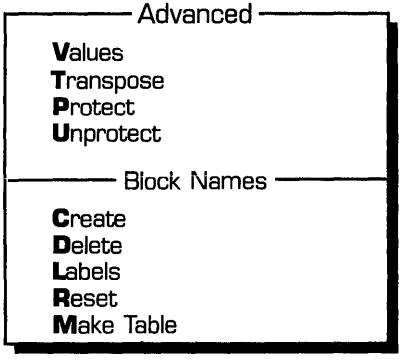


Figure 4.15: The Block Advanced Menu

Values copies a block of data, converting formulas in the block to their results and erasing the formulas themselves.

Transpose switches the position of columns and rows, so that information displayed in columns appears in rows, and vice versa.

Protect lets you disable overall spreadsheet protection (set with the Default Protection command) for individual blocks of cells.

Unprotect removes write-protection from a cell block.

Create lets you assign a name to a cell block, or modify an existing named block.

Delete erases a specific block name.

Labels tells Quattro to assign names to individual cells using adjacent labels.

Reset erases all block names in the spreadsheet.

Make Table creates a table in part of your spreadsheet that lists all named blocks by name and location. Each of these commands is described in the following subsections.

Converting Formulas to Their Values

Formulas require much more memory than simple values. If you've used many formulas to build an area of your spreadsheet and no longer need the formulas themselves, you can save memory space by converting the formulas to their end results.

The **B**lock **A**dvanced **V**alues command lets you copy the *values* calculated by formulas without copying the formulas. You can copy them to another part of the spreadsheet or copy them over the formulas that computed them, removing the formulas themselves from the spreadsheet.

To copy formula values:

1. Press */BAV* to select **V**alues from the Block Advanced menu. Quattro prompts you for the source block of cells. The current cell is shown as the default block.
2. Indicate the block of cells you want to copy. Quattro prompts you for the destination block. Again, the current cell is the default.
3. To replace the formulas in the specified block with their values, specify the same block as the source block. To copy the values of the formulas in the source block to another part of the spreadsheet, specify the top left corner cell of the block you want them copied to. (The formulas in the source block will remain intact.)

Quattro immediately copies the formula values to the destination block. If the source and destination blocks are the same, all formulas in the block are permanently replaced.

Caution: If you copy formula values to a block that already contains entries, the values will replace the existing entries, and any calculations relying on those cells will use the new values.

To copy formulas *and* their values to another part of the spreadsheet, use the **B**lock **C**opy command (see page 66).

To convert a single formula to its resulting value, simply select the cell containing it, press the EDIT key (*F2*), then the CALC key (*F9*), then *Enter*. The result of the formula becomes the new entry in the cell.

To copy the values of all or part of a spreadsheet into a separate file, use the Values option with the **F**ile **X**tract command (see page 168).

Transposing Columns and Rows

A typical spreadsheet contains column headings, row headings, or both, with related data underneath or to the right. Whichever way you choose to set up your spreadsheet, you can reverse the placement of data in columns and rows with the **B**lock **A**dvanced **T**ranspose command.

Figure 4.16 shows a spreadsheet with the same data arranged two ways: one with column headings and the other with row headings. Using the **T**ranspose command on either block results in the other arrangement.

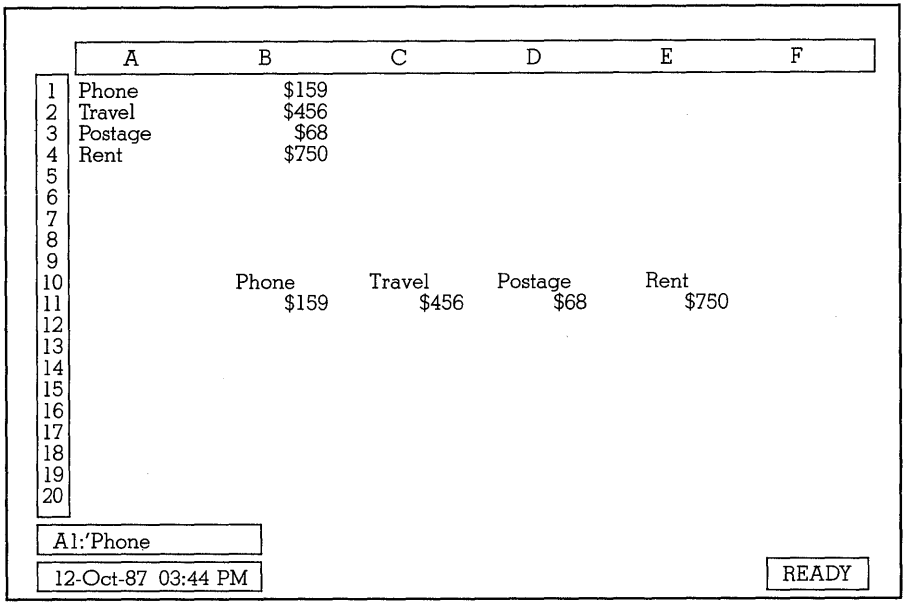


Figure 4.16: The Results of Transposing Data

The **T**ranspose command copies part of a spreadsheet to another area *and* transposes the columns and rows. You cannot replace an entire cell block with transposed data; you must copy it (with the **T**ranspose command) to a different part of the spreadsheet first.

Caution: You cannot successfully transpose formulas that contain relative cell references. If you do, the formulas will become inaccurate. You can make the references absolute before transposing the data, but the formulas

will continue to reference the original cells, not the transposed copies. The best way to rearrange columns and rows that contain formulas is to use the **B**lock **M**ove command (see page 71).

To copy and transpose data:

1. Press */BAT* to select **T**ranspose from the Block Advanced menu. Quattro prompts you for the source block of cells.
2. Specify the block you want to transpose. Quattro prompts you for the destination cell.
3. Indicate the upper left cell of the block you want to copy the transposed data to. This must not be a cell within the source block.

Quattro copies the data to the specified area, rearranging the columns and rows. The original data remains the same.

Caution: If data exists in the block you specify in the destination block, it will be overwritten by the new data. Remember that the transposed data may be a different shape than the original, so you might want to copy it to an area far from other data, then move it again if necessary.

Protecting and Unprotecting Cell Blocks

The **D**efault **P**rotection setting (discussed on page 144) lets you enable or disable spreadsheet protection. When spreadsheet protection is enabled, no changes can be made to the spreadsheet. You can, however, remove protection from individual blocks of cells with the **B**lock **A**dvanced **U**nprotect command.

To remove protection from a block of cells:

1. Press */BAU* to select **U**nprotect from the Block Advanced menu. Quattro prompts you for a cell block.
2. Press *Enter* to remove protection from the current cell only, or enter a different block.

Cells that have been explicitly unprotected with the **B**lock **A**dvanced **U**nprotect command display *U* on the descriptor line when selected (if **D**efault **P**rotection is enabled).

When a cell is protected, you cannot edit, replace, or delete its entry. Nor can you delete a column or row that contains a protected cell. You *can*, however, erase the entire spreadsheet, even if it contains protected cells.

To return protection to a block of cells:

1. Press */BAP* to select **P**rotect from the Block Advanced menu. Quattro prompts you for a cell block.
2. Press *Enter* to protect the current cell only, or specify a different block.

Cells that have been specifically protected display *PR* on the descriptor line when selected, if **D**efault **P**rotection is **E**nable.

When you disable spreadsheet protection with the **D**efault **P**rotection command, none of the spreadsheet cells are protected, even those you protected individually with the **B**lock **A**dvanced **P**rotect command.

When **D**efault **P**rotection is set to **E**nable, you will still be able to move the cell selector around the entire spreadsheet, but will be able to make changes only to the cells that have been unprotected. To restrict movement of the selector to unprotected cells only, use the **F**orm **I**nput command (see page 313).

Using Named Blocks

Quattro lets you assign names to particular blocks of your spreadsheet. You can then refer to those blocks by name instead of address. Although this is a completely optional feature, it has several advantages:

- Names are usually easier to remember than cell addresses.
- If you move the contents of a named block elsewhere in the spreadsheet, the name still refers to the same data, regardless of the new cell addresses.
- Referencing block names instead of cell addresses in a formula can make the formula much easier to read.
- Using block names increases accuracy. If you make a typing error in a block name reference, Quattro doesn't accept the name. If you make a typing error in a block address, you operate on the wrong block. This can be crucial in commands like **B**lock **E**rase.
- If you ever intend to reference a block within a macro, giving it a block name is highly recommended.

You can assign a name to any block in the spreadsheet, from a single cell to the entire spreadsheet. Once you've named a block, the name is stored in memory and is recalled each time you load that spreadsheet file.

To display a list of named blocks for the current spreadsheet, press the NAMES key (*F3*). You can use the *Up* and *Down* arrow keys to scroll through

the list. To enter a block name from the list into the input line, simply highlight it on the list and press *Enter*. To enter a block name into a formula on the input line in this way, the cursor must be to the right of an operator or open parenthesis. For example, in the formula

+C7*@SUM(B6..D19)

you can display a Block Names list if the cursor is on C, @, or B. You can also enter a block name by typing it.

Named blocks are created and deleted with commands on the Block Advanced menu. Other commands on this menu let you assign names to single-cell blocks using adjacent labels and create a table in your spreadsheet listing existing named blocks and their coordinates. Each of these options is discussed in the following subsections.

Caution: If you delete the contents of or move data into a named block's coordinate cell(s), the block will become invalid. Any formulas referencing the named block will display ERR.

Naming a Block

To assign a name to a block of cells:

1. Press */BAC* to select Create from the Block Advanced menu. Quattro prompts you for a block name and displays a scrollable list of existing block names for the spreadsheet.
2. Enter a block name that isn't included on the list. Quattro prompts you for the cell range of the block you're naming and shows the current cell as the default.
3. Press *Enter* to name the current cell or specify a new block.

To assign a new cell range to an existing block name, press */BAC* and select the name from the displayed list. Then specify the new block you want to use for the name.

To change the name of a block, delete the existing block name first, then assign the new name to the block.

Keep the following guidelines in mind when naming blocks:

- Block names can be up to 15 characters long.
- Use any keyboard characters (A-Z, 0-9, punctuation marks, and special characters, such as #,$,%).
- Avoid using operator characters (+, –, *, and /) and spaces, especially at the end of the name.

- Upper and lowercase letters are considered equivalent; in other words, *INPUT* is the same as *input*.

Block names can define overlapping areas. For example, the following group of block names is acceptable:

COMPANY	A1..C10
ADDRESS	A3..C4
TOTALS	A10..M10

There is no limit to the number of block names you can assign to a spreadsheet. If the number reaches into the thousands, however, you may eventually run out of RAM (system memory) in your computer.

Caution: Although it is possible to assign more than one name to the same block, this is not advised. Since changing the coordinates of a named block updates all references to that block (whether referenced by that name or not), you might find references updated that you didn't want changed. For example, if cell C9 has two names, BOB and TOM, and you reassign BOB to D1, TOM also changes to D1. To change the name of a block, you must delete it, then reassign the block the new name.

To assign a block a name using an adjacent label, use the **Labels** command on the same menu (see page 97).

Deleting a Block Name

You can delete a block name without affecting the spreadsheet block itself. Any formulas referencing the name will be converted to reference the block's coordinates; their results are unchanged.

For example, if a formula references a block named TOTAL (@SUM(TOTAL)) and you delete TOTAL from the list of block names, the formula will be adjusted to reference the cell coordinates of the block (@SUM(B1..B20)).

To delete a block name:

1. Press */BAD* to select **Delete** from the Block Advanced menu. Quattro prompts you for the block name to delete, and displays a list of existing names.
2. Select a block name from the list, or type it in.

Once you've deleted a block name, you cannot restore it. You can, however, reassign it to the same block.

To delete the data stored *within* a block, use the **B**lock **E**rase command (see page 75).

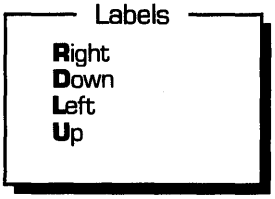
To delete *all* block names, use the **B**lock **A**dvanced **R**eset command (see page 99).

Using a Label to Identify a Block

With the **L**abels command, you can tell Quattro to use the label next to a cell for the cell's block name. It automatically gives a name to each cell in a given block using adjacent labels.

To assign names to cells using adjacent labels:

1. Press */BAL* to select **L**abels from the Block Advanced menu. The **L**abels menu appears:



2. Select the option that reflects the position of the cells you want to name in relation to the labels. For example, if the blocks you're naming are below the labels, select **D**own. Quattro then prompts you for the block of labels to use as names.
3. Specify the block containing the *labels*, not the blocks to be named.

Quattro uses each label in the specified block (up to 15 characters) as a name for an adjacent cell. Any numeric values in the block are ignored; only labels and string-value formulas can be used as block names.

Block names assigned with the **L**abels command remain in memory until deleted. They are not affected by subsequent changes to the labels themselves.

Figure 4.17 shows a group of values used to calculate the monthly payment on a loan. To assign the labels next to the values as block names, you would specify **R**ight as the block position, then specify cell range B2..B5.

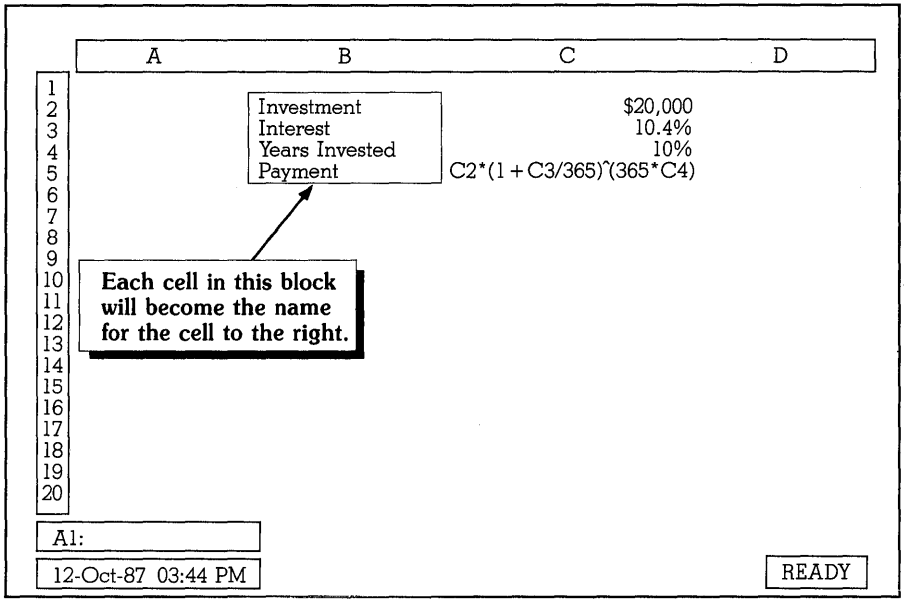


Figure 4.17: Using Labels to Name Single-Cell Blocks

Before you use the **L**abels command, it's a good idea to carefully check over the labels you want to use. If there are duplicate labels involved or labels that duplicate pre-existing block names, the last block given the duplicate name will cancel any others. (Use the NAMES key, *F3*, to display a list of existing block names. Press the EXPAND key (+ on the numeric key pad) to view the coordinates).

Note: If there are leading or trailing spaces within a label, they will be included in the block name. For example, a name that appears to be "INPUT" may actually be "INPUT " (with three trailing spaces). You should edit your labels first if necessary to avoid this.

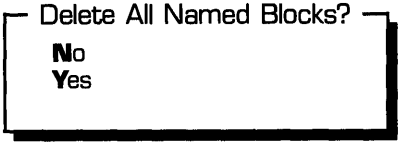
If you accidentally assign a pre-existing block name, the previous block will no longer be defined, but any formulas referencing it will still be accurate. They will continue to refer to the same block, but by cell range instead of by name.

Deleting All Block Names

The **B**lock **A**dvanced **R**eset command erases *all* block names in your spreadsheet.

To delete all block names:

1. Press */BAR* to select **R**eset from the Block Advanced menu. Quattro displays a confirmation menu, asking if you want to delete *all* block names:



2. Press *Y* to select **Y**es from the menu.

Note: If you've set the **B**orland Style confirmation default to **N**o (*/DSCBN*), no confirmation menu is displayed with **R**eset. Your block names are immediately erased when you select it (see page 152).

All block names in the spreadsheet are immediately erased from memory. The spreadsheet itself is not affected. Any formulas that reference named blocks simply are altered so that they refer to the cell ranges of the blocks instead of the names.

Warning: Use this command with caution. Once block names have been erased, the names cannot be restored, except by reassigning each one, retrieving a previously saved version of the file, or using the Transcript add-in (if you had it loaded).

To delete one or more individual block names, use the **B**lock **A**dvanced **D**elete command (see page 96).

Making a Table of Named Blocks

To view a list of all named blocks and their address ranges, you can press the NAMES key, *F3*. Press the EXPAND key (grey +) to see the coordinates. You can also create a table that lists the same information, but is displayed as a permanent part of your spreadsheet.

To create a table of named blocks:

1. Move the selector to the top left cell of the block you want to use for the table. Be sure there's plenty of empty space in the area you specify. Any data in cells used to display the table will be overwritten.
2. Press */BAM* to select Make Table from the Block Advanced menu. Quattro prompts you for a cell address, with the current cell shown as the default.
3. Press *Enter* to use the current cell as the upper left corner cell of the table, or specify a different cell.

Quattro instantly creates a two-column table in the specified area (see Figure 4.18). The first column lists block names alphabetically. The second column indicates the corresponding cell ranges.

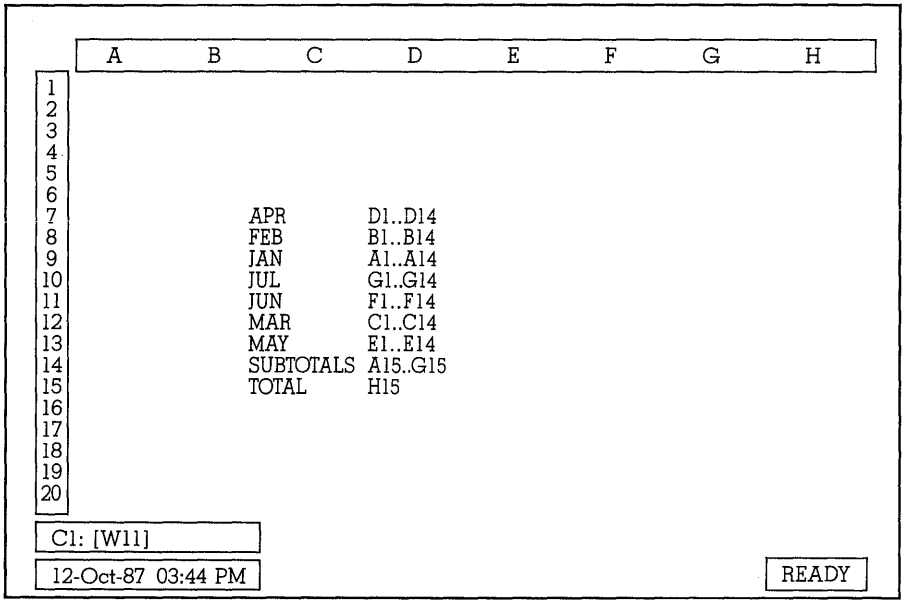


Figure 4.18: Table of Named Blocks

A named block table is not automatically updated. If you add, change, or delete block names, you must recreate the table to reflect the changes.

Working with Columns

Quattro offers several commands that affect columns. These commands are all on the Column menu (Figure 4.19), which is displayed when you select

Column from the main menu. (Row commands are described in "Inserting and Deleting Rows" on page 106.)

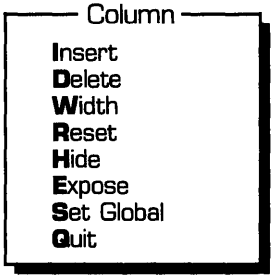


Figure 4.19: The Column Menu

Insert inserts one or more columns to the left of the selector.

Delete removes one or more columns beginning with the current column.

Width lets you adjust the width of a column.

Reset returns a column to the default column width.

Hide temporarily removes one or more columns from the screen display.

Expose returns one or more hidden columns to the screen display.

Set Global lets you change the default column width. This is the same as the **W**idth of Col command on the Default Formats menu (see page 139).

Quit exits the Column menu and returns to the spreadsheet.

Inserting Columns

With the Column **I**nsert command (*/CI*), you can easily insert blank columns anywhere in the spreadsheet.

To insert one or more columns:

1. Move the cell selector to any cell in the column to the right of where you want to insert a column.
2. Press */CI* to select **I**nsert from the Column menu. Quattro prompts you for the insert location. The current cell is shown as the default.
3. Press *Enter* to insert a single column to the left of the current cell, or enter a different cell block. To insert more than one column at a time, extend the given block accordingly. For example, to insert three columns to the left of cell C3, enter the block C3...E3.

The new columns are inserted, and existing columns move to the right. The inserted cells are assigned the spreadsheet's defaults for label-prefix, display format, and column width.

Any formulas or named blocks referencing the block in which the columns were inserted are automatically updated to include the new columns.

Note: Quattro will not insert a column if there is data written near the last column (column IV) that would be pushed "over the edge" of your spreadsheet. Instead, it displays an error message. You can delete the data near the edge, or move it inward, then try again.

Deleting Columns

The **C**olumn **D**elete command lets you remove entire columns of data from your spreadsheet. All columns to the right of a deleted column move left to fill in the deleted space.

To delete one or more columns:

1. Move the cell selector to any cell in the column you want to delete.
2. Press */CD* to select **D**elete from the Column menu. Quattro prompts you for the column(s) to delete. The current cell is shown as the default.
3. Press *Enter* to delete the column containing the current cell, or enter a different cell block. To delete more than one column at a time, extend the given block accordingly. For example, to delete columns C, D, and E, you could enter the block C3...E3.

The specified columns are deleted, and columns to the right of those deleted move left.

Caution: If the deleted column was within the boundaries of a named block or a block referenced by a formula, the block is automatically adjusted. If the deleted column contained a block's coordinate cell (a corner cell used to define the block), the block becomes invalid and any formulas or names referencing the block show ERR. Any formulas that reference an individual cell within a deleted column are also displayed as ERR.

To delete the contents of a column without deleting the actual column itself, use the **B**lock **E**rase command (see page 75).

Setting Column Width

All columns in a spreadsheet start out the same width: the default column width specified with the **W**idth of Col command on the Default Formats menu (initially, nine).

Three commands on the Column menu let you adjust column width: **W**idth, **S**et Global, and **R**eset.

Adjusting Individual Columns

The **W**idth command lets you adjust individual columns to any width between 1 and 240 spaces. This not only lets you make room for lengthy entries, but you can fit more on the screen by customizing columns to the exact widths needed.

To adjust a column's width:

1. Move the cell selector to the column whose width you want to change.
2. Press */CW* to select **W**idth from the Column menu. Quattro prompts you for a column width and shows the width of the current column as the default.
3. Enter a number from 1 to 240, *or* press *Left arrow* or *Right arrow* to widen or narrow the current column on the screen, until it's the width you want.
4. Press *Enter*.

The specified column immediately adjusts to the new width. When you select a cell in a column whose width has been adjusted, the new width appears in brackets (such as [W18]) on the descriptor line.

Note: If your screen is split into two windows, column width changes affect the current window only (see page 112). If you change column width in the right or bottom window, the changes will be discarded when you close that window. If you want the width changes stored with the spreadsheet, make them in the top or left window.

Adjusting All Columns

The **S**et Global command lets you change the default width used for all columns except those that were individually adjusted. It duplicates the **W**idth of Col command on the Default Formats menu (see page 139). The

initial default column width is nine. You can change this to any width from 1 to 240.

To change the default column width:

1. Press */CS* to select **S**et Global from the Column menu. Quattro prompts you for a new width and shows the current width as the default.
2. Type the width (in character spaces) you want as the new default, or use the *Right* and *Left* arrow keys to widen or narrow the columns on the screen.
3. Press *Enter*.

The columns are immediately adjusted.

Columns that were individually adjusted with the **W**idth command will not be affected, however. To include them in the default column width command, you must first reset them to the default column width.

Resetting Column Width

To return an adjusted column to the spreadsheet's default width, use the **R**eset command:

1. Move the cell selector to the column you want to adjust.
2. Press */CR* to select **R**eset from the Column menu.

The column is immediately reset to the default column width and will respond to all subsequent default changes.

If you want to be able to easily spot columns whose widths were individually adjusted, you can temporarily change the default width to very narrow or very wide. Those columns that were adjusted with the **W**idth command do not change width and therefore stand out from the others. After you've made the desired changes to the unique columns, you can return the default width to its previous setting.

Setting a column's width to the default width with the **C**olumn **W**idth command is not the same as resetting the width. You must use the **R**eset command for the column to be affected by changes to default width.

Concealing Columns from Display

Occasionally, you may want to temporarily remove columns of data from the screen, retaining only pertinent information on the screen. The **C**olumn **H**ide command lets you hide columns from view without losing the data they contain. You can later redisplay the columns with the **C**olumn **E**xpose command.

To hide columns from view:

1. Move the cell selector to any cell in the column you want to hide.
2. Press */CH* to select **H**ide from the Column menu. Quattro prompts you for the column(s) you want to hide. The current cell is shown as the default.
3. Press *Enter* to hide the current column. To hide more than one column at once, extend the block shown to include at least one cell in each column you want hidden.

The specified columns are immediately removed from view. Columns to the right of the hidden columns move left to fill in the empty space, but their associated letters are not changed. In other words, if you hide column B, the columns on the screen will be labeled A, C, D, and so on.

Note: As with column width changes, if your screen is divided into two windows (see page 112), hidden or exposed columns affect the current window only. If you want the changes retained when you close the second window, make them in the top or left window.

While a column is hidden, Quattro still keeps track of the data contained in it. Any formulas that rely on data in the hidden column are still accurate.

When a spreadsheet is printed, any columns hidden from view are not included in the printout.

If you use the **F**ile **X**tract command to save part of a spreadsheet that includes hidden columns (see page 168), the hidden columns will be saved in the new file, although they will still be hidden from view when the file is retrieved.

To return a hidden column to the screen, use the **C**olumn **E**xpose command:

1. Press */CE* to select **E**xpose from the Column menu. All hidden columns temporarily return to the screen with asterisks (*) next to their column letters.

2. Specify any cell in the column you want to redisplay. To redisplay more than one column, indicate a block of cells that includes those columns.

Quattro continues to display the columns you specified (without the asterisks) and removes other hidden columns from view.

Quattro momentarily displays hidden columns during a few specific operations, such as **Move** and **Copy**, so you can place or access data in these columns. For example, when you select **Move** from the Block menu, Quattro displays the entire spreadsheet with asterisks next to column headings that have been hidden. You can then move data into or out of the hidden columns. When the operation is complete, hidden columns are again removed from the display.

Inserting and Deleting Rows

The Row menu (accessed by selecting **Row** from the main menu) includes two commands: **Insert** and **Delete**. These commands let you insert blank rows in a spreadsheet and delete existing rows.

Inserting a Row

The **Row Insert** command lets you insert one or more blank rows anywhere in your spreadsheet.

To insert a row:

1. Move the cell selector to a cell in the row above which you want the new row inserted.
2. Press */RI* to select **Insert** from the Row menu. Quattro prompts you for the insert location. The current cell is shown as the default.
3. Press *Enter* to insert a row above the current cell, or enter a different cell block. To insert more than one row at a time, extend the given block accordingly. For example, to insert three rows above cell C3, you could enter the block C3...C6.

Existing rows move down and the new rows are inserted. The inserted cells are assigned the spreadsheet's defaults for label prefix, display format, and column width.

Any formulas or named blocks referencing the block in which the rows were inserted are automatically updated to include the new rows.

As with inserting columns, Quattro will not insert a row if there is data near the bottom of your spreadsheet that would be "pushed over the edge."

Deleting a Row

The **R**ow **D**elete command lets you remove entire rows of data from your spreadsheet. All rows beneath the deleted row(s) move up to fill in the deleted space.

To delete a row:

1. Move the cell selector to any cell in the row you want to delete.
2. Press */RD* to select **D**elete from the Row menu. Quattro prompts you for the row(s) to delete. The current cell is shown as the default.
3. Press *Enter* to delete the row containing the current cell, or enter a different cell block. To delete more than one row at a time, extend the given block accordingly. For example, to delete rows 3, 4, and 5, you could enter the block C3...E5.

The specified rows are deleted.

Caution: If the deleted row was within the boundaries of a named block or a block referenced by a formula, the block is automatically adjusted. If the deleted row contained a block's coordinate cell (a corner cell used to define the block), the block becomes invalid and any formulas or names referencing the block show ERR. Any formulas that reference an individual cell within a deleted row are also displayed as ERR.

To delete the contents of a row without deleting the row itself, use the **B**lock Erase command (see page 75).

Erasing the Spreadsheet

The **E**rase command deletes all data from the current spreadsheet and returns all column widths, display formats, and other settings to their default values.

To erase a spreadsheet:

1. Press */E* to select **E**rase from the main menu. If you've made any changes to the spreadsheet, a confirmation menu is displayed (Figure 4.20), asking, "Lose Your Changes?"

2. Select **Yes** to erase everything in the spreadsheet. If you select **No**, Quattro cancels the command.

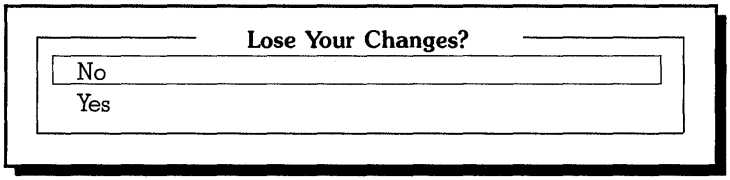


Figure 4.20: The Erase Spreadsheet Confirmation Menu

Quattro erases everything in the current spreadsheet.

Note: If you've set the **B**orland Style Confirmation default to **N**o (*/DSCBN*), the Erase confirmation menu will always be displayed, regardless of whether or not data may be lost (see page 152).

Caution: Once you've executed the **E**rase command, you will not be able to recall the deleted data. If you had previously saved the data on the screen, you can retrieve the file (*/FR*), but any changes you made since last saving it are permanently lost. However, if you had the Transcript add-in loaded (see page 393), you will be able to restore your work.

There's no need to erase the current spreadsheet before retrieving a file; if you've saved your spreadsheet, Quattro will automatically clear it before loading the new file.

To erase only part of a spreadsheet, use the **B**lock **E**rase command (see page 75) or the **R**ow **D**elete or **C**olumn **D**elete commands (see pages 107 and 102).

An alternative to beginning a new database with a blank spreadsheet is to create a spreadsheet file that contains default settings and skeletal data standards for your spreadsheet files. Then, instead of using the **E**rase command, you can simply retrieve this file each time you want to build a new spreadsheet. See "Creating Custom Spreadsheet Templates" on page 165 for more information.

Changing the Screen Layout

The **L**ayout command on the main menu affects the way the Spreadsheet Screen is presented, rather than the data contained in it. You can use it to

freeze rows or titles, open a second window, or change the position of the descriptor line. When you select **L**ayout from the main menu (/*L*), the Layout menu is displayed (Figure 4.21).

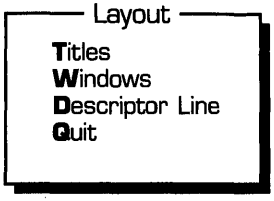


Figure 4.21: The Layout Menu

Titles lets you freeze certain rows and/or columns on your screen as titles. The titles stay put, even when you scroll the rest of the spreadsheet.

Windows lets you split your screen into two windows, so you can view two parts of your spreadsheet at once.

Descriptor Line lets you move the descriptor line (showing cell information and error messages) to the top or bottom of your screen.

Quit takes you out of the menus and back to the spreadsheet.

Freezing Rows and Columns

When your spreadsheet contains more than one screenful of information, you must scroll the spreadsheet, using the direction keys, to display different sections. Often, you will want to view two different areas of your spreadsheet at the same time.

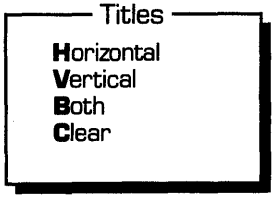
The Titles command lets you freeze specific rows and/or columns as spreadsheet *titles*. When you scroll the spreadsheet, the titles remain fixed on the screen while the rows beneath (or columns to the right of) them scroll as usual.

This command is most often used to lock headings in place on the screen, but you can use it to freeze any part of the spreadsheet.

To freeze titles onscreen:

1. Position the spreadsheet on the screen so that the column(s) or row(s) you want to use as titles are at the far left and/or at the top of the screen. You will not be able to adjust the position of the titles after they are frozen.

2. Move the cell selector to the row below or column to the right of the section you want to freeze. (All rows above the cell selector and/or all columns to the left will also be frozen.) To freeze both the top and left parts of the screen, position the selector in the top left cell of the part you want to remain scrollable.
3. Press */LT* to select Titles from the Layout menu. The Titles menu appears:

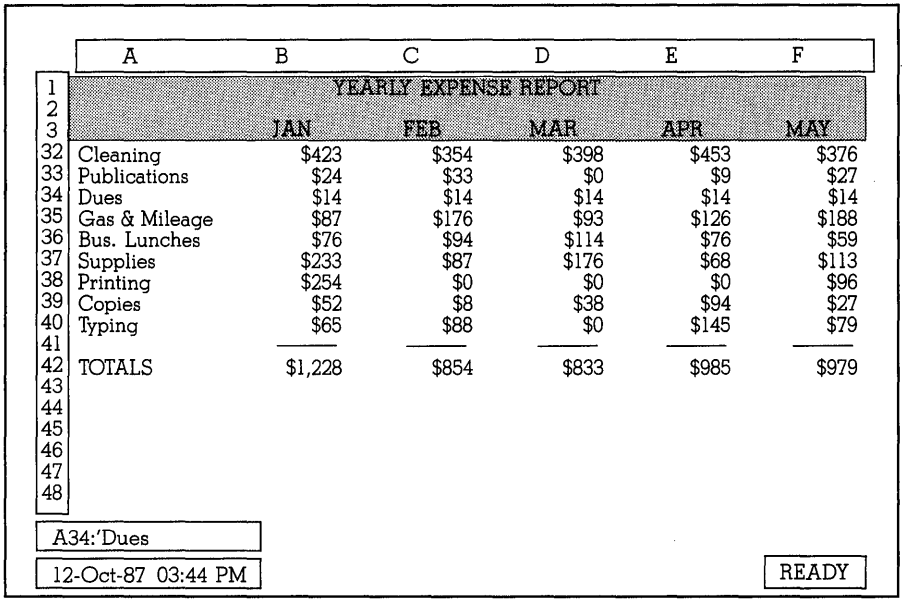


4. Select **H**orizontal to freeze all rows above the cell selector, **V**ertical to freeze all columns to the left, or **B**oth to freeze both rows above and columns to the left.

Any previous **T**itle command is cleared, and Quattro locks the specified columns or rows in place as titles.

To clear frozen titles without specifying new ones, select **C**lear from the Titles menu (*/LTC*).

Figure 4.22 shows a spreadsheet with column headings frozen as titles. The data underneath the headings has been scrolled to reveal the bottom part of the spreadsheet.



	A	B	C	D	E	F
1		YEARLY EXPENSE REPORT				
2						
3		JAN	FEB	MAR	APR	MAY
32	Cleaning	$423	$354	$398	$453	$376
33	Publications	$24	$33	$0	$9	$27
34	Dues	$14	$14	$14	$14	$14
35	Gas & Mileage	$87	$176	$93	$126	$188
36	Bus. Lunches	$76	$94	$114	$76	$59
37	Supplies	$233	$87	$176	$68	$113
38	Printing	$254	$0	$0	$0	$96
39	Copies	$52	$8	$38	$94	$27
40	Typing	$65	$88	$0	$145	$79
41						
42	TOTALS	$1,228	$854	$833	$985	$979
43						
44						
45						
46						
47						
48						

Figure 4.22: A Spreadsheet with Frozen Titles

To view expense figures for June through December, you could also freeze column A, then scroll right. To do so, you would move the selector to cell B6, then press */LTB* to select **B**oth from the Titles menu (selecting **V**ertical would cancel the previous **H**orizontal setting).

You cannot move the cell selector inside a spreadsheet title while Quattro is in Ready mode. You can, however, use the GOTO key, *F5*, to access the title cells. When you press *F5*, you'll be able to move the selector to any cell in the spreadsheet, either by pointing or by specifying a cell address or block name. If you access cells with a title, the titles are duplicated on the screen. Any changes you make to the duplicate cells are automatically reflected in the frozen titles. Figure 4.23 shows the example above with the cell selector in cell A34. Column A is duplicated to the right of the vertical titles.

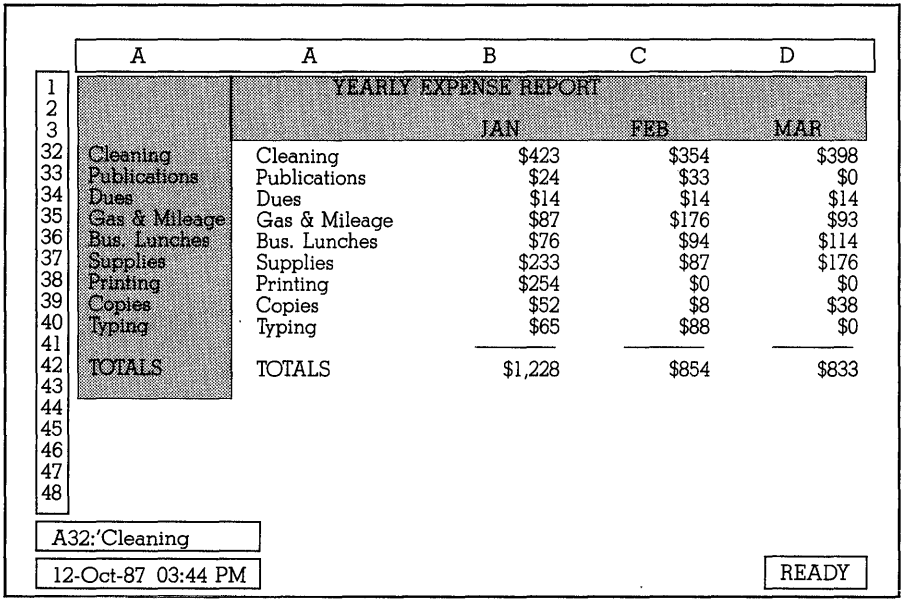


Figure 4.23: Highlighting a Cell within a Title

To remove a duplicate column, press *Tab*, then *Shift-Tab*. To remove a duplicate row from the screen, press *PgDn*, then *PgUp*. To remove both duplicate columns and rows from the screen, press *End-Home* to go to the bottom right, then *Home*.

Note: As with hidden and widened columns, frozen titles affect the current window only. If the screen is divided into two windows (see the next section), frozen titles will be retained in the spreadsheet *only* if they were made in the top or left window.

Using Two Windows to View a Spreadsheet

Another way to view two different areas of a spreadsheet is to split the Quattro screen into two *windows*, each displaying the current spreadsheet. The windows can be side by side (vertical) or one on top of the other (horizontal). Figure 4.24 shows a screen split horizontally.

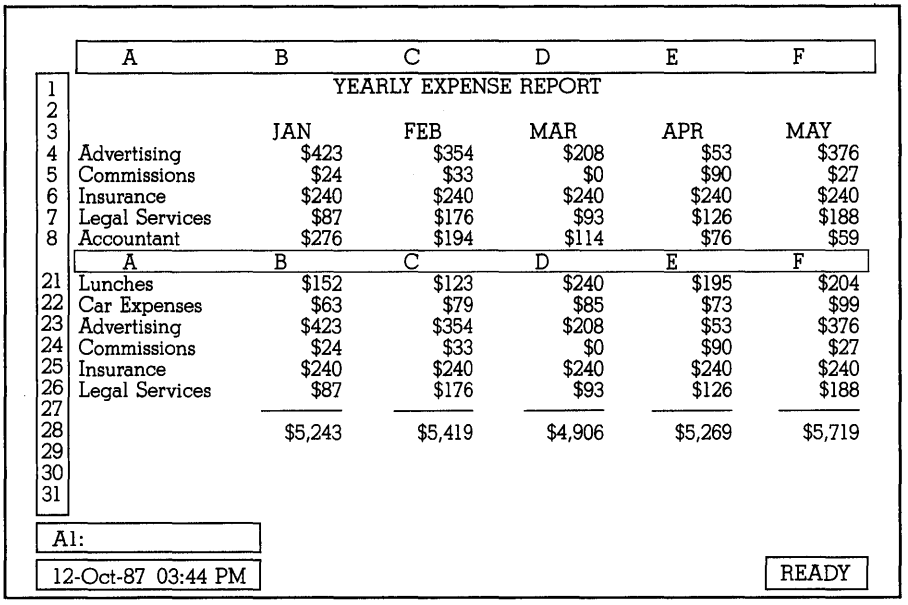


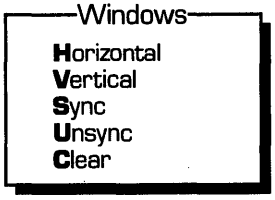
Figure 4.24: The Quattro Screen Split Horizontally

Opening a Second Window

You can open a second window at any place in the spreadsheet. The screen is divided at the current cell.

To split the screen into two windows:

1. Move the cell selector to the row or column at which you want the screen to be split.
2. Press */LW* to select **W**indows from the Layout menu. This displays the Windows menu.



3. Select **H**orizontal to split the screen horizontally at the row containing the selector. Select **V**ertical to split the screen vertically at the column containing the selector.

The menu disappears and the screen is split into two windows. The *current window* is the one containing the cell selector. To move into the other window, press the WINDOW key, *F6*. The cell selector jumps into the other window, making it current.

Some display changes you make to the spreadsheet in the current window do not affect the other window: frozen titles, hidden or exposed columns, column width, and default display format. For example, if you change column widths (either default or specific) in one window, the previous widths remain in the other. And if you change default display format in one window, the previous format remains in the other. (The **B**lock **D**isplay Format command affects both windows, however.) When you return the screen display to one window, Quattro retains these format changes only if they were made in the top or left window.

Unsynchronizing the Windows

When you first split the screen into two windows, the windows are *synchronized*, which means that when you scroll in one window, the other scrolls automatically. You can change this so that each window works independently of the other. This lets you view one part of the spreadsheet in one window, and scroll to another part in the other.

To unsynchronize the windows, so that each scrolls independently, press */LWU* to select **U**nsync from the Windows menu. To return synchronization, press */LWS* to select **S**ync.

Closing the Second Window

To remove the second window from the screen, press */LWC* to select **C**lear from the Windows menu. The window on the bottom or right disappears, and the other window again takes up the entire spreadsheet area.

Any column width changes, frozen titles, or columns that were hidden or revealed in the top or left window remain in effect.

Repositioning the Descriptor Line

Initially, the descriptor line that displays information about the current cell is positioned at the bottom of the Spreadsheet Screen. You can move this line to the top of the screen, if you like, with the **D**escriptor Line command on the Layout menu.

When you select this command (*/LD*), the descriptor line moves from the bottom of the screen to the top, or (if it was already at the top) moves to the bottom.

To make the new position permanent, press *Esc* to return to the main menu, then select **U**pdate from the Default menu (press *DU*).

C H A P T E R

5

Changing the System Defaults

Quattro uses two kinds of defaults to handle and display data in your spreadsheets:

- **Command Defaults** are standard settings for Quattro commands. For example, the Print Destination default is Printer. This means that unless you specify otherwise, spreadsheet files will be sent to the printer when printed (instead of to a disk file). If a command has a default setting, it is presented when you select the command. You can accept it or specify a different setting. Some command defaults you can *update*; this stores the setting you enter as the new default for all spreadsheets you create.
- **System Defaults** affect the entire Quattro program. They determine things like the colors used to display the program and the directory used to store your spreadsheets. System defaults can be changed for the current spreadsheet, or they can be *updated* to affect the entire program. The updated settings remain in effect until you change them again. When you create a new spreadsheet, the updated default settings are in effect.

System defaults can be changed, temporarily or permanently, with commands on the Default menu (Figure 5.1). This menu is displayed when you select **D**efault from the main menu (*/D*). To store changes you make with this menu as the new (permanent) defaults, select **U**pdate from the Default menu (*/DU*).

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

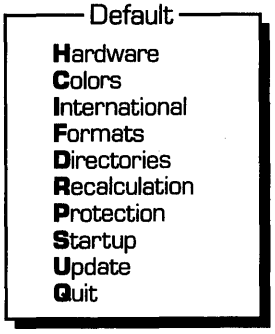


Figure 5.1: The Default menu

Hardware lets you specify information about your computer screen and the printer you'll be using to print spreadsheets. It shows your system's memory usage.

Colors lets you change the colors and/or hues used to display the spreadsheet and menus.

International determines the standards for displaying currency, punctuation, date, and time.

Formats determines the standard spreadsheet display format, label alignment, zero display, column width, and clock and descriptor line display.

Directories specifies the default directories for Quattro program files and for spreadsheet files.

Recalculation determines the order of formula calculation, the number of iterations, and whether or not formulas are calculated automatically or only when you press the CALC key (*F9*).

Protection lets you protect your spreadsheet from any changes being made to it.

Startup lets you specify default information that Quattro uses to start up the program, such as the default extension to be added to spreadsheet files and the name of an autoload file.

Update makes the current default settings "permanent" by storing them in the Quattro defaults file (QUATTRO.DEF).

Quit returns you to the spreadsheet.

Press *Esc* to return to the main menu.

This chapter describes each of these groups of system defaults.

To override default settings for specific blocks of the spreadsheet (for example, to use a different or display format or to alter the width of an individual column), use the **B**lock commands (see Chapter 4, "Making Changes" on page 63).

Hardware Defaults

The Default Hardware command lets you specify information about your computer screen and text printer. It also displays information about your system's memory and coprocessor.

When you select **H**ardware from the Default menu (*/DH*), the Hardware menu is displayed (Figure 5.2).

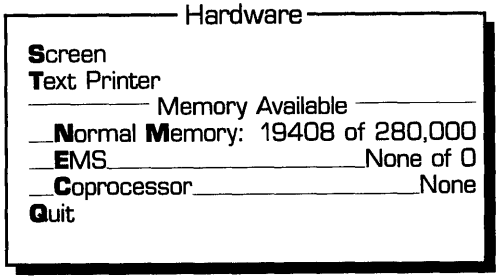


Figure 5.2: The Hardware Menu

Screen lets you specify information about your computer screen, overriding Quattro's automatic screen detection. You can also use it to adjust your screen's aspect ratio, used to display pie charts.

Text Printer lets you specify the type of printer you'll use to print spreadsheets.

Normal Memory displays the number of bytes of available memory in relation to the total.

EMS displays the number of bytes of available expanded memory in relation to the total.

Coprocessor displays the type of math coprocessor used by your computer (8087 or 80287).

Quit returns you to the spreadsheet.

Press *Esc* to return to the Default menu.

Once you've set the **H**ardware commands to reflect your system's configuration, use the **D**efault **U**pdate command (*/DU*) to make the settings permanent (see page 152).

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

Screen Defaults

Quattro automatically detects the following types of screens and loads a special file, called a *driver file*, that contains information about that type of screen:

CGA
MCGA
VGA
EGA
Hercules
IBM 8514/A
IBM 3270 PC

If you're using a non-standard screen type, you may need to specify information about the screen with the **D**efault **H**ardware **S**creen command. You can also use this command to change the resolution or aspect ratio used for displaying graphs, or to specify a second screen for graphs.

When you select **S**creen from the Default Hardware menu, the Screen menu appears (Figure 5.3). It breaks down screen defaults into two menus: one for text display and one for graphs.

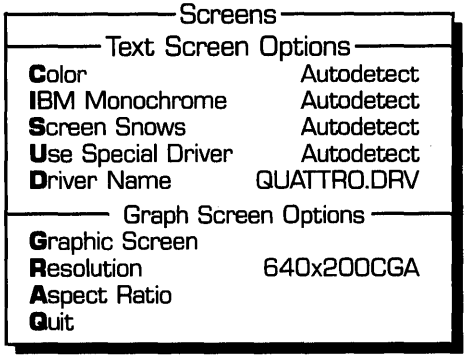


Figure 5.3: The Screen Menu

Color specifies whether the screen you're using is color or monochrome.

IBM Monochrome specifies whether or not you're using an IBM monochrome screen. Set to **Yes** only if you're using a special (highly unusual) monitor that emulates an IBM monochrome but isn't correctly detected by Quattro. Otherwise, keep this set to **Autodetect**.

Screen Snows specifies whether or not your screen flickers when you scroll. If your screen flickers, set to **Yes**.

Use Special Driver specifies whether or not to load a special driver file with information about the screen you're using to display text. The initial default, **Autodetect**, determines automatically what type of screen you're using and loads the appropriate driver file. If Quattro detects the wrong driver file for your screen, set this to **Yes** and specify the driver with the **Driver Name** command. (To load a special driver file for a graphics screen, use the **Graphic Screen** command.)

Driver Name lets you load a special driver file with information about your computer screen. If **Use Special Driver** is set to **Yes**, Quattro will load it next time you run the program.

Graphics Screen lets you specify a different screen driver for displaying graphs. This can be a second screen attached to your computer, or one that you switch to for displaying graphs. When you select this command, Quattro displays a list of screen types. Choose the type you'll be using for graphs.

Resolution lets you change the resolution of (and sometimes the colors available with) your type of screen.

Aspect Ratio lets you adjust your screen so that it displays a perfect circle (used for displaying pie charts).

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Screen menu to the Hardware menu.

The first four commands have three options: **A**utodetect, **N**o, and **Y**es. **A**utodetect, the default, lets Quattro detect the answer. For example, Quattro can tell automatically that an EGA screen is color, doesn't produce "snow" when scrolling, and requires a special driver.

Note: Quattro automatically detects most Compaq screens, and assumes they have black and white screens. If you're using a color screen connected to a Compaq, you'll need to change the Screen Color setting to **Y**es. If you have a Compaq III, you'll need to specify loading the AT&T 400 Line driver with the **G**raphics Screen command.

Caution: After you make changes to the screen defaults, be sure to select **U**pdate from the Default menu to save the changes. Otherwise, the original defaults will resume effect next time you use Quattro.

Note: If you have a black and white screen with a color graphics card, Quattro treats it as if it were color, and translates the colors into shades of black and white. Some of the shades may be hard to distinguish on the screen. To switch to monochrome display, select **P**alettes from the Default Colors menu, and select **M**onochrome (see page 130).

The following subsections describe how to switch your screen to a different resolution and adjust the aspect ratio used by your screen to display graphs.

Setting the Resolution

If you have a color monitor, you can change the resolution (and sometimes the colors) used to display Quattro graphs with the **S**creen **R**esolution command.

When you select **R**esolution from the Screen menu (*/DHSR*), Quattro displays a menu listing the modes available for your particular screen type. (If you don't have a color monitor, no options are listed.)

The initial default for each screen type is the highest resolution available with color. In some cases, you can gain better resolution by switching to a black and white display. If you have a CGA monitor, you can change the set of colors used in graphs.

Select the mode you want to use. It becomes effective when you leave the menu. If you want to use the new resolution from now on, select **U**pdate from the Default menu (*/DU*).

You can also set screen resolution with the **R**esolution command on the Graph Customize menu. See page 271 for more detailed information on the resolution modes available with different screen types.

Adjusting the Aspect Ratio

Different monitors have different *aspect ratios*, which is the ratio of the screen's width to its height. In order to display a perfect circle on your screen (as is needed for a pie chart), Quattro needs to know the aspect ratio of your particular screen. In most cases, Quattro estimates this accurately. But if pie charts appear slightly elongated on your screen, you can use **A**spect Ratio command to adjust the display.

When you select **A**spect Ratio from the Screen menu (*/DHSA*), a circle is displayed on your screen. Use the *Up* and *Down* arrow keys to expand or contract the circle's height and width until it appears to be perfectly round. Then press *Enter*. Quattro then uses the aspect ratio used to perfect that circle to display pie charts.

Be sure to update this default with the **D**efault **U**pdate command (*/DU*) after adjusting the ratio. Quattro will then use this ratio from now on.

Text Printer Defaults

To print your spreadsheets, Quattro assumes you're using a parallel printer attached to your computer's first parallel port. It also assumes that the printer uses continuous-feed paper and doesn't have automatic line feed. If any of these assumptions are incorrect for your printer, you need to specify this with the **T**ext Printer command.

If you're using a serial printer, Quattro uses the printer setup established with DOS to determine baud rate, parity, and number of stop bits. If you've already set up your computer to work with this printer, you won't need to adjust these settings.

When you select **T**ext Printer from the Default Hardware menu (*/DHT*), the Text Printer menu is displayed (Figure 5.4).

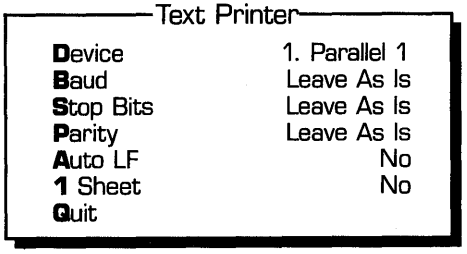


Figure 5.4: The Text Printer Menu

Device displays a list of possible printer connections: Parallel 1 or 2, Serial 1 or 2, or one of four DOS LPT connections. The initial default is Parallel 1.

Baud specifies the baud rate (110-19200) your printer is set to, if you're using a serial printer. The initial default, Leave As Is, uses the baud rate set by DOS.

Stop Bits specifies how many stop bits are stored at the end of each byte (if you're using a serial printer). You can set this to **1** Bit, **2** Bits, or Leave As Is. The initial default, Leave As Is, uses the number of stop bits set by DOS.

Parity specifies the type of parity your serial printer uses. You can set this to **N**o, **O**dd, **E**ven, or **L**eave As Is. The initial default, Leave As Is, uses the parity set by DOS.

Auto LF specifies whether or not your printer automatically inserts a carriage return at the end of each line. The initial default is **N**o. You can also see your printer's manual or print some sample text. If your printout appears double-spaced, change this to **Y**es; if it prints everything on one line without advancing, change this to **N**o.

1 Sheet specifies whether or not you'll be using continuous-feed paper. The initial default expects continuous-feed paper. If you'll be using single sheets of paper, set this to **Y**es.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Text Printer menu to the Default Hardware menu.

After you've changed any of the text printer defaults, select **U**pdate from the Default menu (*/DU*) to make the changes permanent.

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

If you intend to print graphs as well as spreadsheets, you need to specify further printer information with the **P**rinters command on the Graph Print menu (see page 275).

Color Defaults

The color combinations used to display Quattro on a color monitor have been carefully chosen to enhance readability. However, since the actual colors used are often a matter of personal preference, Quattro lets you adjust the colors used in each specific part of the program.

Note: If you're using a black and white monitor with a color graphics card (such as a Compaq), you can change the Screen Color default to Yes to imitate a color screen (see page 118). You'll then be able to adjust the hues used for display.

When you select Colors from the Default menu, the Colors menu is displayed (Figure 5.5).

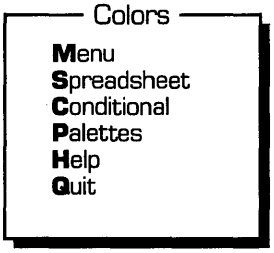


Figure 5.5: The Colors Menu

Menu determines the colors used to display the command menus.

Spreadsheet determines the colors used within the spreadsheet screen.

Conditional lets you specify different colors to use for spreadsheet values that meet certain conditions.

Palettes lets you switch between color and monochrome displays without erasing any changes you may have made to either color set.

Help lets you change the colors used to display help information when you press *F1*.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Colors menu to the Default menu.

After you've changed any of the colors used, select Update from the Default menu (*/DU*) to make the changes permanent.

Caution: Selecting Update from the Default menu saves *all* default settings.

Menu Colors

The **Menu** command lets you change the colors used to display menus on the screen: the menu frame, the banner, the first letters of the menu items, and so forth.

When you select **Menu** from the Default Colors menu (*/DCM*), the Menu Colors menu appears (Figure 5.6).

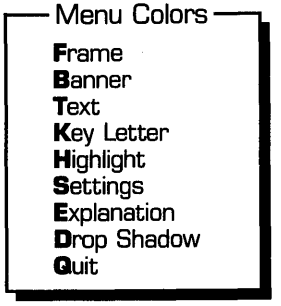


Figure 5.6: The Menu Colors Menu

Frame determines the color used to display the box around the Quattro menus.

Banner determines the color used to display the name of the menu.

Text determines the color used to display the menu items (all but the first letter).

Key Letter determines the color used to display the first letter of each menu item.

Highlight determines the color of the highlight bar used to select menu items.

Settings determines the color used to display the command settings within the menu.

Explanation determines the color used to display the menu command description at the top of the screen.

Drop Shadow determines the color used to display the shadow under the menu frame.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Menu Colors menu to the Colors menu.

To change the color used for an item listed on this menu:

1. Select the area you want to change. A color palette appears, displaying every color or hue available. (If you have a monochrome screen, a menu of options appears.)
2. Use the arrow keys to highlight the color or option you want to use. Then press *Enter* to select it. The color palette or menu disappears.
3. Change the color of another item, or exit the Menu Colors menu. The menus will appear in the colors you specified.
4. If you want to save the colors you chose as the new defaults, press *Esc* twice and select **U**pdate from the Default menu.

Note: To remove the menu shadow from display, select **D**rop Shadow from the Menu Colors menu, then select **E**mpty (for a monochrome screen), or select the color in the top left corner of the palette (for a color screen).

Spreadsheet Colors

The **S**preadsheet command lets you change the colors used to display parts of the spreadsheet screen. When you select **S**preadsheet from the Colors menu, the Spreadsheet Colors menu is displayed (Figure 5.7).

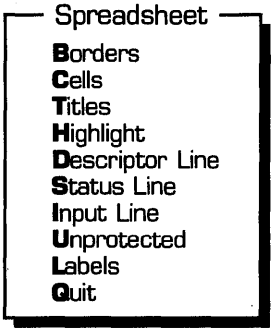


Figure 5.7: The Spreadsheet Colors Menu

Borders determines the color used to display the box around the spreadsheet and the column and row borders.

Cells determines the color used to display cells in the spreadsheet.

Titles determines the color used to display frozen titles.

Highlight determines the color used to highlight the current cell.

Descriptor Line determines the color used to display cell information and error messages on the descriptor line.

Status Line determines the color used to display mode and status indicators and the date and time on the status (bottom) line.

Input Line determines the color used to display data on the input (top) line.

Unprotected determines the color used to display cells in the spreadsheet whose protection status has been explicitly changed with a **B**lock command.

Labels specifies the color to use for label entries.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Spreadsheet Colors menu to the Colors menu.

To change the color used for any area listed, select the corresponding command. A color palette appears, showing each color available with your screen. (If you have a monochrome screen, a menu of options is displayed.) Highlight the color or option you want and press *Enter*. The areas you altered are immediately displayed in the colors you select.

If you want to save the colors you chose as the new defaults, press *Esc* twice and select **U**pdate from the Default menu.

To vary the colors used to display cells based on the values contained in them, use the **C**onditional command.

Conditional Colors

The **C**onditional command lets you change the color of specific types of data displayed in your spreadsheet: ERR values, labels, values above or below a specified range, and so forth. You can use it to highlight specific values in your spreadsheet. For example, you could display all negative values in red, or all values greater than 1000 in green.

When you select **C**onditional from the Colors menu, the Conditional Colors menu appears (Figure 5.8).

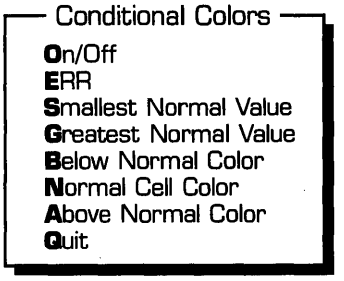


Figure 5.8: The Conditional Colors Menu

On/Off tells Quattro whether or not to use the conditional colors set with this menu. It has two options: **E**nable and **D**isable. **D**isable is the initial default.

ERR specifies the color to use for ERR values generated by formula errors.

Smallest Normal Value and **Greatest Normal Value** let you set up a range of values considered normal. You can then specify different colors for displaying values within the range, above the range, and below the range.

Below Normal Color specifies the color to use for values below the number indicated with **S**mallest Normal Value.

Normal Cell Color specifies the color to use for values within the range set up with **S**mallest Normal Value and **G**reatest Normal Value.

Above Normal Color specifies the color to use for values above the number indicated with **G**reatest Normal Value.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Conditional Colors menu to the Default Colors menu.

To change the color of ERR values, select the corresponding command. A color palette appears, showing each color available with your screen. (If you have a monochrome screen, a menu of options is displayed.) Highlight color or option you want and press *Enter*.

To set up a range of "normal values," enter the high and low values with the **G**reatest Normal Value and **S**mallest Normal Value commands. Then specify the colors to use for values above, within, and below that range.

Spreadsheet values are immediately displayed in the colors you select (as long as they're enabled with the **O**n/Off command).

If you want to save the colors and conditions you set up as the new defaults, press *Esc* twice and select **U**pdate from the Default menu.

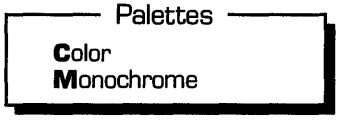
To disable conditional colors without resetting each item on the menu, select **On/Off**, then select **D**isable.

Note: Spreadsheet display is faster when conditional colors are disabled. For quick display response, disable conditional colors when they're not necessary.

Reinstating Default Colors

After you've made changes to any of the colors used, you can reinstate the original default colors for either monochrome or color screens.

To override any color changes you've made, even after updating the defaults, select **P**alettes from the Default Colors menu (*/DCP*). The Palettes menu appears (Figure 5.9).



Select **M**onochrome to reinstate original default colors for a monochrome screen. Select **C**olor to reinstate colors for a color screen.

If you want to erase all color changes you've made and use the original default colors as the new defaults, select **U**pdate from the Defaults menu (*/DU*).

Note: If you have a black and white monitor with a color graphics card, you may want to switch to the monochrome palette for better display.

Help Colors

The **H**elp command lets you change the colors used to display help information on your screen when you press *F1*. When you select **H**elp from the Default Colors menu (*/DCH*), the Help Colors menu appears (Figure 5.10).

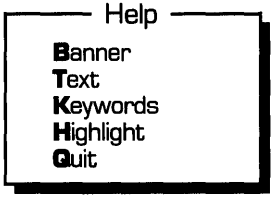


Figure 5.10: The Help Colors Menu

Banner determines the color used to display the name of the help screen.

Text determines the color used to display general text in the help screen.

Keywords determines the color used to display key words, or words that you can select to display more information.

Highlight determines the color used for the help cursor used to select key words.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Help Colors menu to the Default Colors menu.

To change the color used for any area listed, select the corresponding command. A color palette appears, showing each color available with your screen. (If you have a monochrome screen, a menu of options is displayed.) Highlight the color or option you want and press *Enter*.

If you want to save the colors you set up as the new defaults, press *Esc* twice and select **U**pdate from the Default menu.

International Defaults

International settings determine standards for displaying currency, punctuation, dates, and time. This not only affects the display of values in the spreadsheet, but also how time is displayed at the bottom of your screen and how you enter arguments in @functions.

The initial defaults are set to display the formats that are standard for the United States. If you are using Quattro in another country, or are doing business with another country, you can change these settings to suit your requirements.

The international defaults determine your display *options*, not the display itself. To actually *set the display* of a cell value as a date, time, or currency value, use the **B**lock **D**isplay Format command (see page 76) or the **D**isplay command on the Default Formats menu (see page 135).

When you select International from the Default menu, the International Menu is displayed (Figure 5.11).

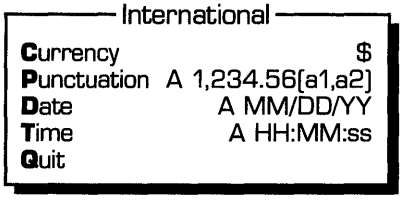


Figure 5.11: The International Menu

Currency lets you specify the character(s) to use to indicate currency. You can display the characters before or after the value. The initial default displays the dollar sign ($) before the value.

Punctuation determines the characters used to separate thousands, show the decimal point in numbers, and separate arguments in functions and macros. The initial default uses a comma to separate thousands and arguments and a period as a decimal point.

Date determines the date format used as the "International" option on the Date Format menu. MM/DD/YY is the initial default.

Time determines the time format used as the "International" option on the Time Format menu. HH:MM:SS is the inital default.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the International menu to the Default menu.

To make the changes you made to the International settings permanent, select Update on the Default menu (*/DU*).

Caution: Selecting Update from the Default menu saves *all* default settings.

Currency

By initial default, currency is displayed in the spreadsheet as dollars, with a dollar sign preceding the value (for example, $35). To display a different type of currency, such as yen or pesetas, select Currency from the International menu (*/DIC*). Quattro prompts you for the character(s) to use as a currency symbol. You can use any character or character combination, including special ASCII characters. To enter an ASCII character not on your keyboard, hold down the *Alt* key and enter the ASCII code for that character. These codes are all listed in the ASCII table in Appendix D of the *Quattro Reference Guide.*

When you press *Enter*, Quattro displays a menu with two items: **P**refix and **S**uffix. Select **P**refix to display the symbol before the value (such as $100). Select **S**uffix to display the symbol *after* the value (such as 500F).

To store the new currency format as the default (to be used whenever **C**urrency is selected as the display format), press *Esc* and select **U**pdate from the Default menu.

Punctuation

Punctuation settings specify the punctuation characters used to do three things:

- designate a decimal point in numbers
- separate arguments in @function statements and in macro commands
- separate thousands in numbers (display only)

Normally, a period (.) is used for a decimal point and commas are used to separate arguments and thousands. You can choose from seven other punctuation combinations, however.

When you select **P**unctuation from the International menu, the International Punctuation menu appears (Figure 5.12).

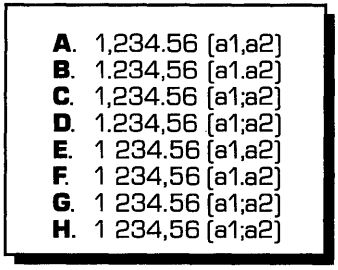


Figure 5.12: The International Punctuation Menu

Each option shows the punctuation marks used to mark thousands and the decimal place, followed by the punctuation mark used to separate arguments in @functions and macros (a1,a2).

Select the combination you want. The last four options specify that a blank space be used in display to separate thousands in numbers.

To store the punctuation combination as the new default, press *Esc* and select **U**pdate from the Default menu.

International Date Format

The International Date command does not directly determine how dates will be displayed in the spreadsheet. Rather, it determines the *international date format* given as an option for date display. Both short and long versions of this format will be listed as optional date formats when you select Date from the Display Format menu. To set the actual display of dates in your spreadsheet, use the Block Display Format command (see page 76).

Initially, the long and short international date formats are MM/DD/YY and MM/DD. The short format is simply a truncated version of the format you choose for long. To change the international date format, select Date from the International menu (*/DID*). Then choose one of the four options listed on the displayed International Date menu (Figure 5.13).

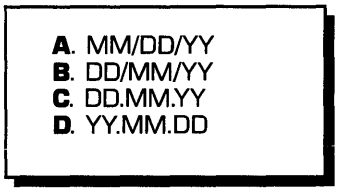


Figure 5.13: The International Date Menu

The format you choose will be listed (in both long and short form) on the Date Format menu. The long version of the format will be used as the international clock setting. The short form of each format is listed below:

HH/DD/YY	MM/DD
DD/MM/YY	DD/MM
DD.MM.YY	DD.MM
YY.MM.DD	MM.DD

To store the date format you chose as the new default, press *Esc* and select Update from the Default menu.

International Time Format

The International Time command specifies the *international time format*. Both short and long versions of this format are listed optional time formats when you select Date, then Time, from the Display Format menu. To set the actual display of times in your spreadsheet, use the Block Display Format command (see page 76).

Initially, the long and short international time formats are HH:MM:SS and HH:MM. The short format is simply a truncated version of the format you choose for long. To change the format used as international time, select **T**ime from the International menu (*/DIT*). Then choose one of the four options listed on the displayed International Time menu (Figure 5.14).

All international time settings are 24-hour formats (12:00-23:59).

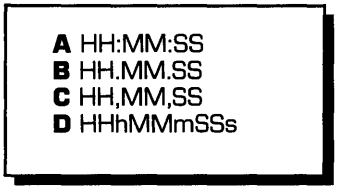


Figure 5.14: The International Time Menu

The format you choose will be listed on the Display Format Time menu and will be used as the international clock setting. The short form of each format is listed below.

HH:MM:SS	HH:MM
HH.MM.SS	HH.MM
HH,MM,SS	HH,MM
HHhMMmSSs	HHhMMm

To store the date format you chose as the new default, press *Esc* and select **U**pdate from the Default menu.

Formatting Defaults

The Formats command on the Default menu lets you change settings that affect the default display of data in your spreadsheet. When you select this command (*/DF*), the Default Formats menu is displayed (Figure 5.15).

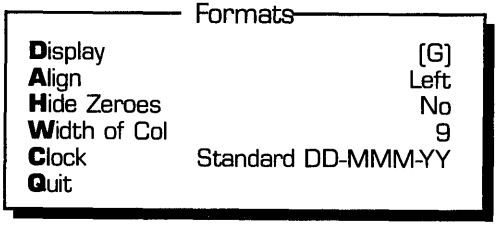


Figure 5.15: The Default Formats Menu

Display determines the default display format used to display numbers, dates, and time.

Align determines default label alignment.

Hide Zeroes determines whether zero values are displayed.

Width of Col determines the default column width.

Clock determines the format in which current date and time are displayed at the bottom of the spreadsheet.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Default Formats menu to the Default menu.

The **D**isplay, **A**lign, and **W**idth of Col values are always stored with the current spreadsheet. In other words, if you change the default display format to **C**urrency, the next time you display that spreadsheet, the display default will revert to **C**urrency, no matter what the default was before the spreadsheet was retrieved. The other format settings revert to the default value when you exit Quattro, unless you update them as the new defaults (by selecting **U**pdate from the Default menu).

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

Display, **A**lign, and **W**idth of Col values can be overridden locally with the associated **B**lock commands. **A**lign can also be overridden by including a label prefix with a label.

Default Display Format

The Default Formats **D**isplay command determines the default format used to display numbers, dates, or time in your spreadsheet. This is the format that will be used if none other is specified with the **B**lock **D**isplay Format command (see page 76).

Initially, the default display format is set to **G**eneral. This displays numbers more or less as you enter them (unless they don't fit within the current column, in which case they are translated into scientific notation).

To change this default, select **D**isplay from the Default Formats menu (*/DFD*). The Display Format menu is displayed (Figure 5.16).

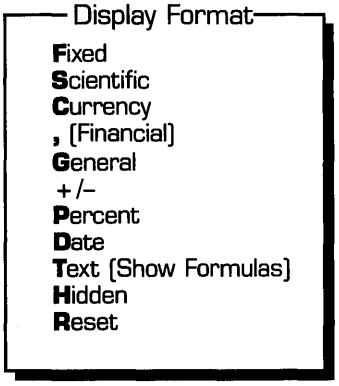


Figure 5.16: The Display Format Menu

Select the format you want to use most often in the spreadsheet. If the format you choose allows a variable number of displayed decimal places, you will then need to specify a number between 0 and 15. Regardless of the number of decimal places displayed, the number originally entered or calculated (up to 15 significant digits) will be stored in Quattro and used in calculations.

If you specify the **D**ate format, another list is displayed, showing specific date formats and **T**ime. If you select **T**ime, another list is displayed, showing possible time formats.

If you intend to normally use the chosen format in your spreadsheets, select **U**pdate from the Default menu to make the change permanent (*/DU*). If the change is intended for the current spreadsheet only, don't use **U**pdate after changing this default; the format will be saved with the spreadsheet file.

If you change the **F**ormats **D**isplay default, all existing entries in your spreadsheet are changed to reflect the new format and all subsequent entries will use the new format (except those formatted locally with the **B**lock **D**isplay Format command).

Note: If your screen is split into two windows, only the current window is affected by changes to the default display format. The other window will show the spreadsheet with the original formats. When you close the second window, the default format set in the top or left window is used. (**D**isplay format set locally with the **B**lock **D**isplay Format command (*/BD*) affects *both* windows, however.)

For further details on each of these display formats, see "Changing Display Format" on page 75. That section also describes how to assign a different display format to a specific block of cells.

Default Label Alignment

The **A**lign default determines the general alignment of labels in the spreadsheet (left, right, or centered). Initially, this default is set to **L**eft Align, which aligns labels flush with the left sides of their cells.

You can align labels differently by preceding them with label-prefix characters (see page 42) or by using the **B**lock **L**abel Align command (see page 80).

If you intend for most of the labels in your spreadsheet to be either right-aligned or centered, specify this with the default alignment setting. If you want the change to affect *all* spreadsheets, update the defaults with the **D**efault **U**pdate command (*/DU*) after changing this setting.

All labels you subsequently enter will be aligned by the new setting (unless preceded by a contrasting label-prefix). Unlike the display format default, existing entries are not affected. To alter the alignment of existing entries, you must use the **B**lock **L**abel Align command (or change the label's prefix).

Value entries (including the results of @STRING functions) are always aligned right and are unaffected by label alignment settings.

Default Zero Display

Initially, all values are displayed in the spreadsheet, even when they equal zero. The **H**ide Zeroes command lets you suppress the display of any cell entry whose value equals zero, whether it was entered directly or calculated with a formula. The zero values (or formulas resulting in them) will be shown on the descriptor line, however, when the cells containing them are selected.

Hiding zeroes removes from display only those values that equal *exactly* zero. In other words, a value such as .0004 would display 0 if the decimal precision was set to 3 or less, even if zero suppression was active, because the actual value of the entry is not 0.

Zero suppression does not remove the zero values from the database. They remain in memory, even though hidden, and return when you reset the **H**ide Zero default to **N**o.

Caution: When zero suppression is on, it is very easy to accidentally write over cells that may contain formulas.

Default Column Width

When a blank Quattro spreadsheet first appears, all its columns are the same width (initially nine characters wide). You can adjust the width of all columns at once by changing the **W**idth of Col setting.

If you update the defaults (using the **D**efault **U**pdate command) after changing the **W**idth of Col setting, the change will be saved as the new default, and all spreadsheets subsequently created will use this default. If you don't update the new setting, the previous **W**idth of Col setting will be used next time you load the program. The default column width is always stored with the spreadsheet. It resumes effect the next time you retrieve this particular spreadsheet.

The column width default does not affect columns that have been individually adjusted with the **C**olumn **W**idth command. Before those can be affected by the default width, they must be returned to the default column width with the **C**olumn **R**eset command (see page 103).

Note: If your screen is split into two windows, only the current window is affected by changes to the default column width (or columns adjusted individually with the **C**olumn **W**idth command). The other window will show the spreadsheet with the original column widths. When you close the second window, the column widths of the top or left window are retained.

Default Clock Display

The **C**lock default determines how the date and time are displayed on your Spreadsheet Screen (see Figure 5.17).

Figure 5.17: Default Clock Display Menu

Initially, Quattro displays the date and time in the **S**tandard format (DD-MMM-YY and HH:MM AM/PM). You can choose the **I**nternational format, which displays date and time in the Long International formats specified with the **I**nternational **D**ate and **T**ime commands (see page 134). You can also choose **N**one, which removes the clock display from the screen. If you

want to use the new clock format from now on, press *Esc* twice and select **U**pdate from the Default menu.

Quattro updates the time displayed on your screen every 60 seconds. If the time or date displayed is incorrect, you need to update your computer's internal clock. Press */FD* to access DOS, type

```
TIME HH:MM
```

and then press *Enter*, and/or

```
DATE MM/DD/YY
```

and press *Enter*. Type

```
EXIT
```

and press *Enter* to return to Quattro.

Directory Defaults

When you first load Quattro, the disk drive and/or directory you've loaded the program from is used as the default directory for all Quattro files. This is the directory Quattro automatically checks for files when no other directory is specified.

The **D**efault **D**irectories command lets you specify different default directories for your Quattro resource files and data files. When you select this command, the Directories menu is displayed (Figure 5.18).

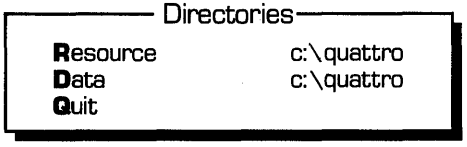


Figure 5.18: The Directories Menu

Data indicates which directory spreadsheet files are stored in.

Resource indicates which directory Quattro program resource files are stored in. These are files Quattro needs to access for certain functions, such as translating files or printing graphs.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Directories menu to the Default menu.

Once you've specified new default directories, you'll probably want to save them permanently with the **D**efault **U**pdate command (*/DU*).

Data Directory

The data directory contains the spreadsheet files you create with Quattro. Initially, this default is set to the directory from which you loaded Quattro. You can specify a different directory with then **D**ata command on the Default Directories menu (*/DDD*).

When you select this command, Quattro prompts you for a path name. Enter the path, including the drive letter, of the directory you want to store you data files in. For example,

```
C:\Quattro\FILES
```

stores your data files in a subdirectory called FILES within the Quattro directory on your hard disk (C:).

Quattro stores spreadsheet and other data files in the default data directory when you don't indicate a different directory or drive. It also displays the contents of this directory when you are retrieving or storing a file. You can override this directory with any **F**ile command simply by preceding the file name you specify with a different directory path (see "Entering a File Name" on page 157).

You can also temporarily change the directory Quattro goes to with the **F**ile **D**irectory command (see page 158). Any changes to the data directory default, however, are made automatically to the **F**ile **D**irectory command.

Note: If you installed Quattro for use with a floppy-disk system, your data directory should be set to Drive B.

Resource Directory

The resource directory refers to the location of your Quattro resource files (those files on your Resource program disk). The initial setting for this default is the directory from which you loaded Quattro, or (if you installed Quattro for a floppy-disk system) Drive B.

If Quattro can't find the program's resource files, you won't be able to use Quattro graphics or load a different user interface.

When you select **R**esource from the Default Directories menu (*/DDR*), Quattro prompts you for a path name. Enter the path, including the drive letter, of the directory containing your Quattro resource files. For example,

```
B:
```

indicates that your resource files are stored in Drive B. And

```
C:\QUATTRO
```

indicates that your resource files are in a directory named QUATTRO on your hard disk.

Note: If you have a floppy-drive system, your resource directory will be set to B:, even though you move your Resource Disk to Drive A after loading Quattro. This is because resource access is most important during loading. Quattro will still be able to find your resource files on Drive A after loading, however, because what it doesn't find in the resource directory (Drive B), it will look for in Drive A.

Recalculation Defaults

The **R**ecalculation defaults determine the way formulas in the spreadsheet are recalculated. When you select the **R**ecalculation command, the Recalculation menu appears (Figure 5.19).

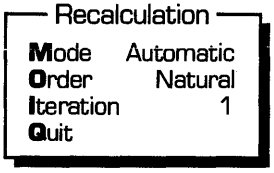


Figure 5.19: The Recalculation Menu

Mode specifies whether formulas are calculated automatically or only when you press the CALC key (*F9*).

Order determines the sequence in which formulas in a spreadsheet are calculated.

Iteration determines how many times formulas in the spreadsheet are recalculated before calculation is considered complete.

Quit returns you to the Default menu.

Manual versus Automatic Mode

Normally, recalculation mode is set to Automatic: When you alter a cell's value, any formula depending on that value is immediately recalculated.

Recalculation time is greatly minimized by Quattro's method of minimum recalculation, which recalculates only those formulas that have been changed. (Most spreadsheet programs recalculate all formulas in the

spreadsheet whenever a change is made.) Still, the recalculation pause can sometimes be annoying. You can avoid it by setting recalculation mode to **M**anual. Select **M**ode from the Default Recalculation menu, then select **M**anual (*/DRMM*).

When recalculation mode is set to **M**anual, Quattro still calculates formulas when you enter or edit them, and displays the resulting value. It does not, however, automatically recalculate formulas whose references change. For example, if you enter +B3-C16 in a cell, the resulting value is displayed. That same value continues to be displayed, even if you change the values contained in B3 or C16.

If any formula in the spreadsheet needs to be recalculated, the CALC status indicator appears at the bottom right of the screen to remind you that the spreadsheet is not entirely accurate. To recalculate all formulas that need it, press the CALC key (*F9*). Formulas are recalculated as necessary, and the CALC indicator disappears.

To recalculate a single cell, select the cell, press EDIT (*F2*), then *Enter*. (This works only if the formula is not dependent on other formulas.)

Automatic is the recommended recalculation mode, since it ensures that your spreadsheet data is always accurate. **M**anual mode is most appropriate as a temporary break from recalculation while you adjust crucial cells. You should then return to **A**utomatic mode for increased accuracy and spreadsheet speed. If you do use **M**anual mode for any length of time, press *F9* frequently to speed up system response time.

To reinstate automatic recalculation, select **M**ode from the Default Recalculation menu, then **A**utomatic (*/DRMA*).

Order of Recalculation

The **R**ecalculation **O**rder command has three options: **N**atural, **R**owwise, and **C**olumnwise.

Normally, Quattro recalculates a spreadsheet in **N**atural order. This means that before a formula is calculated, each cell it references is recalculated first, to ensure accuracy.

Before natural recalculation was introduced, the only orders available were **R**owwise and **C**olumnwise. These orders are maintained as options for Quattro, even though they are rarely used and are not recommended.

In the **C**olumnwise option, recalculation starts in cell A1 and proceeds down column A, ignoring formulas in other columns. When A is finished,

recalculation continues in B1, and on down column B. This continues through to the end of the spreadsheet (column IV).

Rowwise recalculation also starts in cell A1, but the recalculation proceeds by rows, starting at 1 and continuing through row 8192.

When recalculation order is set to Columnwise or Rowwise, one pass through the spreadsheet is not sufficient. With just one pass, formulas with references occurring after the formula could be inaccurate. Therefore, if you use either of these methods, you must also specify the number of iterations to perform to complete the recalculation. Usually two iterations are sufficient.

Number of Iterations

Many complex formulas, such as those involving financial calculations and complicated engineering problems, require multiple evaluations to attain an acceptable degree of accuracy. These formulas are therefore deliberately constructed to contain *circular references*, references that eventually refer back to the original formula. For such applications, Quattro allows you to set the number of iterations, or cycles of recalculation, to be performed each time the spreadsheet is recalculated.

When you select Iteration from the Recalculation menu, Quattro prompts you for a number. You can specify up to 255 iterations. For each iteration, Quattro recalculates all cells with circular references.

Note: If you have specified either a Columnwise or Rowwise order of recalculation, you should set the number of iterations to at least four. Otherwise, the spreadsheet may be inaccurate.

If Quattro can't find any circular references in the spreadsheet and recalculation order is set to Natural, the iteration count is ignored.

Protection Defaults

A completed spreadsheet represents hours, days, or even weeks of work—work that could all too easily be destroyed with an erroneous Block Erase command or an overwritten formula. The Protection command lets you protect your work by disallowing changes to the spreadsheet.

When you select Protection from the Default menu, the Default Protection menu is displayed (Figure 5.20).

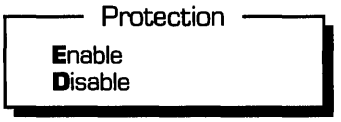


Figure 5.20: The Default Protection Menu

Enable turns on global spreadsheet protection. All cells in the spreadsheet are protected, unless explicitly unprotected with the **B**lock **A**dvanced **U**nprotect command (see page 93).

Disable removes *all* protection from the spreadsheet. The status of cells that have been explicitly protected or unprotected with **B**lock commands is ignored until you exit **D**isable mode.

To protect *part* of your spreadsheet, set **D**efault **P**rotection to **E**nable, then use the **B**lock **A**dvanced **P**rotect command (*/BAP*) to "unprotect" the cells you want to allow changes to.

When default protection is enabled, protected cells display PR on the descriptor line when selected and unprotected cells display U. When default protection is disabled, cells that have been explicitly "unprotected" display U on the descriptor line when selected.

You cannot delete a column or row that contains a protected cell. You *can*, however, erase a protected spreadsheet with the **E**rase command.

Default protection status is saved with the spreadsheet. When you protect a spreadsheet, is remains protected until you unprotect it.

To protect or unprotect cells individually or as blocks, use the **B**lock **A**dvanced **P**rotect and **U**nprotect commands (see page 93).

To prevent unauthorized access to a spreadsheet, assign a password to the spreadsheet file (see page 162).

Startup Defaults

The **S**tartup defaults include information that Quattro references each time it is loaded. When you select **S**tartup from the Default menu (*/DS*), the Startup menu is displayed (Figure 5.21).

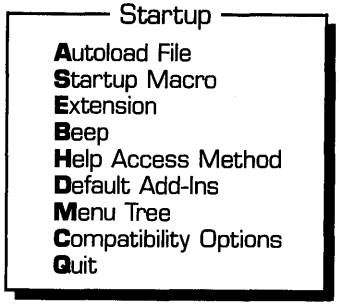


Figure 5.21: The Startup Menu

Autoload File specifies the name of a spreadsheet file to be loaded (if found) automatically each time you enter Quattro.

Startup Macro specifies the name of a macro to be executed automatically (if found) each time you retrieve a spreadsheet.

Extension specifies the default file-name extension to use for spreadsheet files. When you don't specify an extension with file commands, this extension is assumed. The initial default is .WKQ, which stores files in Quattro format. To store files for use with another program, specify the file-name extension used by that program with this command (see "Translating Files" on page 166).

Beep determines whether or not Quattro beeps when you make an error. The initial default is **Yes**. To turn off the beeps, set this command to **No**.

Help Access Method determines whether Quattro leaves help files open between accesses (for hard disks) or closes them each time (for floppy-drive systems).

Default Add-Ins specifies up to eight program add-ins to be loaded automatically each time you start up Quattro.

Menu Tree lets you specify a different menu structure to use with Quattro. You can specify one main menu tree (to use most of the time) and one alternate menu tree (to switch to occasionally).

Compatibility Options offers several default options that let you make Quattro more compatible with other spreadsheet programs: how the menus work, when Quattro displays a confirmation menu, and how macros are recorded.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Startup menu to the Default menu.

Once you've set the startup defaults to what you want, be sure to select **U**pdate from the Defaults menu to save them.

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

The following subsections detail these options.

Setting Autoload Defaults

With the first three startup defaults you can specify the following items to be loaded automatically when you load Quattro:

- a spreadsheet file
- a macro
- up to eight program add-ins

Each time you load Quattro, it checks to see if there's a spreadsheet file with the name specified as the autoload name. If so, it retrieves it automatically. If autoload add-ins are specified, it then loads each one. Each time you retrieve a spreadsheet, Quattro looks for a macro with the specified autoload macro name. If it finds one, it executes it.

After you've changed autoload defaults, be sure to select Update from the Default menu (*/DU*) to save them.

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

Autoload File

Initially, the default autoload file is QUATTRO.WKQ, which means that each time you load Quattro, Quattro looks for a file in the default data directory named QUATTRO.WKQ. If Quattro finds it, it retrieves it automatically.

You can change this default to specify loading a file with a different name. Just select **A**utoload File from the Startup menu. Quattro prompts you for a file name and displays a list of existing files in the current directory. Select one from the list, or type in a file name. If you want to automatically load a file in a different directory, specify the directory with the file name.

After you specify a new autoload file, return to the Default menu (press *Esc*) and select **U**pdate. Otherwise, the new file name will be discarded when you exit Quattro.

You can also automatically retrieve a spreadsheet when you load Quattro by specifying the file name with the Quattro load command, for example,

```
Q FILENAME
```

(see page 6 for details).

Autoload Macro

Initially, the default startup macro is \0, which means that every time you retrieve a spreadsheet file, Quattro looks for a macro named \0 and, if found, executes it automatically.

You can change this default to specify executing a macro with a different name. Just select **S**tartup Macro from the Startup menu and enter any macro name.

After you specify a new startup macro, return to the Default menu (press *Esc*) and select **U**pdate. Otherwise, the new macro name will be discarded when you exit Quattro.

Caution: Selecting **U**pdate from the Default menu saves *all* default settings.

You can use the startup macro with an autoload file to automatically load a special application when you start Quattro.

You can also automatically load a macro with a spreadsheet by specifying both on the DOS command line when you load Quattro, for example,

```
Q FILENAME MACRO
```

(see page 6 for details).

Autoload Add-Ins

You can specify up to eight program add-ins to be loaded automatically when you load Quattro.

When you select **D**efault Add-Ins from the Default Startup menu (*/DSD*), Quattro displays the Default Add-In menu (Figure 5.22).

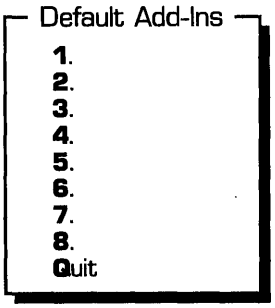


Figure 5.22: The Default Add-In Menu

If any default add-ins have already been specified, they are shown.

Select any blank number. Quattro prompts you for the name of an add-in and displays a list of add-ins in your resource directory. Select one from the list, or type it in. Repeat for each add-in you want loaded automatically.

Once you've specified default add-ins, return to the Default menu (press *Esc*) and select **U**pdate. Otherwise, the add-in defaults will be erased when you exit Quattro.

Each time you load Quattro, it will automatically load the add-ins specified as defaults. (To *run* the add-ins, you must still select **R**un from the Macro menu (*/MR*), but you won't have to load them first.)

Setting the Computer's Beep

Normally, when you make an error while working with Quattro (for example, if you enter a formula with the wrong syntax), Quattro causes your computer to beep.

If you find the beep annoying, you can turn it off by setting the **B**eep command on the Startup menu to **N**o (*/DSBN*). To reinstate the beeping, set the command back to **Y**es.

Setting the Help Access Method

The **H**elp Access Method command determines whether Quattro leaves help files open between accesses or closes them each time. The initial

default, **R**emovable, assumes you have a floppy-drive system and therefore closes the file between accesses (in case you remove the disk).

If you have a hard disk, you can speed up access to Quattro's help file by selecting **I**nstant as the help access method. This allows Quattro to leave the help file open between accesses, giving you an "instant" help window when you press *F1*.

After you've changed the Help Access default, be sure to select **U**pdate from the Default menu (*/DU*) to save it.

Caution: Never set the **H**elp Access Method to **I**nstant if your Help files are not on your hard disk.

Using a Different Menu Tree

A menu tree is the structure of menus you use to give Quattro commands. Normally, the standard Quattro menu tree (the one documented here) is used. If you want to use a different menu tree—either one of the optional menu trees or one you've created with the Menu Builder—specify it with the **M**enu Tree command.

You can also specify a second menu tree, an *alternate menu tree*, to switch to occassionally.

When you select **M**enu Tree from the Default Startup menu, the Menu Tree menu is displayed (Figure 5.23).

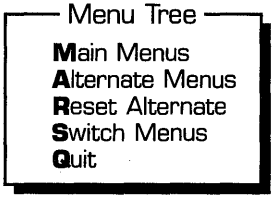


Figure 5.23: The Menu Tree Menu

To change the main menu tree, select **M**ain Menus from the Menu Tree menu (*/DSMM*). Quattro displays a list of available menu trees. After you select a different interface, you must exit and reenter the system to establish the new interface. You can do this by selecting the **F**ile **O**S command, then typing `EXIT` *Enter* to return.

Caution: If you want to use the menu tree you've specified the next time you load Quattro, be sure to select **U**pdate from the Default menu (*/DU*).

To establish an alternate interface, select **A**lternate Menus and select another menu tree from the displayed list.

To use the alternate menu trees, select **S**witch Menus from the Menu Tree menu, then select **A**lternate menus. Quattro switches the alternate menus as soon as you return to the spreadsheet. To return to the main menu tree, select **S**witch Menus again and choose **M**ain Menus.

The alternate menu tree takes up extra space in your system's memory. If you've specified an alternate menu tree and find that you're not really using it, it's a good idea to remove it. Select **R**eset Alternate from the Menu Tree menu.

To use the new menu tree each time you use Quattro, select **U**pdate from the Default menu.

Note: To load Quattro and install the Lotus-compatible menu names, as well as several Lotus-compatible default settings, enter Q123 on the DOS command line instead of Q. (See page 153 for details.)

Setting Compatibility Options

Quattro offers several options that allow for compatibility with other products. To set them, select **C**ompatibility Options from the Default Startup menu (*/DSC*). The Compatibility menu is then displayed (Figure 5.24).

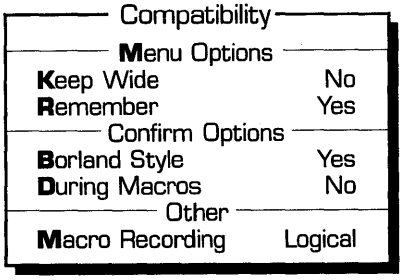


Figure 5.24: The Compatibility Menu

Keep Wide determines whether menus are initially displayed with settings or without. The initial default, **No**, displays narrow menus (without settings) unless explicitly expanded with the EXPAND key (the grey + on the numeric keypad). If you set this setting to **Yes**, the menus are expanded to show setting, unless you explicity contract them with the CONTRACT (minus) key.

Remember determines whether Quattro highlights the last item you used when you return to a menu. The initial default, **Yes**, has Quattro "remember" your place in each menu, so that the next time you display the menu, the item highlighted when you were in the menu last is still highlighted.

Borland Style determines when confirmation, or warning, menus are displayed. The initial default, **Yes**, asks for confirmation only when there's the possibility of data loss. If you want a confirmation menu *always* displayed when you erase a worksheet or quit (as Lotus 1-2-3 does), set this default to **No**.

During Macros determines whether or not confirmation menus are displayed during macro execution. The initial default, **Yes**, asks for confirmation as required during macros. If you want to hold off confirmation during macros, set this default to **No**.

Macro Recording determines how macros are recorded. The initial default, **Logical**, translates menu commands into special menu-equivalent commands that can be used by all Quattro interfaces. If you set this to **Keystroke**, Quattro will record actual keystrokes pressed instead. However, you won't be able to use the macros you record in **Keystroke** mode with other interfaces. **Quit** returns you to the spreadsheet.

Press *Esc* to back out of the Confirmation menu to the Default Startup menu.

If you want to save any changes you made to the Compatibility menu, select **Update** from the Default menu (*/DU*).

Updating the System Defaults

When you make a change to any of the Quattro default settings, that change remains in effect until you exit Quattro. When you reload Quattro, the previous settings take effect.

If you want to make your new settings permanent, select **U**pdate from the Default menu. The new settings are stored in the Quattro defaults file (QUATTRO.DEF) and will be in effect each time you load Quattro.

Note: If you loaded Quattro using the Q123 command (see the next section), Quattro stores any default changes you update in the 123.DEF file instead of the QUATTRO.DEF file.

Caution: Selecting **U**pdate from the Default menu updates *all* system defaults. If there are some defaults you want to change only temporarily, set these *after* you've made and updated changes you want to save.

The following default settings are stored with the spreadsheet file, regardless of whether or not you update defaults:

Display Format
Column Width
Label Alignment
Protection
Recalculation
Hide Zeroes

When you retrieve a spreadsheet, the settings for those commands that were in effect when the file was saved resume effect.

To restore the original defaults, delete the QUATTRO.DEF file from your disk or directory.

Installing a Different Set of Defaults

Quattro includes a special file that allows you to reconfigure Quattro defaults to behave in a Lotus-compatible manner. It includes not only the **S**tartup **C**ompatibility **O**ptions settings, but also things like placement of the descriptor line. It also loads an optional file created with the Menu Builder (123.RSC) as the main menu tree.

You can load this file with Quattro, automatically setting the defaults as you load. Just type:

```
Q123 Enter
```

This loads a special batch file that contains one command:

```
Q /D 123.DEF
```

The */D* inserts settings from the default file (123.DEF) into Quattro.

If you're a programmer and want to create your own default file, you can load it using the */D* command.

C H A P T E R

6

Saving and Retrieving Files

Information you enter in a spreadsheet is stored temporarily in system memory, called RAM (random-access memory). RAM is an intermediate storage area in your computer; it allows instant access to data, considerably lessening the time required to perform calculations, scroll the spreadsheet, and so on. However, RAM is temporary. When the computer is turned off, power is lost, or Quattro is exited, all data stored in RAM is erased.

In order to use a spreadsheet again at a later time, you must save it on a *disk*—either a floppy disk or a hard disk. Each spreadsheet you save is stored in a *file* with a unique name. Once you've saved a spreadsheet in a file, you can *retrieve* it at any time. The spreadsheet is redisplayed on the screen, replacing any existing data.

You can even retrieve spreadsheet files created with other popular programs, or store Quattro files for use with other programs; Quattro translates the files automatically.

This chapter describes how to:

- save a spreadsheet in a file
- retrieve a spreadsheet file
- save and retrieve files in different program formats, such as Lotus 1-2-3 or Paradox
- delete a file from your disk
- save part of your spreadsheet in a separate file
- compress spreadsheet files for efficient storage
- insert data from another file into the current spreadsheet

- import text files, translating them into spreadsheet format
- break down long labels created by imported text into separate cells

The File Menu

All file functions are accessed through the File menu (Figure 6.1). To display this menu, select File from the main menu (*/F*).

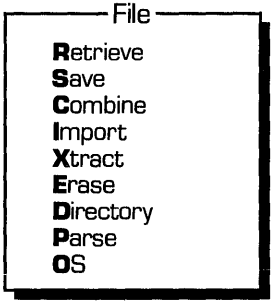


Figure 6.1: The File Menu

Retrieve lets you display a spreadsheet stored in a file, replacing the current spreadsheet.

Save lets you save the current spreadsheet in a file.

Combine lets you merge two spreadsheet files together.

Import lets you retrieve a text file and automatically translate it into spreadsheet format.

Xtract lets you copy part of a Quattro spreadsheet into a separate file.

Erase lets you delete files from your disk.

Directory lets you temporarily override the default data directory set with the Default command.

Parse lets you break down long labels into separate cell entries. It's used to translate text files created with other programs.

OS lets you access DOS (the operating system) without leaving Quattro. You can then return to your spreadsheet exactly where you left off.

Each of these commands (except **OS**) is described in detail in the following sections. The **OS** command is discussed in Chapter 1, "Quattro Basics," on page 27.

Entering a File Name

Most **File** commands require the name of a file to work on. When you select one of these commands, Quattro prompts you for a file name, shows the current directory as the default, and displays a list of files in that directory. If you select **File Save** after retrieving a file, the name of the file retrieved is shown as the default.

The simplest way to respond to the file prompt is to type in the name of the file you want and press *Enter*. Quattro offers numerous options, however, for entering file names and directories. For example, you can

- Select any file name from the list to enter it as the response.
- Select a subdirectory from the list to display a list of files in that directory.
- Press *Backspace* with a list displayed to show files in the parent directory.
- Press the spacebar to edit the existing file name.
- Display a list of files in any directory by pressing *Esc* twice to erase the path name, entering a different path name, and pressing *Enter*.
- Display a list of files that match any wildcard you type. For example, *.PRN displays a list of all text files in the directory. 87*.WK? displays a list of all spreadsheets with names beginning with 87. An asterisk looks for any number of characters in its position. A question mark looks for any single character in its position.

Table 6.1 details the effects of different actions on file prompts—with a default file name shown, with default directory and file list shown, and with no default shown after the prompt.

Table 6.1: The Effects of Keys Pressed with a File Prompt Displayed

	With a File Name Shown	With a List Shown	With No Default Shown
Press *Ctrl-Backspace*	Clears the entire prompt.	Clears the entire prompt.	Clears the entire prompt.
Press *Esc*	Replaces the file name with a wildcard and displays a list of files in current directory.	Removes list, erases wildcard from prompt line.	Erases path name.
Press *Backspace*	Beeps or, if editing, erases the character in back of the cursor.	Displays a list of all files in the parent directory.	Beeps.
Begin Typing	Replaces the file name on the prompt line with what you type.	Removes list and replaces the wildcard on the prompt line with what you type.	Adds characters to the prompt line.
Press the spacebar	Moves the cursor on the prompt line. Lets you edit the response.	Removes list and wildcard. Adds space to the prompt line.	Adds space to the prompt line.
Press *Enter*	If the name ends in :, \, or a wildcard, a list of files in the specified directory is displayed. Otherwise, the file name is entered as the response.	Enters the file name highlighted on the list. If a directory name is highlighted, a list of files in that directory is displayed.	Adds current directory path to the prompt line, and shows a list of all files in the directory.
Press EXPAND		Shows the date, time, and size for each file.	
Press CONTRACT		Removes the date, time, and size for each file.	

Specifying a Temporary Data Directory

The data directory is the disk drive and/or directory specified as the default with the **Data** command on the Default Directories menu (see page 141), and is used to store spreadsheet files.

When you use a **File** command, Quattro displays a list of files in the default data directory. Unless you specify otherwise, spreadsheet files are saved in it and Quattro looks in this directory when you retrieve a file.

You can always override this directory by specifying a different one with one of the **File** commands. To display files in a different directory, just type the directory path and press *Enter*.

You can also temporarily access a different directory with the **Directory** command. When you specify a directory with the **Directory** command, files in that directory are then displayed each time you initiate a **File** command, overriding the default data directory.

To temporarily change the data directory:

1. Select **Directory** from the File menu (*/FD*). Quattro prompts you for a directory path name.
2. Enter the path name leading to the directory you want. Press *Esc* to erase the existing default, or edit it as shown. If the disk drive differs from the current directory, include the drive designation as well, for example, C:\BUDGET\EXPENSES.

Quattro uses the new directory until you specify a new one with the **Directory** command, change the default data directory, or exit Quattro. The **Directory** setting is then erased and Quattro defers to the original default data directory.

As with the default data directory, you can always override the temporary directory by specifying a directory along with a file name.

To change the default data directory, use the **Data** command on the Default Directories menu (*/DDD*) (see page 141). When you change this default directory, the **File Directory** command is automatically set to the same directory. Changing the temporary directory does not affect the data directory default, however.

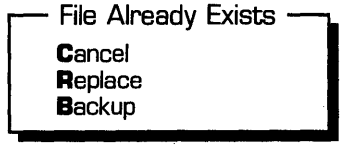
For more information on using subdirectories, see Appendix B, "A DOS Primer," on page 409.

Saving a Spreadsheet

The File Save command stores the current spreadsheet in a disk file, under the file name you specify.

To save a spreadsheet in a file:

1. If you're using a floppy-based system, make sure there's a work disk in the default data drive.
2. Select Save from the File menu (press */FS*). A list of spreadsheet files in the default data directory is displayed, and Quattro prompts you for a file name. It shows the data directory path as the default. If the spreadsheet has been saved before, the current file name is included as the default. Otherwise, it displays a list of files in the current directory.
3. To use the default file name, press *Enter*. To use a different file name, edit the existing name, or press *Esc* and enter a new name or choose one from the list. If you don't specify a file name extension, the default extension (initially .WKQ) is added automatically. (If you specify a different extension, you'll have to include it each time you refer to the file.) To store the file in a different directory, press *Esc* twice and type the new directory path, followed by the file name.
4. If the file name you specified already exists, an Overwrite Warning menu appears:



5. Select the desired option.
   - **Replace** writes over the existing file with the new data.
   - **Backup** makes a copy of the existing file, giving it a .BAQ file name extension. To later retrieve the backup file, include the .BAQ extension with that name.
   - **Cancel** interrupts the command and returns you to the spreadsheet; you can then save the spreadsheet under a different file name.

The spreadsheet is saved in the specified directory. It remains on your screen and you can continue working on it. If you want to create a new spreadsheet, you can erase the current one (from the display only; the file

remains intact) by selecting Erase from the main menu (/E). If you want to retrieve another spreadsheet file, use the File Retrieve command (/FR).

Note: If your floppy disk doesn't have enough room to store the spreadsheet, Quattro displays an error message. Press Esc, insert a new disk, and try again. If you don't have a preformatted disk, you can use the OS command to return to DOS and format one without having to exit Quattro.

When you save a spreadsheet, the data in the spreadsheet is stored with any formatting information, including display format, label alignment, column width, protection, recalculation mode, and zero display. Also saved are any graphs and named blocks created with the spreadsheet. All system defaults are *not* stored with individual spreadsheets; a spreadsheet assumes the current setting for these defaults the next time it's retrieved.

To save a Quattro spreadsheet file for use with another program, such as Lotus 1-2-3 or dBASE, include the program's data file extension with the file name when you save it (see "Translating Files" on page 166 for details).

For details on the mechanics of entering a file name, refer back to page 157.

Assigning a File Name

File names can be up to eight characters long and can consist of both letters and numbers. You can enter file names using either upper or lower case, but lowercase letters will be converted to uppercase. Do not use spaces in a file name. You can, however, use the underscore character (_) to simulate spaces, for example, 87_SALES.

When you name a file, use a name that will help you remember what is in the file, such as BUDGET or TAXES. If you have several similar files, you can differentiate between them by adding dates (BUDGET86 or TAXES615). If you share a disk with other people, it's a good idea to begin each of your file names with your initials. This ensures that all your files will be displayed together, since Quattro sorts file names alphabetically.

Caution: If the name you give a file is more than eight characters long, Quattro truncates it. This will cause problems if the the first eight characters of two file names are the same. For example, SPREADSHEET1 and SPREADSHEET2 would both be truncated to SPREADSH, and saving one would overwrite the other.

Unless you're saving your file for use with another program, it's easiest if you don't include an extension with the file name. The default extension

(initially .WKQ) is then added automatically and you won't have to include it when you retrieve the file later. (To change the default extension, see page 146).

Saving While Working

If there is an interruption of power, or a mistaken keystroke that erases important data, your only "backup" is the last version you saved on disk. For this reason, it's a good idea to save your spreadsheet periodically during the course of your work.

Note: You can back up your work automatically with the Transcript add-in. Then, if there's a system or power failure, you can easily recover your work. See Chapter 13, "Using Add-Ins," for details.

Assigning a Password to a File

When you save a spreadsheet file, you can protect it from unauthorized access by giving it a password. That password must then be supplied before the file can be retrieved.

To assign a password to a spreadsheet:

1. With the spreadsheet displayed, press */FS* to select **S**ave from the File menu. Quattro prompts you for a file name.
2. Type the name of the file, followed by a space and the letter P.
3. Press *Enter*. Quattro prompts you for a password.
4. Type the password you want to give the file. You can use up to 16 characters. The characters you type are shown on the screen as asterisks (to thwart eavesdroppers).
5. Press *Enter*. Quattro asks for verification, just in case you made a typographical error.
6. Type the password again, and press *Enter*. If the password differs at all from the first one you typed, an error message is displayed and the command is aborted.

A file that's been assigned a password is said to be *encrypted*. To retrieve an encrypted file, supply the correct password.

Caution: If you forget the password you assign to a file, you won't be able to access it. For this reason, it's important to record your passwords when you create them—either on paper or in another encrypted file.

In the United States, Quattro uses the DES method of encryption to assign a password to a file. This method is much more secure than that used by Lotus 1-2-3. Quattro can retrieve files encrypted by Lotus 1-2-3 (assuming you supply the correct password), but Lotus cannot open files encrypted by Quattro's default encryption method. If you want to be able to use an encrypted Quattro file with Lotus 1-2-3, assign a .WK1 extension to the file when you encrypt it. Quattro then uses an encryption method that can be decrypted by Lotus 1-2-3.

Note: To save or retrieve a .WK1 file, the FSWK1.TRN and FRWK1.TRN files must be present in the default resource directory. To save or retrieve an encrypted Quattro file, the FSWKQ.TRN and FRWKQ.TRN files must be present.

Retrieving a File

Once you've saved spreadsheet data in a file, you can redisplay it at any time by retrieving it with the **File Retrieve** command (*/FR*). You can also retrieve files created with other spreadsheet programs; Quattro translates them automatically.

Retrieving a file clears system memory (RAM) and fills it with the specified spreadsheet data. Any changes made to the previous spreadsheet since saving it are lost. So be sure to save the current spreadsheet before retrieving a different one.

To retrieve a spreadsheet file:

1. If there's data in the current spreadsheet that hasn't been saved, and you don't want to lose it, save it (press */FS*).
2. Select **Retrieve** from the File menu (*/FR*). Quattro prompts you for the name of a file, with the current data directory shown as the default. It also displays a list of Quattro spreadsheet files in that directory.
3. If you want to access a different directory, press *Esc* twice to erase the path, then enter a new one and press *Enter*. Quattro spreadsheet files are then listed for that directory.
4. Enter a file name or choose one from the displayed list (highlight it and press *Enter*). You can switch to a different directory by pressing *Esc* twice and typing a new path name. When you press *Enter*, a list of files for that

directory is displayed. To display a list of files in a different directory, type the path name and press *Enter*. Select a name from the list or type one in. If you type the name, use either upper or lower case, and don't include a file-name extension, unless the file was created with a different program.

5. If the file has been assigned a password, Quattro prompts you for it. Type the password and press *Enter*. If the password is incorrect, Quattro displays an error message and aborts the command.

When a spreadsheet is retrieved, it replaces any existing data on the screen.

To retrieve a file that was created with a different program, include the file-name extension when you retrieve it (see "Translating Files" on page 166).

For details on the mechanics of entering a file name, refer back to page 157.

Note: When Quattro retrieves a backup file, it assumes it was created with Quattro. If not, change the extension of the file back to what it was before you retrieve it.

Retrieving a File from the Command Line

When you first load Quattro (by typing Q *Enter* from the DOS prompt), you can specify a spreadsheet file to be retrieved at the same time.

To specify a spreadsheet, type Q, followed by a space and the name of the file you want to retrieve, for example,

```
Q BUDGET
```

To load a file from a directory other than the default data directory, include the path name with the file name, for example:

```
Q C:\COMPANY\BUDGET
```

loads both the BUDGET file in the COMPANY directory on the hard disk and Quattro at the same time. If it can't find the directory or the file you specify, Quattro beeps and displays an error message. The program will load, but with a blank spreadsheet.

You can also invoke a macro from the command line by including its name after the program name and a file name. For example,

```
Q BUDGET \P
```

loads Quattro, retrieves the BUDGET file, and invokes a macro named \P. For more information on macros, see Chapter 12, "Using Macros," on page 355.

Automatically Retrieving a File

When you start Quattro from DOS without specifying a particular file name for it to retrieve, a blank spreadsheet is normally displayed. However, if your default data directory contains an autoload file, this file is retrieved automatically.

An *autoload file* is a spreadsheet file specified with the Autoload File command on the Default Startup menu (see page 146). Initially, this default is QUATTRO.WKQ, and any spreadsheet file named QUATTRO is loaded automatically when no other is specified. However, you can change the default to any file name you like.

This feature lets you immediately display the spreadsheet you use most often. If you use a *template* to create spreadsheets (a spreadsheet you've created with the basic parameters you use most often), you can display it automatically instead of the blank spreadsheet. (For more information, see the next section.)

Creating Custom Spreadsheet Templates

After you've worked with Quattro for awhile, you may find certain traits typical of your spreadsheets: macros you use repeatedly, standard column widths or numeric formats, and so on. You can save yourself the time required to set up standard spreadsheets by creating spreadsheet templates.

A spreadsheet template is like a structural skeleton that you can use as a base for your spreadsheet. You can store in it whatever "personal defaults" you wish. When you retrieve the template, much of your initial work will be done for you.

You may want to create several types of spreadsheet templates, for example, one for a monthly budget, another for expense reports. The templates can be forms you simply need to fill out.

Translating Files

Quattro includes several special translator files that save spreadsheets in formats for use with different programs and automatically translate files created with different programs when you retrieve them. It recognizes the format required by each program by the file's extension.

Table 6.2 shows the types of files Quattro can translate, the extensions used for each, and the translator files required for each.

Table 6.2: Files Quattro Can Translate

Extension	Program	Translator Files Required	
		To Save	To Retrieve
.DB	Paradox	FSDB.TRN	FRDB.TRN
.DBF	dBASE III	FSDBF.TRN	FRDBF.TRN
.DB2	dBASE II	FSDB2.TRN	
.WRK	Symphony	FSWRK.TRN	FRWRK.TRN
.WK1	Lotus 1-2-3, version 2.0	FSWK1.TRN	FSWK1.TRN
.WKS	Lotus 1-2-3, version 1A	FSWKS.TRN	FSWKS.TRN
.WKE	Lotus 1-2-3, Educational	FSWKE.TRN	FSWKE.TRN

To save a file for use with one of the above programs, just include the appropriate extension when you save it. For example, to save the spreadsheet MYFILE for use with Symphony, specify the file name as MYFILE.WRK.

To retrieve a file created by one of the above programs, just include the file's extension when you retrieve it.

Note: dBASE II and dBASE III use the same file-name extension but different file formats. To save files in dBASE II format, use the .DB2 extension, then change the extension to .DBF to before retrieving the file in dBASEII. To retrieve dBASE II files, use the .DBF extension.

You can also combine files (see "Combining Files" on page 169) and extract files (see "Extracting Part of a Spreadsheet" on page 168) in different program formats.

In all cases, Quattro performs the translation automatically. You never even see it.

When you save a Quattro spreadsheet in Paradox or dBASE format, a translator menu appears with three options: View the Structure, Write Out

the File, and Quit. To see how Quattro intends to format the file, select View the Structure. Quattro displays a list of field names based on the first row of the spreadsheet. To change the field type, field size, or name of a field, select if from the list and enter the correct information. To remove a field from the file being translated, highlight it on the list and press *Del*.

Caution: In order to perform the appropriate translation, the appropriate translator files must be present in the resource directory.

Erasing a File

You can erase any file on your disk from within Quattro using the File Erase command (*/FE*). When you select this command, the File Erase menu is displayed (Figure 6.2).

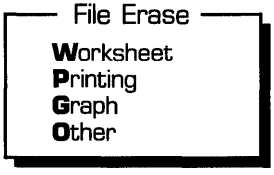


Figure 6.2: The File Erase Menu

Worksheet displays a list of all spreadsheet files in the current directory.

Printing displays a list of all print or text files (with a .PRN extension) in the current directory.

Graph displays a list of all graph print files (with extension .PIC) in the current directory.

Other lists all files in the current directory.

To delete a file:

1. Select Erase from the File menu (*/FE*).
2. Select the type of file you want to delete.
3. Select the file to delete from the displayed list, or type in a name. To display files in a different directory, press *Esc* twice, type the path name of the directory, and press *Enter*.

The file is permanently erased from the disk.

For details on the mechanics of entering a file name, refer back to page 157.

Note: Do not confuse the File Erase command with the Erase command on the main menu. The File Erase command deletes an actual file on your disk. The Erase command clears any data displayed in your spreadsheet screen. If you saved the data in a file first, it is untouched.

Extracting Part of a Spreadsheet

The File Xtract command (*/FX*) lets you save part of a spreadsheet in a separate file. This command copies, or *extracts*, a specific block of the spreadsheet to a different file, leaving the original file intact. Extracting is useful for breaking down a large spreadsheet into more manageable pieces. You can then work on those pieces separately or combine them with other spreadsheets.

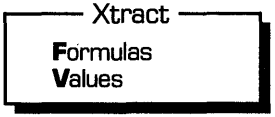
When you extract part of a spreadsheet, all the spreadsheet's block names, named graphs, and defaults are saved with the extracted portion. Some of the block names or graphs may not be meaningful if they refer to cells or blocks that were not included in the extracted block. You can delete them, reassign them, or ignore them.

The Xtract command has two options: Formulas and Values. Formulas saves an exact copy of the block, including formulas. Values converts all formulas in the block to their end values before saving it.

When the Formulas option is used, formulas are updated to reference cells relative to their new positions, even if they are absolute. (Absolute formulas retain their absoluteness for the new spreadsheet after their initial adjustment.) If the formulas being saved reference cells outside the block being saved, problems can arise. In this case, it's best to use the Values option. Or convert those individual formulas to their results with the Block Advanced Values command (see page 91).

To extract part of a spreadsheet:

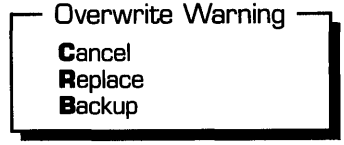
1. Select Xtract from the File menu (*/FX*). The Xtract menu appears with two options:



2. Select Formulas to save the block exactly as is. Select Values to save the resulting values of formulas instead of the original formulas. Quattro

prompts you for a file name and displays a list of files in the default data directory.

3. Select a file from the list, or type in a new name. You can switch to a different directory by pressing *Esc* twice and typing a new path name. When you press *Enter*, a list of files for that directory is displayed. If you want to save the extracted data for use with another program, include the appropriate extension (see "Translating Files" on page 166).
4. If the file name you enter already exists, Quattro displays an Overwrite Warning menu:



5. Select the option you want:
   - **Replace** overwrites the existing file.
   - **Backup** creates a backup copy of the file, giving it a .BAQ file-name extension. (To retrieve the backup file later, include the .BAQ extension with the name.)
   - **Cancel** halts the command.
6. Quattro prompts you for a cell block. Indicate the block you want to extract either by typing the cell coordinates or a block name, or by pointing to the block using the direction keys.
7. Press *Enter* to extract the specified block.

The extracted block is placed in the new spreadsheet beginning at cell A1, regardless of its position in the original file.

For details on the mechanics of entering a file name, refer back to page 157.

Combining Files

The File Combine command lets you copy all or part of an existing spreadsheet file into any area of the current spreadsheet. Unlike File Retrieve, it does not erase the current spreadsheet; it affects only the portion of the spreadsheet covered by the inserted block.

Combine options let you:

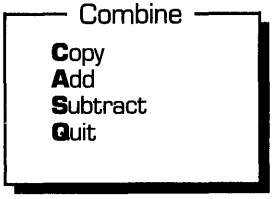
- Copy the combine file "as is" into the specified block, replacing any existing values.

- Add the values from the combine file to the existing values in the block.
- Subtract the new values from present values in the block.

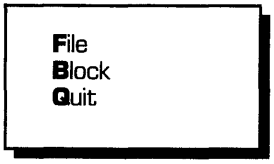
The details of these options are discussed later in this section.

To combine files:

1. If you intend to combine only *part* of a file with the current one, make sure you know the exact block you want to use—either the block name or the cell coordinates. You may need to retrieve the file first and make note of this.
2. With the spreadsheet file you want added to displayed, place the cell selector in the top left cell of the block in which you want to insert the combine file. Make sure you have enough space to the right and below so that cell entries won't be overwritten unexpectedly.
3. Select **C**ombine from the File menu (*/FC*). A submenu appears:



4. Choose the appropriate option:
   - **Copy** inserts the exact contents of the file.
   - **Add** adds the new values to the existing values.
   - **Subtract** subtracts the new values from the existing values.
5. Quattro displays another submenu:



6. Choose **F**ile to copy the entire file into the existing one. Choose **B**lock to copy a specified block of the file.
7. If you chose **B**lock, Quattro prompts you for a cell block. Enter a cell range or block name. (Because the block names are from another file, pressing *F3*, NAMES, will not display a list of block names.)
8. Quattro prompts you for the name of the file to combine and displays a list of spreadsheet files in the default data directory. Type or select a file name. You can specify a different directory by pressing *Esc* twice, then typing a new directory path. When you press *Enter*, a list of files in the

new directory is displayed. To combine a file created with another program, include the extension with the name (see "Translating Files" on page 166 for more information).

Quattro copies the contents of the specified file or block into the current spreadsheet. Default and format settings (such as column width and display format) are not copied with the data. Any named blocks in the file being copied are deleted to avoid confusion, and references to them are converted to cell ranges. For details on the mechanics of entering a file name, refer back to page 157.

Copying Data

The Copy option for the Combine command copies data directly from a file into the current spreadsheet. The data is inserted beginning at the position of the cell selector. If you specify copying the entire file, only the block that contains data is copied.

For example, suppose you have a file called "HEADINGS" that you use to set up headings for your spreadsheets (Figure 6.3).

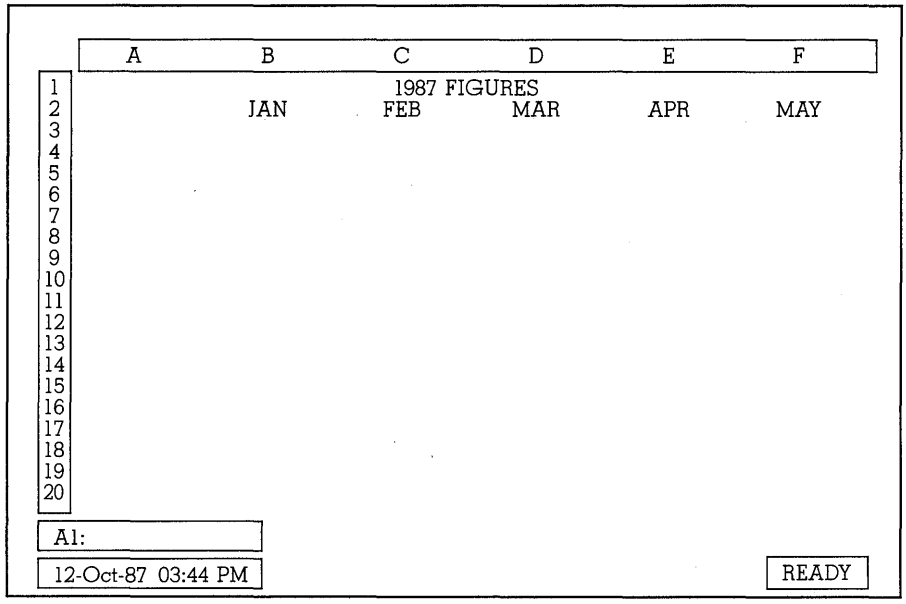


Figure 6.3: A Headings File

To insert these headings in the spreadsheet shown in Figure 6.4, you would move the cell selector to cell A1, select Combine from the File menu (*/FC*), select Copy, then File. When Quattro prompts you for a file name, enter HEADINGS. The headings are added to the top of the file (see Figure 6.5). The data underneath the headings is not overwritten, because only the block that contains data (A1..M3) is copied into the spreadsheet.

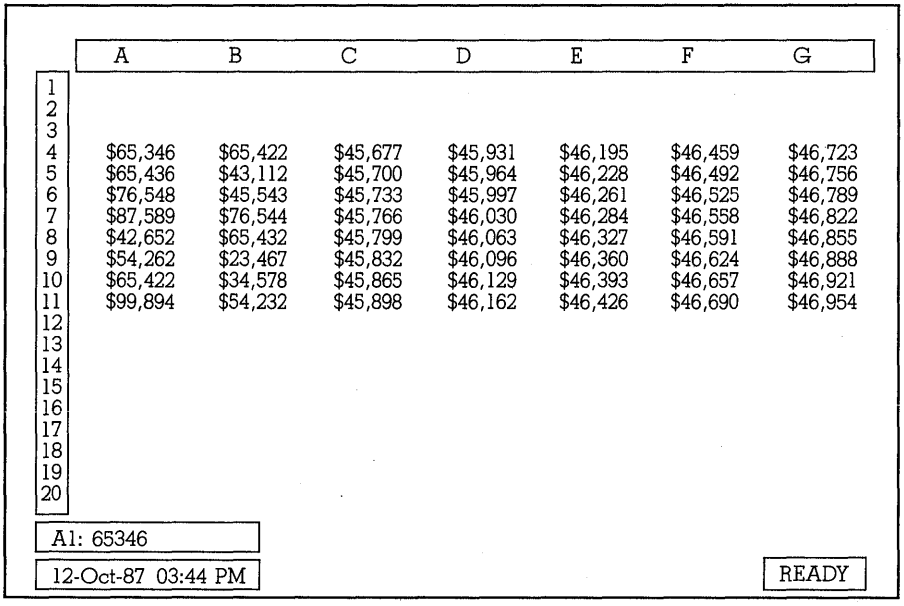
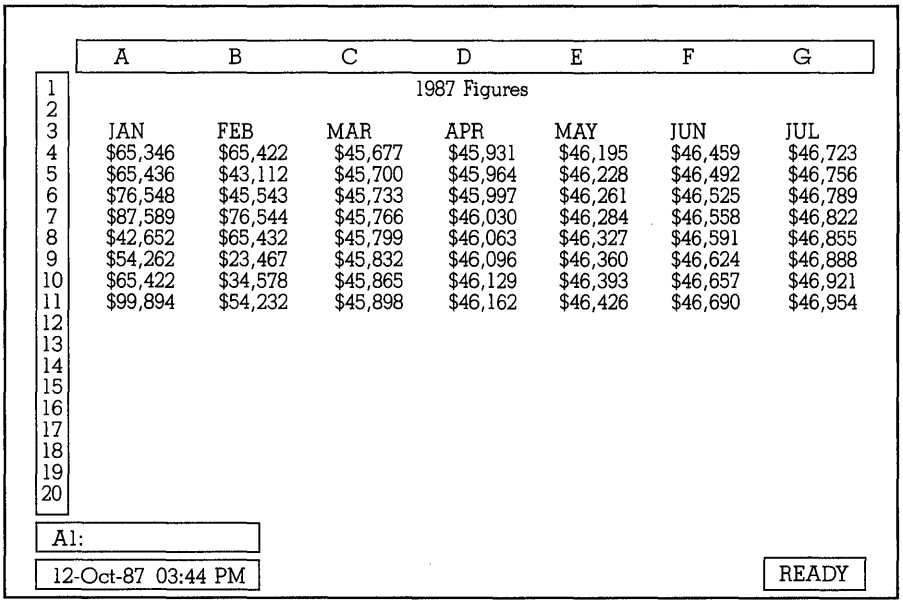


Figure 6.4: A Spreadsheet Lacking Headings



	A	B	C	D	E	F	G
1				1987 Figures			
2							
3	JAN	FEB	MAR	APR	MAY	JUN	JUL
4	$65,346	$65,422	$45,677	$45,931	$46,195	$46,459	$46,723
5	$65,436	$43,112	$45,700	$45,964	$46,228	$46,492	$46,756
6	$76,548	$45,543	$45,733	$45,997	$46,261	$46,525	$46,789
7	$87,589	$76,544	$45,766	$46,030	$46,284	$46,558	$46,822
8	$42,652	$65,432	$45,799	$46,063	$46,327	$46,591	$46,855
9	$54,262	$23,467	$45,832	$46,096	$46,360	$46,624	$46,888
10	$65,422	$34,578	$45,865	$46,129	$46,393	$46,657	$46,921
11	$99,894	$54,232	$45,898	$46,162	$46,426	$46,690	$46,954
12							
13							
14							
15							
16							
17							
18							
19							
20							

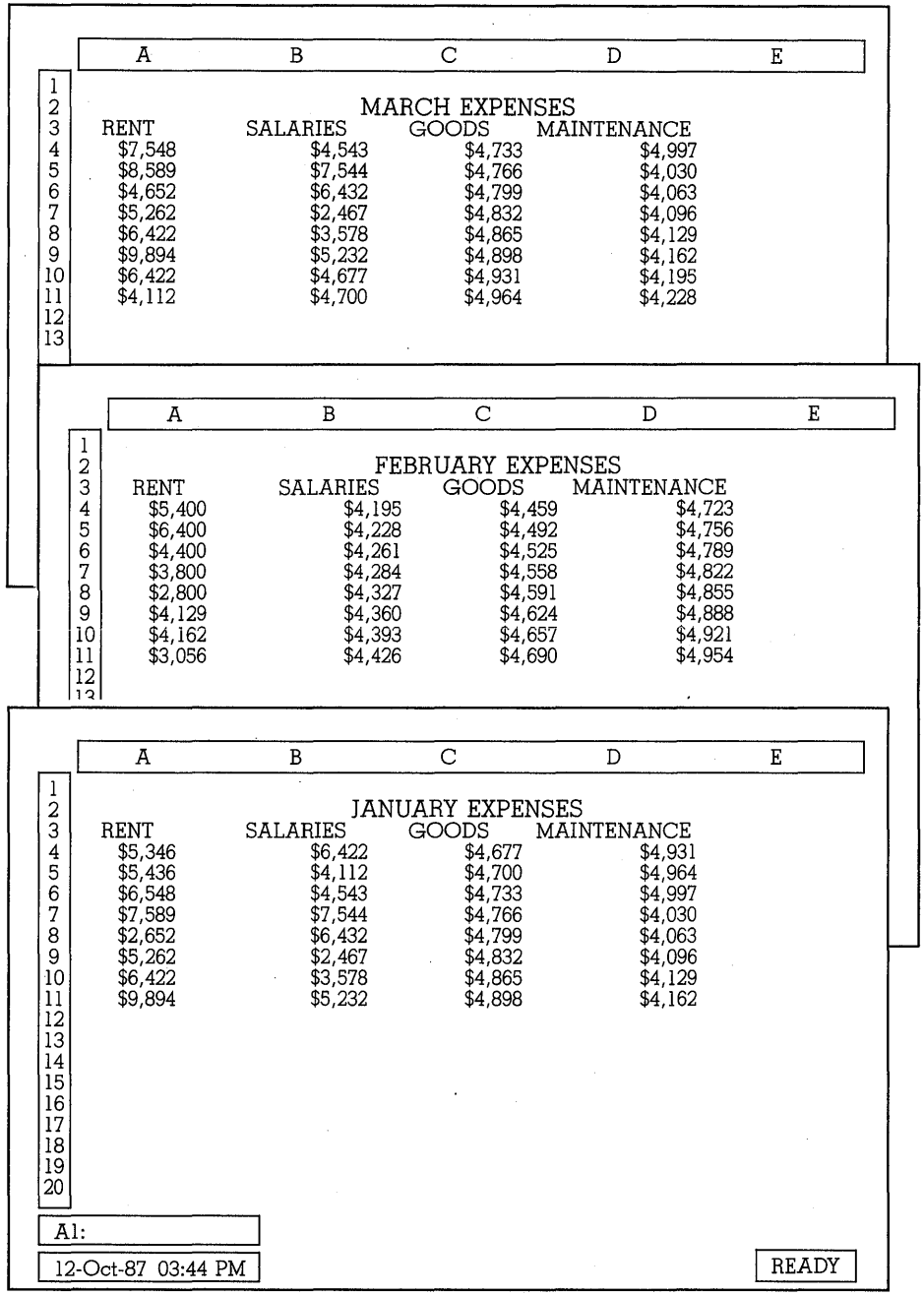
Figure 6.5: The Spreadsheet with Headings Added

With the **Copy** option, formulas are copied as is. However, if they reference cells outside of the block being copied, they may be inaccurate. If you want to copy the formula *values* instead of the formulas themselves, use the **File Xtract Values** command to copy them to another file first (see page 168).

Adding Data

The **Add** option for the **Combine** command combines values in the inserted block with existing values in that area of the spreadsheet and displays the sum. Any formulas involved are converted to their resulting values first.

This is most useful for combining files for a cumulative total, for example, to compile year-to-date figures from monthly spreadsheets. Figure 6.6 shows three spreadsheets with monthly expense figures. You can retrieve one, place the cell selector at cell A1, and combine each of the other files with the **Add** option, so that a cumulative spreadsheet is created showing year-to-date expense totals (Figure 6.7).



MARCH EXPENSES

RENT	SALARIES	GOODS	MAINTENANCE
$7,548	$4,543	$4,733	$4,997
$8,589	$7,544	$4,766	$4,030
$4,652	$6,432	$4,799	$4,063
$5,262	$2,467	$4,832	$4,096
$6,422	$3,578	$4,865	$4,129
$9,894	$5,232	$4,898	$4,162
$6,422	$4,677	$4,931	$4,195
$4,112	$4,700	$4,964	$4,228

FEBRUARY EXPENSES

RENT	SALARIES	GOODS	MAINTENANCE
$5,400	$4,195	$4,459	$4,723
$6,400	$4,228	$4,492	$4,756
$4,400	$4,261	$4,525	$4,789
$3,800	$4,284	$4,558	$4,822
$2,800	$4,327	$4,591	$4,855
$4,129	$4,360	$4,624	$4,888
$4,162	$4,393	$4,657	$4,921
$3,056	$4,426	$4,690	$4,954

JANUARY EXPENSES

RENT	SALARIES	GOODS	MAINTENANCE
$5,346	$6,422	$4,677	$4,931
$5,436	$4,112	$4,700	$4,964
$6,548	$4,543	$4,733	$4,997
$7,589	$7,544	$4,766	$4,030
$2,652	$6,432	$4,799	$4,063
$5,262	$2,467	$4,832	$4,096
$6,422	$3,578	$4,865	$4,129
$9,894	$5,232	$4,898	$4,162

A1:

12-Oct-87 03:44 PM

READY

Figure 6.6: Three Monthly Spreadsheets

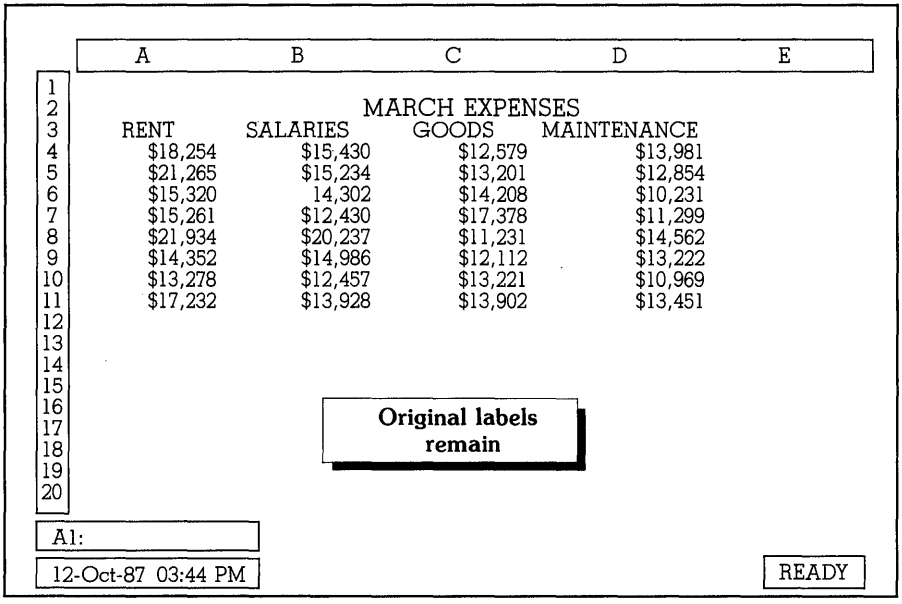


Figure 6.7: Totals Created with the Add Option

Before you use the **Combine Add** command, place the cell selector where you want the upper-left corner of the inserted data to be. Data will be added to values below and/or to the right of the selector.

If you add an entire file, Quattro adds only the block that contains data. If you specify a block to add, Quattro adds exactly that block.

When adding spreadsheet data, make sure both spreadsheets or blocks are set up similarly, for example, with headings in the same position. The incoming data will assume the cell formats (display format, column width, and so on) of the current spreadsheet.

Caution: Accuracy is very important when adding combined values. If the cell selector is one cell off when you combine the files, the combined data may be useless. For this reason, it's a good idea to save the current spreadsheet before combining data. Then, if you don't get the results you wanted, you can retrieve the file as it was before the combine operation.

When adding values with a **Combine** command, Quattro follows these rules:

- In the current spreadsheet, cells that contain labels, formulas, ERR, or NA are not altered by the incoming data.

- Value entries in the affected block of the current spreadsheet are replaced by the sum of the original and incoming values.
- When adding incoming values to those existing in the spreadsheet, Quattro converts all incoming formulas to their end values and interprets labels and blank cells as zero.

Subtracting Data

The **S**ubtract option for the **C**ombine command subtracts values in a specified block or file from existing values in the current spreadsheet. It has the same requirements and rules as the **A**dd option.

Subtract is often used to break down a file that has been combined with the **C**ombine command. For example, after combining the monthly spreadsheets, such as those shown in Figure 6.6, you might want to pull out certain months to see how their absence affects the total.

Importing a File

The **F**ile **I**mport command (*/FI*) copies a text file into the current spreadsheet, in much the same way as the **F**ile **C**ombine command combines spreadsheet files.

A *text file* consists of plain text with a minimum of formatting. The **F**ile **I**mport command converts a text file into a spreadsheet file.

Note: There's no need to *import* spreadsheet or database files created with Lotus 1-2-3, dBASE, Paradox, or Symphony. These files are translated automatically when you retrieve them (see "Translating a File" on page 166).

When you select **I**mport from the File menu, the File Import menu is displayed (Figure 6.8).

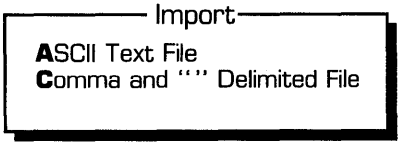


Figure 6.8: The File Import Menu

ASCII Text File lets you import a plain, unformatted text file. Quattro automatically converts the data into a single column of labels. Each line in the file becomes a label.

Comma & "" Delimited File lets you import a file that uses commas and/or quotes to separate text in rows. The delimiters are used to set up columns in the spreadsheet.

Both of these options are described in detail later in this section.

To import a file:

1. Move the cell selector to the upper left corner of the block in which you want to place the imported file.
2. Select **I**mport from the File menu (*/FI*). The File Import menu is displayed (see Figure 6.8).
3. Select the appropriate option. Quattro prompts you for a file name and displays a list of all files with the .PRN extension in the default data directory. You can display *all* files by changing the file name default to *.* and pressing *Enter*, or display files with a .TXT extension by changing it to *.TXT. To display files in a different directory, press *Esc* and enter a different directory path, then press *Enter*.
4. Select or enter the name of the file you want to import.

The text file is copied into the current spreadsheet beginning with the current cell.

For details on the mechanics of entering a file name, refer back to page 157.

Importing ASCII Text Files

ASCII text files are straight, unformatted text, such as a letter or mailing list written with a word processor. When you import an ASCII text file, you should first remove any special formatting characters, such as bold, underlining, or centering.

Quattro enters each line in an ASCII text file as a label in the first column of the indicated block (using columns to the right for spillover display only). Lines longer than 255 characters are truncated. The long cell entries can then be broken up into a more useable format with the File Parse command (see page 180). Any blank lines in the imported file become empty labels.

Figure 6.9 shows an ASCII text file imported into a spreadsheet.

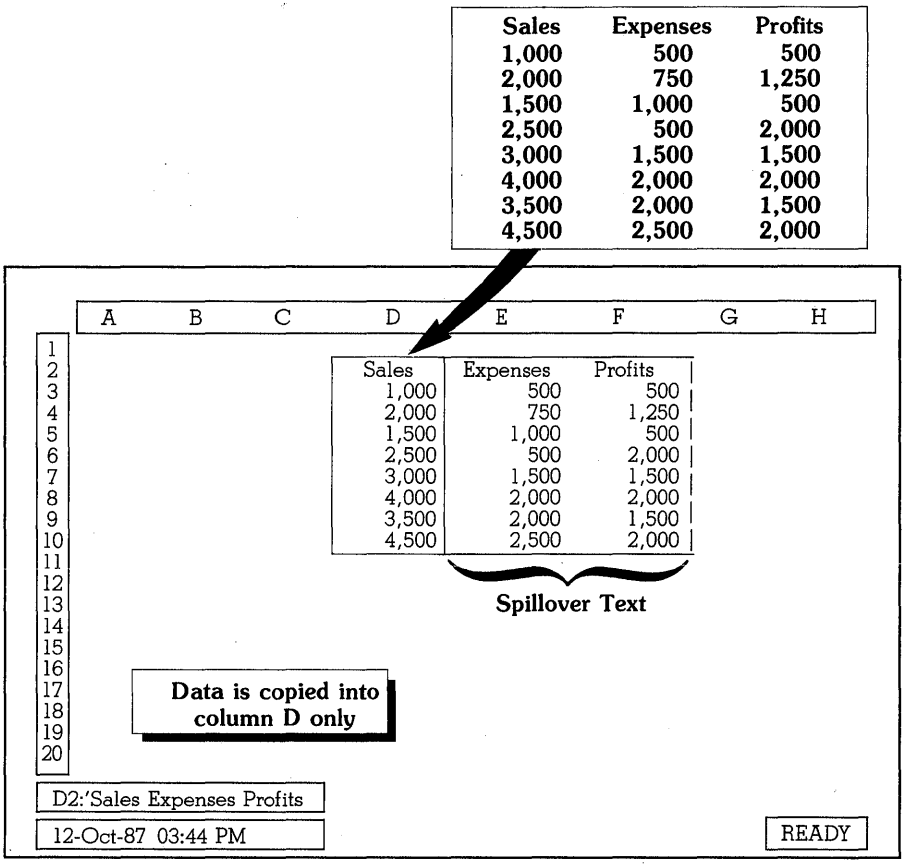


Figure 6.9: How Quattro Imports an ASCII Text File

Caution: Many word-processing programs produce files that contain special characters that you may not be able to see. For example, Wordstar files insert "soft carriage returns" at the end of each line. Characters such as these may produce unwanted results. If your word processor has an option for creating straight ASCII files, use it to create the file you intend to import.

Importing Comma-and-Quote Delimited Files

A comma-and-quote delimited file is a text file with the following format: Data is entered in rows, much like the rows of a spreadsheet, and groups or types of data are separated (or delimited) on each line with commas. If a comma is contained in a data group, the group is surrounded by double quotes.

When Quattro imports a comma-and-quote delimited file, it adheres to the following rules:

- Each group of data is stored in a separate cell.
- Data groups surrounded by quotes are stored in the spreadsheet as labels.
- Data groups that are strictly numbers become value entries.

Figure 6.10 shows a comma-and-quote delimited file imported into a spreadsheet.

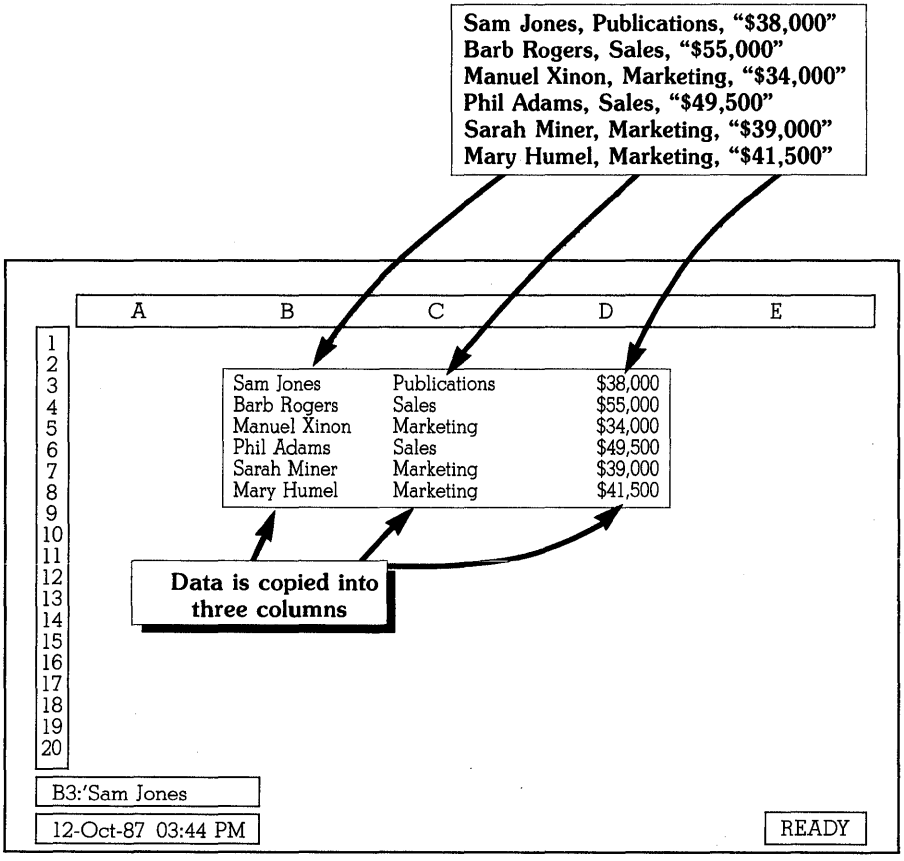


Figure 6.10: An Imported Delimited Text File

Many form letter data files, including Wordstar's MailMerge, are delimited with commas and quotes.

Breaking Down Long Labels

After you've imported a text file to the spreadsheet, you may need to break down, or *parse*, the data into individual cells. This is most often required after importing an ASCII text file, because Quattro interprets each line of text as a single label.

Figure 6.11 shows an imported ASCII text file. Although the spreadsheet appears to contain data in several columns, the text in each row is actually entered only in column A, as you can see by the descriptor line. The columns to the right are only used to display the spillover of column A.

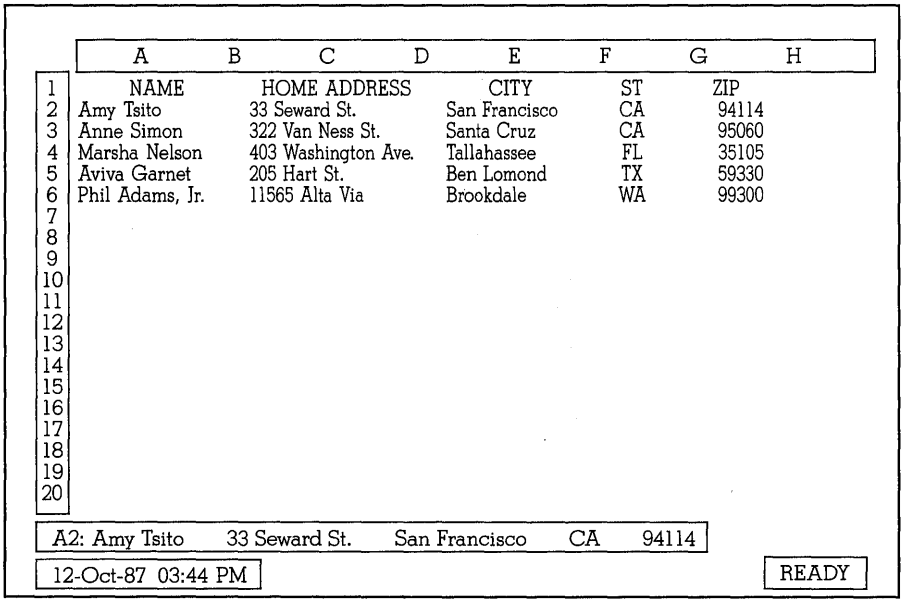


Figure 6.11: An Imported ASCII Text File

To turn this file into a useful database file, you need to break down each row, or label, into individual *fields*. In this example, the first column could be the Name field, then the Address field, City, and so on. The **File Parse** command lets you break down labels with minimum effort (see "Setting Up a Database" on page 293 for more information on databases).

You can also use **Parse** to break down data in a regular spreadsheet, for example, to turn a Name column into two columns: one for first name and one for last.

When you select **Parse** from the File menu (*/FP*), the Parse menu is displayed (Figure 6.12).

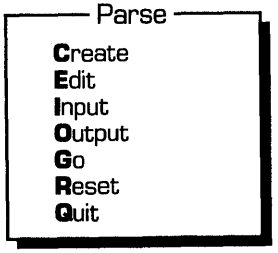


Figure 6.12: The Parse Menu

Create inserts a format line above the current cell. This line indicates how Quattro will break down the labels into separate cells.

Input lets you specify the block containing the label entries to be parsed.

Edit lets you alter the parsing format suggested by Quattro.

Output lets you specify the cell block you want the parsed data to be copied to.

Go begins the parsing procedure.

Reset erases all menu settings.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Parse menu to the File menu.

The basic procedure for parsing a file is:

1. Set up one or more format lines to indicate how you want the labels broken up.
2. Specify the column containing the labels to be parsed, including the format line.
3. Specify the block you want to copy the parsed labels to.
4. Select **Go**.

Format Lines

A format line begins with a unique prefix (|) and stretches across the length of the text below it. It uses the following special symbols to indicate how to translate text into separate fields:

|	begins a format line
V	begins a value cell entry
L	begins a label cell entry
T	begins a time serial number displayed in a time format
D	begins a date serial number displayed in a date format
>	continues an entry
*	indicates blanks that may be filled in by longer entries underneath the first
S	tells Quattro to skip (delete) the character in this position (this symbol can only be entered by editing the format line)

When you create a format line, Quattro guesses at how you might want to parse the line and uses these symbols to indicate parsing on the format line. You can edit the line to parse the labels differently, and you can insert additional format lines to parse specific areas differently.

Creating a Format Line

To create a format line, position the cell selector at the first cell containing a label to be parsed and select **C**reate from the Parse menu. Quattro creates and inserts a format line above the current cell. It contains parsing directions for the entire block based on the first label.

Figure 6.13 shows a format line inserted above the imported text file shown earlier.

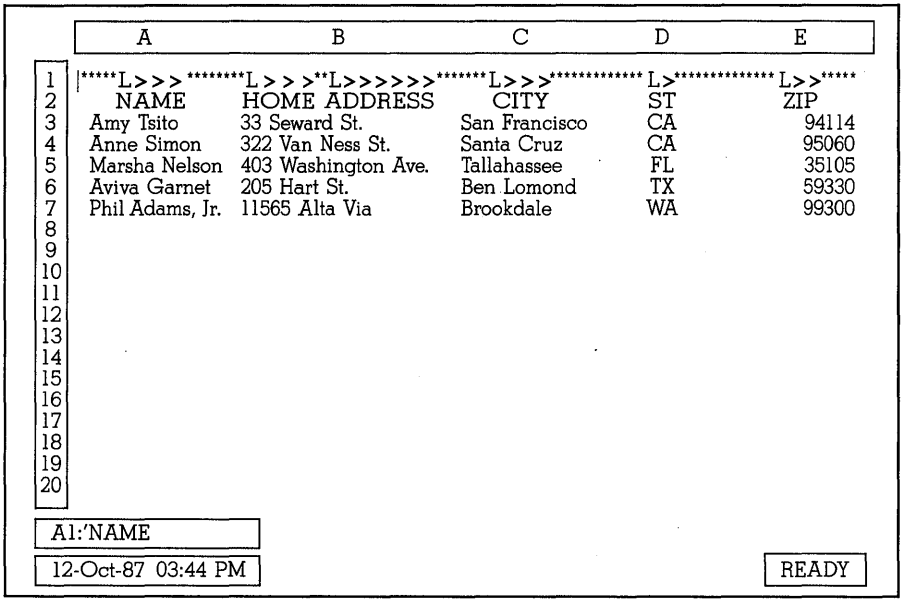


Figure 6.13: An Initial Format Line

The format line shown here breaks the first label up into six cells—one for each word in the label. Because each word begins with a letter, each becomes a separate label entry. In this case, the format line needs to be edited, because Quattro has divided the address field into two fields: Home and Address.

Editing Format Lines

To edit a format line, select Edit from the Parse menu with the cell selector in the first cell of the line (this is where the selector will be after creating a format line). Quattro enters Format mode, which is similar to Edit mode, except that you can edit the format line directly within the spreadsheet, not just on the Edit Line. The FRMT mode indicator appears in the bottom right corner of the screen.

In Format mode, you can use the same edit keys you use in Edit mode to make changes to the format line. Quattro automatically places the spreadsheet in overwrite (OVR) mode so that you can replace characters without misaligning the rest of the line. You can't move from the format line while editing it. However, you can scroll the spreadsheet downward

without leaving the format line. The cursor remains in the format line as you scroll, and the format line stays fixed on the screen like a frozen title.

When you're finished, press *Enter.* (To discard any changes you made, press *Esc* twice instead of pressing *Enter.*)

Figure 6.14 displays the same format line shown above after editing. The Address field is now presented as one field.

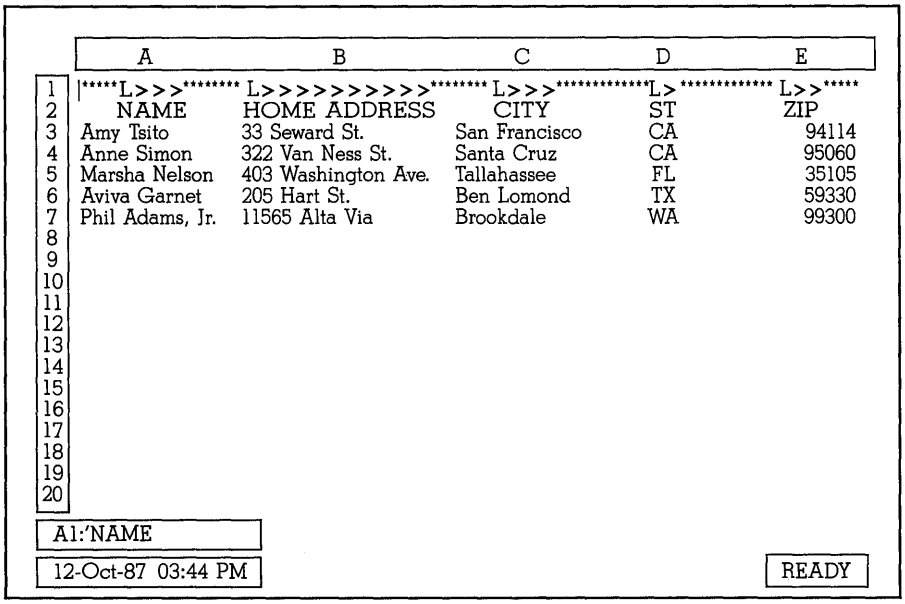


Figure 6.14: An Edited Format Line

When the format line is correct, you need to specify input and output blocks, then select **Go** to begin the parsing

Using More than One Format Line

In some cases, you'll need to use more than one format line to parse a file. For example, in Figure 6.15, the initial format line makes little sense. It uses only the spreadsheet title to base parsing on.

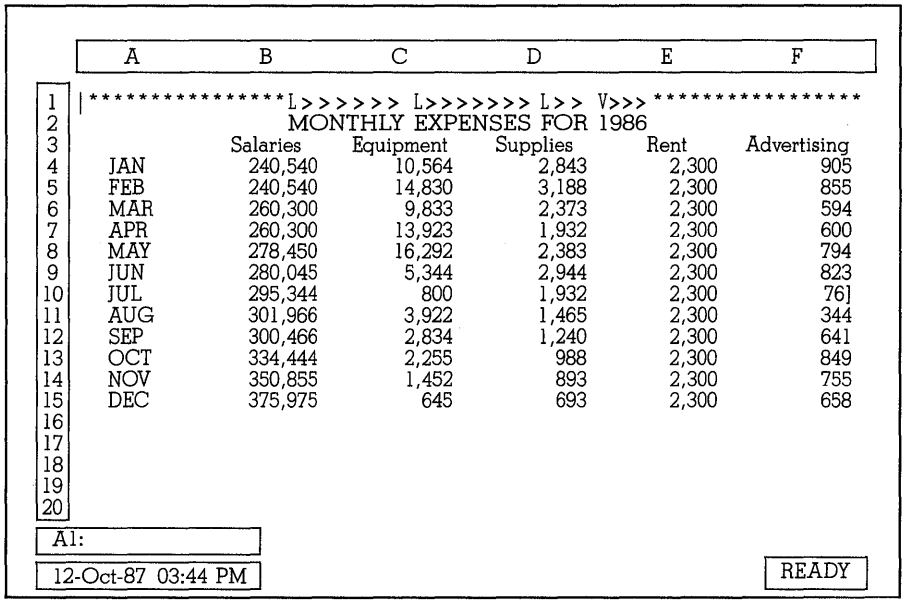
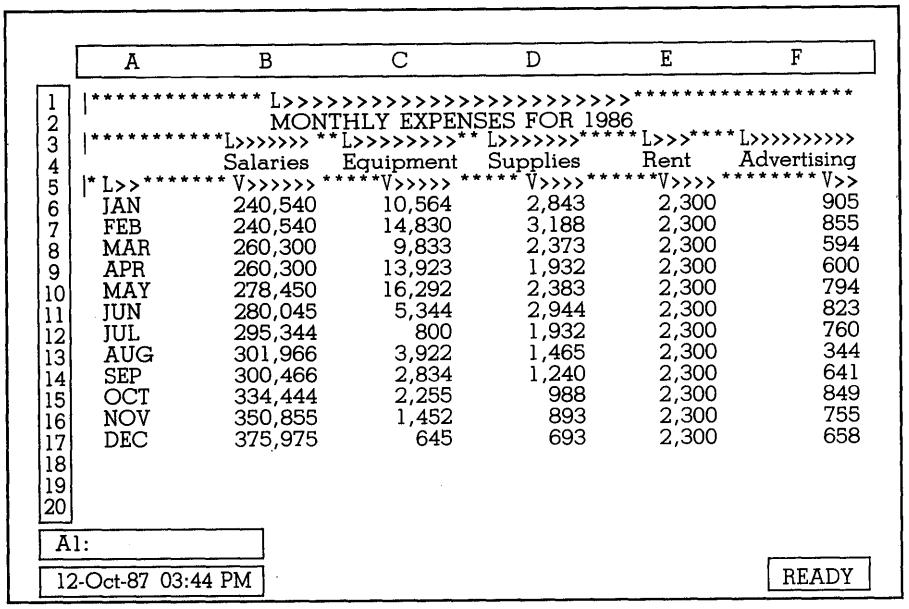


Figure 6.15: The Initial Format Line for a Spreadsheet

Figure 6.16 shows the same spreadsheet with two more format lines. The original format line has been edited to keep the spreadsheet title as one cell, which will spill over into adjacent cells. The second and third format lines were entered without editing.

To make the same adjustments:

1. Move the selector to cell A1 and press */FPE* to select Edit from the Parse menu.
2. Change the format line to show arrows extending from the first *L* to the end of the label (6).
3. Move to cell A3 and press */FPC* to select Create from the Parse menu. Another format line is added above the headings, correctly interpreting each heading as a label.
4. Move to cell A5 and press */FPC* again. Another format line is created above the data, correctly interpreting the numbers as values and the row headings as labels.



	A	B	C	D	E	F
1						
2		MONTHLY EXPENSES FOR 1986				
3						
4		Salaries	Equipment	Supplies	Rent	Advertising
5						
6	JAN	240,540	10,564	2,843	2,300	905
7	FEB	240,540	14,830	3,188	2,300	855
8	MAR	260,300	9,833	2,373	2,300	594
9	APR	260,300	13,923	1,932	2,300	600
10	MAY	278,450	16,292	2,383	2,300	794
11	JUN	280,045	5,344	2,944	2,300	823
12	JUL	295,344	800	1,932	2,300	760
13	AUG	301,966	3,922	1,465	2,300	344
14	SEP	300,466	2,834	1,240	2,300	641
15	OCT	334,444	2,255	988	2,300	849
16	NOV	350,855	1,452	893	2,300	755
17	DEC	375,975	645	693	2,300	658
18						
19						
20						

Figure 6.16: A Spreadsheet with Three Format Lines

You can insert as many format lines in your spreadsheet as necessary. Each format line affects all the text below it until the next format line is encountered, or until the end of the block you specify with **Input**.

Assigning Input and Output Blocks

Before you can parse a file, you need to tell Quattro what area to parse and what area to copy the parsed file to. You do this by assigning cell blocks with the **Input** and **Output** commands.

The input column is the spreadsheet column that contains the text you want to parse and the format line(s) used to parse it. (Remember that your labels are contained in a single column, even though they may be displayed across several.) To specify the input column, select **Input** from the Parse menu, then indicate the block you want to parse. Be sure to include all format lines. When you press *Enter*, Quattro returns to the Parse menu.

The output block is the block of cells you want to copy the parsed data to. If you specify the top cell of the input column as the output block, the parsed data will overwrite the existing data. To be on the safe side, you may want to first copy the parsed data to another part of the spreadsheet. Then, when

you've obtained the results you want, replace the original data with a **B**lock **M**ove operation.

To specify the output block, select **O**utput from the Parse menu. You can indicate the output block in either of two ways: specifying the top left cell or specifying the entire block. If you specify the top left cell, Quattro uses whatever space is necessary for the parsed data, overwriting cells if necessary. If you specify the entire block, you must be sure to include enough space for the new data; otherwise, only part of the data will be copied and an error message will be displayed. (Remember that the data will probably be a different width after parsing.)

To return both of the parsing blocks to their previous values, select **R**eset from the Parse menu.

With both parsing blocks assigned and the format line(s) set up, you can begin parsing. Select **G**o from the Parse menu. The WAIT status indicator is displayed while Quattro completes the parsing. When finished, the parsed data is entered in the output block.

C H A P T E R

7

Printing

When you've completed a spreadsheet, you can print it out using the **Print** commands. You can quickly print out a simple list of figures, or create a thorough, multi-page report, embellished with headers, footers, and page numbers.

This chapter describes:

- the basic procedure for printing your spreadsheet
- including row and column headings on each page
- printing to a disk file
- printing headers and/or footers on each page
- inserting page breaks
- printing with or without page breaks
- changing margins
- using setup strings to give commands to your printer
- printing a list of cell contents, as opposed to data in spreadsheet format

The Print Menu

All spreadsheet **Print** commands are available on the Print menu (Figure 7.1), displayed when you select **Print** from the main menu. (Graphs are printed through the Graph menu—see page 275.)

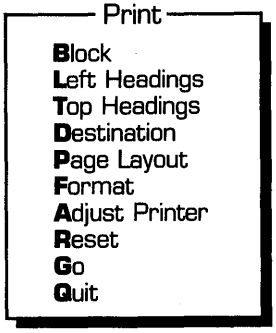


Figure 7.1: The Print Menu

Block lets you specify the area of the spreadsheet you want to print.

Left Headings lets you specify one or more columns to be printed as headings on the left of each page.

Top Headings lets you specify one or more rows to be printed as headings at the top of each page.

Destination lets you send your spreadsheet data either to a printer or to a disk file for future use.

Page Layout lets you change the margins or page length and enter printer setup commands, headers, and footers. You can also insert page breaks, or print your spreadsheet with or without page breaks.

Format lets you print a list of individual cell contents and formatting information.

Adjust Printer displays a menu with commands used to advance the paper in the printer and set the top-of-page indicator.

Reset returns Print commands to their default settings. You can reset the entire Print menu, the block to print, headings, or Page Layout commands.

Go begins printing, either on the attached printer or to the specified disk file.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Print menu to the main menu.

All Page Layout, Headings, and Block settings are saved with the spreadsheet for use next time you print it. The Page Layout settings remain in effect when you select Erase (*/E*). When you exit Quattro, all Print

commands are returned to the default settings. If you want to use new **Page Layout** settings from now on, select **Update** from that menu.

The Basic Procedure

It's easy to print a spreadsheet with Quattro. Once you've selected **Print** from the main menu, you simply specify the block to print, set any necessary **Print** options, make sure the printer's ready, and select **Go**.

The basic procedure is as follows:

1. With the spreadsheet you want to print displayed, select **Print** from the main menu (*/P*). The Print menu is displayed.
2. Select **Block** and specify the block of cells you want to print.
3. If you want to change any of the print settings (for example, adjust margins, add headers and footers, or print to a disk file instead of the printer), reset the appropriate **Print** commands.
4. Turn the printer on and adjust the paper alignment (if necessary) using the **Adjust Printer** commands.
5. When you're ready to begin printing, select **Go**.
6. When printing is complete, select **Quit** to return to the spreadsheet.

Specifying the Block to Print

Before you can print your spreadsheet, you must specify the exact cell block you want to print:

1. Select **Block** from the Print menu (*/PB*). The menu disappears temporarily and Quattro prompts you for a cell block.
2. Enter the cell block's coordinates or block name, or point out the block using the direction keys (move the selector to one corner, enter a period (.), move to the opposite corner, and press *Enter*).

Quattro will print everything within the block you specify. If a cell's contents spill over into adjacent cells, be sure to include the spillover cells in the print block; otherwise, only part of the entry will be printed.

The **Print Block** setting is stored with the spreadsheet when you save the file. To remove the setting, use the **Reset** command. Select **Reset**, then **Block** (*/PRB*).

Figure 7.2 shows how a spreadsheet appears when printed. Notice that the blank rows between data appear in the printout, because they are within the spreadsheet's data block.

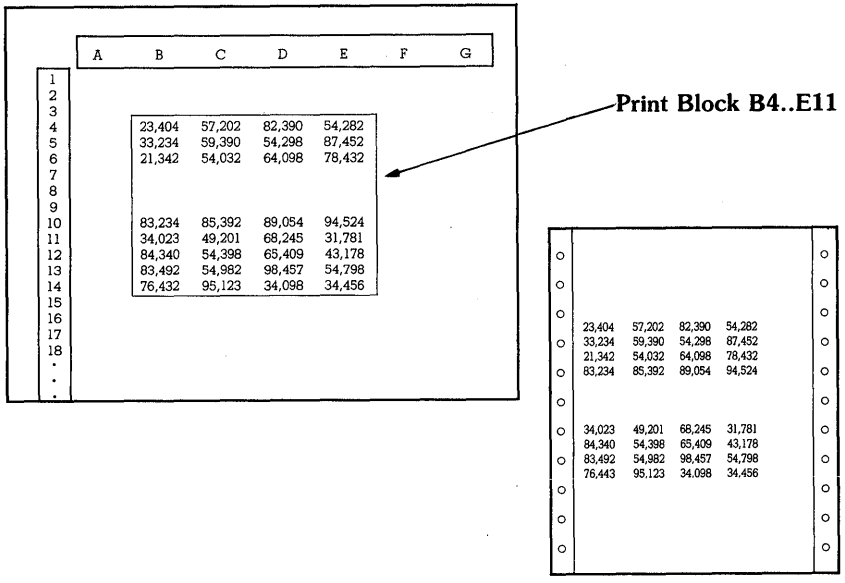


Figure 7.2: A Printed Spreadsheet

Setting the Print Options

To make it as easy as possible to print spreadsheet files, Quattro uses the most common defaults for its print options. It prints your spreadsheet with automatic page breaks on 8.5 by 11-inch paper with approximately one-half-inch margins.

You can change these settings to print a spreadsheet with different dimensions. You can also use other print commands to specify optional settings, such as headers and footers, hard page breaks, and column and row headings.

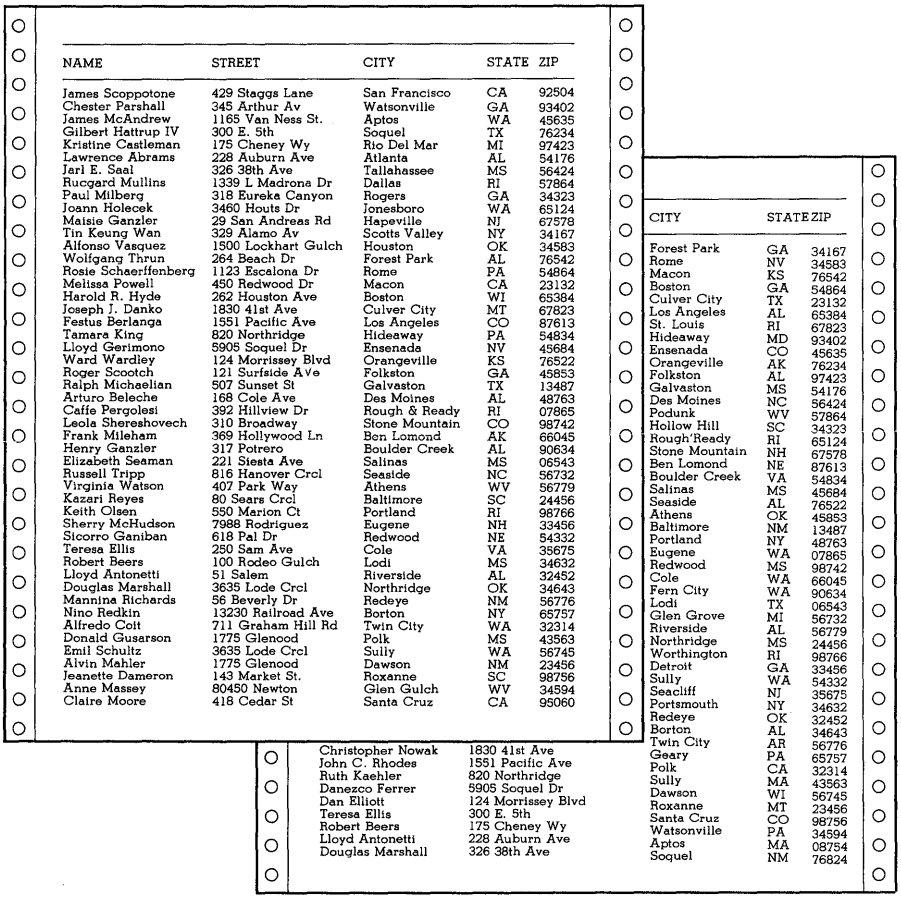
The following sections describe each of the printing options and how to use them.

Including Headings

The **L**eft and **T**op Headings commands let you print specific columns or rows from the spreadsheet onto each page. Left Headings print along the leftmost column of the page. Top Headings print at the top of each page, below any specified headers (see Figure 7.3).

This command is usually used with large spreadsheets to include row or column headings on each page.

Headings are repeated on each printed page.



NAME	STREET	CITY	STATE	ZIP
James Scoppotone	429 Staggs Lane	San Francisco	CA	92504
Chester Parshall	345 Arthur Av	Watsonville	GA	93402
James McAndrew	1165 Van Ness St.	Aptos	WA	45635
Gilbert Hattrup IV	300 E. 5th	Soquel	TX	76234
Kristine Castleman	175 Cheney Wy	Rio Del Mar	MI	97423
Lawrence Abrams	228 Auburn Ave	Atlanta	AL	54176
Jarl E. Saal	326 38th Ave	Tallahassee	MS	56424
Rucgard Mullins	1339 L Madrona Dr	Dallas	RI	57864
Paul Milberg	318 Eureka Canyon	Rogers	GA	34323
Joann Holecek	3460 Houts Dr	Jonesboro	WA	65124
Maisie Ganzler	29 San Andreas Rd	Hapeville	NJ	67578
Tin Keung Wan	329 Alamo Av	Scotts Valley	NY	34167
Alfonso Vasquez	1500 Lockhart Gulch	Houston	OK	34583
Wolfgang Thrun	264 Beach Dr	Forest Park	AL	76542
Rosie Schaerffenberg	1123 Escalona Dr	Rome	PA	54864
Melissa Powell	450 Redwood Dr	Macon	CA	23132
Harold R. Hyde	262 Houston Ave	Boston	WI	65384
Joseph J. Danko	1830 41st Ave	Culver City	MT	67823
Festus Berlanga	1551 Pacific Ave	Los Angeles	CO	87613
Tamara King	820 Northridge	Hideaway	PA	54834
Lloyd Gerimono	5905 Soquel Dr	Ensenada	NV	45684
Ward Wardley	124 Morrissey Blvd	Orangeville	KS	76522
Roger Scootch	121 Surfside AVe	Folkston	GA	45853
Ralph Michaelian	507 Sunset St	Galveston	TX	13487
Arturo Beleche	168 Cole Ave	Des Moines	AL	48763
Caffe Pergolesi	392 Hillview Dr	Rough & Ready	RI	07865
Leola Shereshovech	310 Broadway	Stone Mountain	CO	98742
Frank Mileham	369 Hollywood Ln	Ben Lomond	AK	66045
Henry Ganzler	317 Potrero	Boulder Creek	AL	90634
Elizabeth Seaman	221 Siesta Ave	Salinas	MS	06543
Russell Tripp	816 Hanover Crcl	Seaside	NC	56732
Virginia Watson	407 Park Way	Athens	WV	56779
Kazari Reyes	80 Sears Crcl	Baltimore	SC	24456
Keith Olsen	550 Marion Ct	Portland	RI	98766
Sherry McHudson	7988 Rodriguez	Eugene	NH	33456
Sicorro Ganiban	618 Pal Dr	Redwood	NE	54332
Teresa Ellis	250 Sam Ave	Cole	VA	35675
Robert Beers	100 Rodeo Gulch	Lodi	MS	34632
Lloyd Antonetti	51 Salem	Riverside	AL	32452
Douglas Marshall	3635 Lode Crcl	Northridge	OK	34643
Mannina Richards	56 Beverly Dr	Redeye	NM	56776
Nino Redkin	13230 Railroad Ave	Borton	NY	65757
Alfredo Coit	711 Graham Hill Rd	Twin City	WA	32314
Donald Gusarson	1775 Glenood	Polk	MS	43563
Emil Schultz	3635 Lode Crcl	Sully	WA	56745
Alvin Mahler	1775 Glenood	Dawson	NM	23456
Jeanette Dameron	143 Market St.	Roxanne	SC	98756
Anne Massey	80450 Newton	Glen Gulch	WV	34594
Claire Moore	418 Cedar St	Santa Cruz	CA	95060

Christopher Nowak	1830 41st Ave
John C. Rhodes	1551 Pacific Ave
Ruth Kaehler	820 Northridge
Danezco Ferrer	5905 Soquel Dr
Dan Elliott	124 Morrissey Blvd
Teresa Ellis	300 E. 5th
Robert Beers	175 Cheney Wy
Lloyd Antonetti	228 Auburn Ave
Douglas Marshall	326 38th Ave

CITY	STATE	ZIP
Forest Park	GA	34167
Rome	NV	34583
Macon	KS	76542
Boston	GA	54864
Culver City	TX	23132
Los Angeles	AL	65384
St. Louis	RI	67823
Hideaway	MD	93402
Ensenada	CO	45635
Orangeville	AK	76234
Folkston	AL	97423
Galvaston	MS	54176
Des Moines	NC	56424
Pedunk	WV	57864
Hollow Hill	SC	34323
Rough'Ready	RI	65124
Stone Mountain	NH	67578
Ben Lomond	NE	87613
Boulder Creek	VA	54834
Salinas	MS	45684
Seaside	AL	76522
Athens	OK	45853
Baltimore	NM	13487
Portland	NY	48763
Eugene	WA	07865
Redwood	MS	98742
Cole	WA	66045
Fern City	WA	90634
Lodi	TX	06543
Glen Grove	MI	56732
Riverside	AL	56779
Northridge	MS	24456
Worthington	RI	98766
Detroit	GA	33456
Sully	WA	54332
Seacliff	NJ	35675
Portsmouth	NY	34632
Redeye	OK	32452
Borton	AL	34643
Twin City	AR	56776
Geary	PA	65757
Polk	CA	32314
Sully	MA	43563
Dawson	WI	56745
Roxanne	MT	23456
Santa Cruz	CO	98756
Watsonville	PA	34594
Aptos	MA	08754
Soquel	NM	76824

Figure 7.3: Headings Printed on Pages

If you specify a column or row as a heading and it is already part of the block to be printed, it will appear twice. Be sure to exclude the headings from the print block with the **B**lock command. For example, if you've specified cells A2..G2 as headings and want to print all data under them down to row 30, specify A3..G30 as your print block.

To set print headings:

1. Select **L**eft Headings or **T**op Headings from the Print menu (*/PL* or */PT*). Quattro prompts you for a cell block.
2. Specify the address of any cell in the column (for a left heading) or row (for a top heading) you want to use.
3. Press *Enter*.

Headings specified with the Print menu are stored with the spreadsheet when you save it. To remove the settings for both headings, use the **R**eset command. Select **R**eset from the Print menu, then select **H**eadings (*/PRH*).

Printing to a Disk File

The **P**rint Destination command has two options: **P**rinter and **F**ile. The default, **P**rinter, sends the spreadsheet directly to the printer and prints it.

The second option, **F**ile, sends the spreadsheet to a disk file. The data is stored in ASCII format and includes all print information, such as headers and footers, headings, and page breaks.

Printing a spreadsheet to disk is handy for postponing printing. You can print it at any time in the future, not only with Quattro, but even with a DOS PRINT command. The original spreadsheet format is retained. You can also use the DOS FIND, SORT, and TYPE commands with the file. And because the file is straight ASCII code, you can use the file with other programs—such as word processors.

To print a file to disk:

1. Select **D**estination from the Print menu (*/PD*).
2. Select **D**isk from the displayed menu. Quattro prompts you for a file name.
3. Type the name you want to give the file. Don't include an extension. Quattro automatically adds the extension .PRN.
4. Press *Enter*. The Print menu returns.
5. If you want to use the file with other programs, you'll probably want to remove page breaks, headers, and footers from the file. Select **B**reak Pages from the Page Layout menu, then select **N**o (*/PPBN*).
6. Adjust any other command settings you want, such as the block to print or margins.
7. If you're saving to a floppy disk, make sure it's in the correct drive.

8. Select **Go**.
9. If you want to save another block of data at the end of the file, specify the new block and select **Go** again. You can save as many blocks of the same spreadsheet as you like in the same file.
10. When "printing" is over, select **Quit** to exit the menu. The disk file is automatically closed.

Caution: Printer setup strings may cause unpredictable results in an ASCII text file. When printing to disk, it's best to first erase any setup strings entered with the **Setup String** command (*/PPS*), unless it is for subsequent printing to the printer.

Changing Page Layout

With the **Page Layout** command on the Print menu, you can specify page length, margins, headers, footers, and printer setup strings. These settings are automatically saved with the spreadsheet, so that next time you retrieve it, the same settings are in effect. You can also "update" commands on this menu, so that the changed settings become the permanent values, to be used as defaults for *all* spreadsheets.

When you select **Page Layout** from the Print menu (*/PP*), the Page Layout menu is displayed (Figure 7.4).

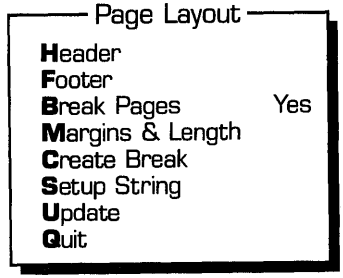


Figure 7.4: The Page Layout Menu

Header lets you specify text to be added to the top of each printed page.

Footer lets you specify text to be added to the bottom of each printed page.

Break Pages lets you print without page breaks, headers, or footers.

Margins & Length lets you specify four margins for the printed page and the page length. The default settings leave approximately one-half-inch margins on all sides of 11-inch paper.

Create Break inserts a page break in the current row of the spreadsheet.

Setup String lets you send print codes to the printer.

Update saves the current Page Layout settings in the system configuration file. The settings will then be used as the new defaults for each new spreadsheet you create.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Page Layout menu to the Print menu.

All settings are stored with the spreadsheet when you save the file. To reinstate the default settings, use the **R**eset command. Select **R**eset from the Print menu, then select **D**efaults. (If you update the printer defaults with the **U**pdate command, the current settings *become* the new defaults. The **R**eset command cannot resurrect the old default settings.)

Using Headers and Footers

Headers and footers are text that is printed at the top and bottom of each page, respectively. They can each contain one line of text, up to 240 characters. Quattro separates headers and footers from the text of a page with two blank lines.

To enter a header or footer:

1. Select **H**eader or **F**ooter from the Printer Defaults menu (*/PPH* or */PPF*). Quattro prompts you for a line of text.
2. Type the text you want to use as the footer or header. Use *Backspace* or any of the editing keys to correct mistakes as you type.
3. Press *Enter*.

The header or footer is entered and will appear at the top or bottom of each page. Unless specified otherwise, it is aligned left. To change or delete a header or footer, select the command again and delete the entry or edit it.

Quattro offers three special characters for use in headers and footers:

#	enters the current page number.
@	enters the current date (as determined by your computer's calendar).
|	(a vertical line) determines the position of the text: left, right, or center.

The last character, |, works like a tab, with the first tab centering the text and the second aligning it right. You can use | between text to align parts of a header or footer differently. Table 7.1 shows examples.

Table 7.1: Aligning Headers and Footers

Entry	Results
Budget Report	Budget Report
|Budget Report	Budget Report
||Budget Report	Budget Report
Budget Report|page #	Budget Report *page* 3
@|Budget Report|page #	16-Jan-88 Budget Report *page* 3

Printing without Page Breaks

During printing, Quattro recognizes hard page breaks (inserted with the Create Break command or the |:: sequence) and automatically inserts additional page breaks where necessary. If headers and footers are specified with Print commands, it includes them on each page.

If you'd rather Quattro not insert page breaks, but print the data in one continuous stream, set the Break Pages command to No (*/PPBN*).

This prints the spreadsheet without page breaks, headers, or footers. To return to using page breaks, set the command back to Yes.

Note: Quattro still responds to hard page breaks entered in the spreadsheet, even when the Break Pages command is set to No. If you want to ignore *all* page breaks, delete any hard breaks from the spreadsheet first.

The Break Pages No option is useful for quick printouts or for printing to a disk file.

Changing the Margins

Default margin and page length settings leave half-inch margins on all sides of an 8.5-inch page. (See Figure 7.5.)

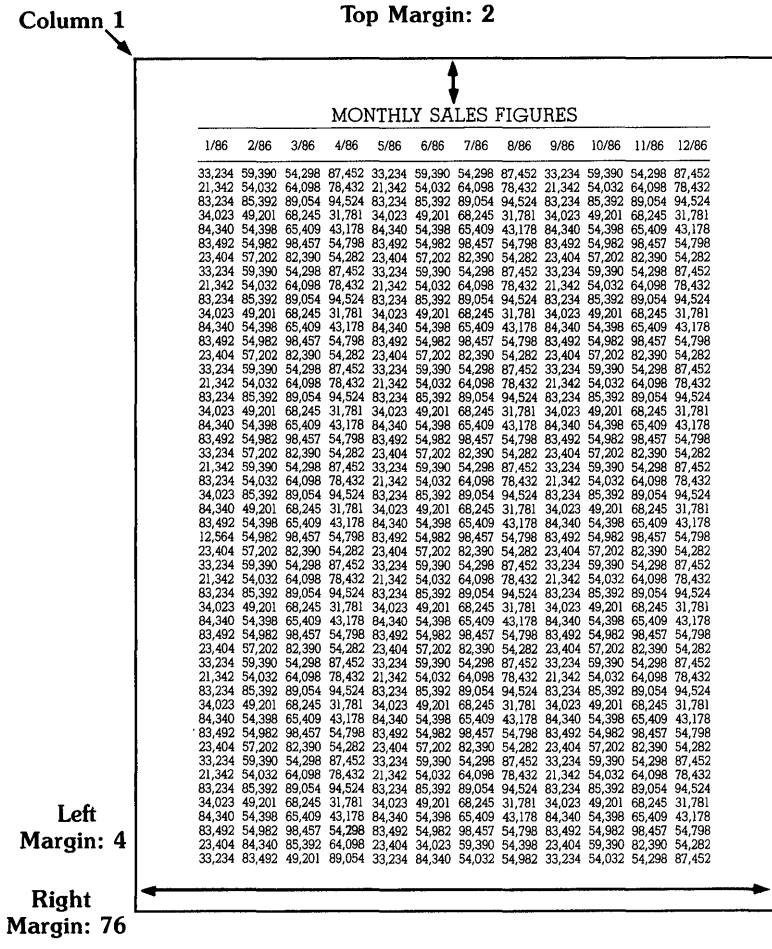


Figure 7.5: A Printed Spreadsheet with Standard Margins.

If your spreadsheet won't fit across one page, Quattro prints the left part, then (on a separate page) prints the next section, and so on until the entire spreadsheet is printed. You can combine the pages to create one large spreadsheet (see Figure 7.6)

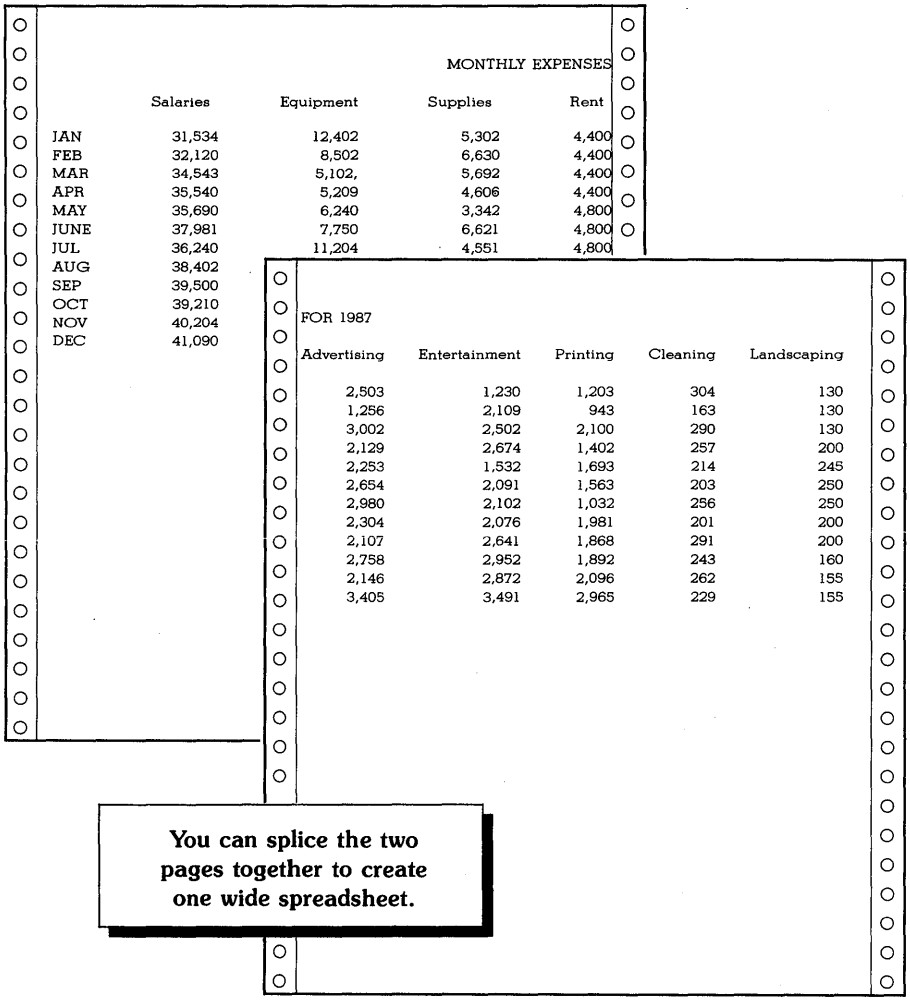


Figure 7.6: How Wide Spreadsheets Are Printed

If you're using wide paper, or other than 10-pitch print, you'll need to change the right margin. The other margins you can change to best present your spreadsheet—to center a small spreadsheet on the page, for example.

When you select **M**argins & Length from the Page Layout menu (*/PPM*), the Margins & Length menu appears (Figure 7.7). To change any of the

settings, select the command and enter a new value. To return to the Print menu, press *Esc*.

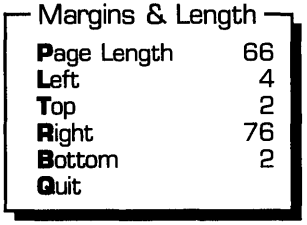


Figure 7.7: The Margins Menu

Page Length (1-100) determines the number of lines printed on each page. The default, 66, is the correct setting for a printer that prints six lines per inch (the standard setting) on 11-inch paper. If your printer is set to a different lines-per-inch value, or if your paper is a different length, change this setting accordingly. To calculate the page length, multiply the lines-per-inch value by the number of inches on a page. This setting is unaffected by headers, footers, or top or bottom margins.

Left (0-240) determines the amount of space to leave between the left edge of the paper and the first column of data. The default, 4, leaves four character spaces, or about one half-inch. Depending on the width of your spreadsheet, you may want to lengthen or shorten this margin.

Top (0-32) determines the number of blank lines to leave at the top of each page. The default, 2, leaves approximately one-half inch. If you include a header in your printout, it is printed underneath this margin with two blank lines between it and the spreadsheet data.

Right (0-240) determines the amount of space to leave for a right margin. This value is determined by the number of spaces between the *left* edge of the paper and the beginning of the right margin—like the margin settings on a typewriter. The default, 76, begins the right margin at the 76th character space, leaving approximatly a half-inch margin when 10-pitch characters are printed on 8.5-inch paper.

If you're using wide paper, compressed or proportional print, or a different pitch, more characters will be able to fit on a line. So you'll want to increase your right margin accordingly. Compressed print on 8.5-inch paper can print as many as 120 characters on a line, depending on your printer. You may need to experiment to find the best setting for your printer. (See "Using Setup Strings" on page 203 for information on using printer commands, such as compressed print.)

Bottom (0-32) determines the number of blank lines to leave at the bottom of each page. The default, 2, leaves approximately one-half inch. If you

include a footer in your printout, it is printed above this margin with two blank lines between it and the spreadsheet data.

Inserting Page Breaks

Quattro automatically inserts page breaks where needed (as specified by the Page Length command). You can specify *hard page breaks* as well. Hard page breaks are inserted manually and are stored with the spreadsheet. They are not removed until you delete them individually from your spreadsheet.

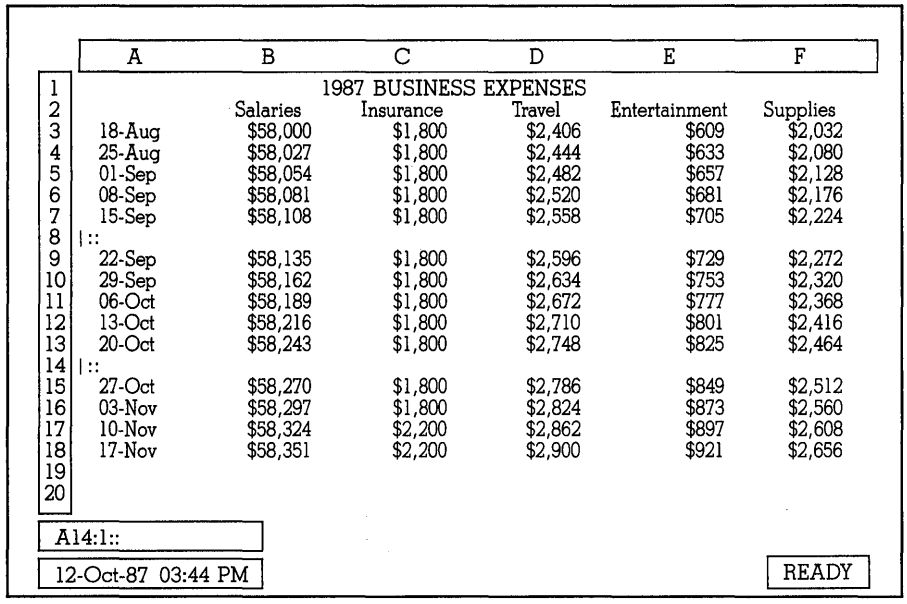
There are two ways to create hard page breaks:

- typing them into the spreadsheet
- using the Create Break command on the Page Layout menu

To enter a page break directly into the spreadsheet, you simply enter one vertical line followed by two colons (|::) in the first cell of a blank row. The row must not be part of a specified heading. If there is any other data in the row, it is ignored during printing.

To enter a page break using the menus, insert a blank row where you want the break to be. With the cell selector in the first cell of the blank row, select Create Break from the Page Layout menu (*/PPC*).

Figure 7.8 shows a spreadsheet with two page breaks inserted.



	A	B	C	D	E	F
1			1987 BUSINESS EXPENSES			
2		Salaries	Insurance	Travel	Entertainment	Supplies
3	18-Aug	$58,000	$1,800	$2,406	$609	$2,032
4	25-Aug	$58,027	$1,800	$2,444	$633	$2,080
5	01-Sep	$58,054	$1,800	$2,482	$657	$2,128
6	08-Sep	$58,081	$1,800	$2,520	$681	$2,176
7	15-Sep	$58,108	$1,800	$2,558	$705	$2,224
8	:::					
9	22-Sep	$58,135	$1,800	$2,596	$729	$2,272
10	29-Sep	$58,162	$1,800	$2,634	$753	$2,320
11	06-Oct	$58,189	$1,800	$2,672	$777	$2,368
12	13-Oct	$58,216	$1,800	$2,710	$801	$2,416
13	20-Oct	$58,243	$1,800	$2,748	$825	$2,464
14	:::					
15	27-Oct	$58,270	$1,800	$2,786	$849	$2,512
16	03-Nov	$58,297	$1,800	$2,824	$873	$2,560
17	10-Nov	$58,324	$2,200	$2,862	$897	$2,608
18	17-Nov	$58,351	$2,200	$2,900	$921	$2,656
19						
20						

Figure 7.8: Two Page Breaks in a Spreadsheet

Using Setup Strings

Printers often require special codes to invoke certain functions, such as compressed or letter-quality printing. The Setup String command lets you send such codes to your printer.

A *setup string* is a sequence of characters that is interpreted by the printer as one or more commands. Most printer commands include *Esc* or *Ctrl* characters that are not recognized by the Setup String command and must be translated into ASCII characters first. Appendix D of the *Quattro Reference Guide* lists ASCII translations of codes used by popular printers. If you're using a printer that isn't listed, refer to its manual for the specific print commands (*Esc-X, Esc-G,* and so on). Then use the procedure described in Appendix D to translate the commands into ASCII codes (for example, `\015` tells an IBM or Epson printer to use compressed print).

To enter a setup string, select **S**etup String from the Page Layout menu (*/PPS*). Quattro prompts you for the string you want to send. Type as many commands as you like (up to 39 characters). Do not use spaces to separate commands. When you're finished, press *Enter*. The setup string will be sent to the printer each time you select **G**o.

You can also embed setup strings within your spreadsheet by entering them in the first cell of a blank row. (If the row is not blank, data following the string is not printed.) The row must not be part of a heading. Embedded setup strings have greater flexibility, because you can specify different codes for different areas. For example, you can specify printing column headings in bold type, then return to normal typeface for the rest of the spreadsheet.

If your printer offers compressed type, you can use setup strings in combination with other print settings to make wide spreadsheets fit on standard-sized paper. To print 132 characters per line on paper 8.5 inches wide, set the right margin to 132 and enter `\015` in the **S**etup String command to compress type (if you have an IBM or Epson printer). To print 240 characters on paper 14 inches wide, set the right margin to 240 with `\015` in the **S**etup String command to compress type.

Caution: Setup strings can cause unexpected results in text files. If you're printing to a disk file, it's best to delete any setup string specified with this command, unless it's used for subsequent printing to the printer.

Updating the Page Layout Defaults

All **P**age Layout settings are automatically saved with the current spreadsheet. The next time you retrieve that spreadsheet, the settings will be the same as they were when you saved the file.

If you want to save the **P**age Layout settings with the system configuration file, to be used as the settings for *all* new spreadsheets, use the **U**pdate command on the Page Layout menu.

When you select this **U**pdate command (*/PPU*), the current **P**age Layout settings are saved as the new defaults. Any changes you made to the system defaults (on the Default menu) are saved as well. If there are defaults you've changed but don't want updated, change them back to the initial default before selecting **U**pdate.

Caution: The **U**pdate command permanently erases the previous default settings from the Page Layout menu. Be sure you really want to replace those settings before using this command.

Changing the Print Format

The Format command on the Print menu offers two options: As Displayed and Cell-Formulas. The default, As Displayed, prints data exactly as it appears on the screen. The second option, Cell-Formulas, prints data in an entirely different format. It lists the content of each cell, one per line, exactly as it appears on the descriptor line when a cell is highlighted. It includes each cell's address, format and width (if different from the default), and contents as entered. When you print a spreadsheet in the Cell-Formulas format, all other print formatting information, such as headers, footers, borders, and so on, is ignored.

Figure 7.9 shows two printouts. The first is printed with the default, As Displayed. The second is printed with the Cell-Formulas option.

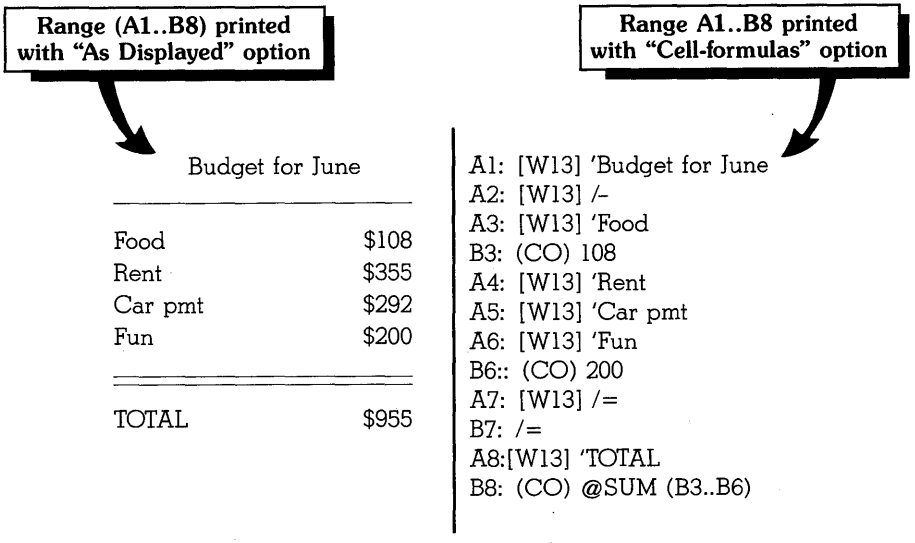


Figure 7.9: Two Printout Formats

To print a list of cell contents, select Cell-Formulas from the Format menu (*/PFC*). To return to regular spreadsheet format, select As Displayed (*/PFA*).

Resetting the Print Options

To return the **Print** command settings to their default values (their values when you first displayed the menu), select **Reset**. The Print Reset menu is displayed (Figure 7.10). Select the area you want to reset.

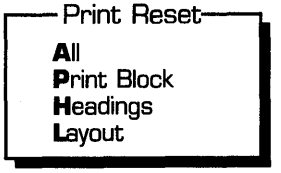


Figure 7.10: The Print Reset Menu

All returns all print commands to their default values.

Print Block clears the setting for the **Print Block** command.

Headings erases the cell range entered for the **Top** and **Left Border** commands.

Layout returns all commands on the Page Layout menu and submenus to their default settings, except for **Header** and **Footer**.

Note: Selecting **Reset Layout** cannot undo a **Page Layout Update** command. To return to the defaults in effect before updating, you must reenter the settings individually.

Adjusting the Printer

Before you begin printing (unless you're printing to disk), make sure your printer is turned on and ready ("on line"). If the paper in your printer isn't properly positioned, you can use the **Adjust Printer** commands to reposition it.

When you select **Adjust Printer** from the **Printer** menu, the **Adjust Printer** menu is displayed (Figure 7.11).

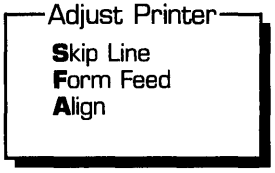


Figure 7.11: The Adjust Printer Menu

Skip Line moves the paper in the printer forward one line.

Form Feed moves the paper in the printer forward to the top of the next page.

Align tells Quattro to assume that the current position of the paper in the printer is at the "Top of Page."

To ready the printer, you can use the Skip Line and Form Feed commands to line up the top of a page with the printer's printhead.

When the paper is properly aligned, use the Align command to set the "Top of Page." This resets Quattro's line counter, which determines the placement of page breaks, headers, footers, and margins. If you adjust the printer paper without selecting the Align command afterwards, your printout could appear misaligned.

When printing is complete, you can use the Form Feed command to move the paper forward one page, if necessary.

Note: If you select Skip Line or Form Feed after printing spreadsheet data to disk, a blank line or group of lines is added to the end of the file.

Starting Printing

When all the print defaults and options are set as you want them, you can begin printing. Simply select Go from the Print menu. A WAIT mode indicator appears in the bottom right corner of the screen while the data is sent to the printer or file.

If there is a problem with the printer (for example, if it's turned off, off line, or out of paper), a confirmation menu appears on the bottom line of the screen (Figure 7.12)

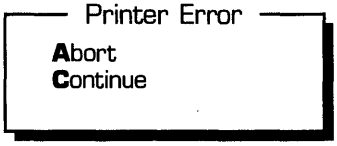


Figure 7.12: The Printer Error Confirmation Menu

Select **A**bort to halt the command, or correct the situation and select **C**ontinue.

To abort printing before it's complete, press the *Ctrl* and *Break* keys at the same time. *Ctrl-Break* aborts printing from within your computer, not within your printer. Depending on the size of your printer's memory buffer, printing may continue for awhile before stopping.

Since most printer commands are saved with a spreadsheet, printing a spreadsheet for a second time is usually much easier. In most cases, you simply press */PG* to begin printing.

C H A P T E R

8

Building Graphs

Sometimes a simple graph can reveal information that isn't immediately apparent in a table of figures. With Quattro, you can use data from your spreadsheet to instantly create graphs—from simple to detailed.

Quattro offers 10 different types of graphs:

- Line
- Bar
- 3-dimensional Bar
- XY
- Stacked Bar
- Pie
- Area
- Rotated Bar
- Markers
- Combined Lines and Markers

Quattro's extensive graph options let you customize each detail of your graph—from the pattern used for grid lines to the placement of the graph on the printed page.

You create a graph using Graph menu commands and by specifying data from your spreadsheet. You can view your graph at any point in the building process with the View command, which is available on most of the graphing menus.

Once you've completed a graph, you can print it on a printer or plotter, or save it in a file for future use.

After you've returned to the spreadsheet, you can view the latest graph instantly by pressing the GRAPH key, *F10*. If you have two monitors, you can even view both the graph and spreadsheet at the same time.

Note: To view graphs on your screen, your computer must have a graphics board—for either color or monochrome display. To print graphs, you must have a printer with graphics capability. Even if you can't display graphs on your screen, you can still build them and print them out on a graphics printer.

This chapter describes:

- how to create a basic Quattro graph
- the different graph types and what they're best used for
- adding titles to a graph
- customizing a graph, including rescaling the *x* and *y*-axes, defining the graph legend, combining graph types, changing markers, fill patterns, and colors used, adding interior labels, and adjusting pie charts
- storing graphs with a spreadsheet, and displaying previously saved graphs
- printing graphs

What Is a Graph?

A graph is a visual representation of the relationship between values. Graphs offer a new perspective on the information stored in your spreadsheets. Not only do they enhance the presentation of information, but they often help you interpret your data. For example, the bar graph in Figure 8.1 shows a dip in sales in June with a rising trend since August.

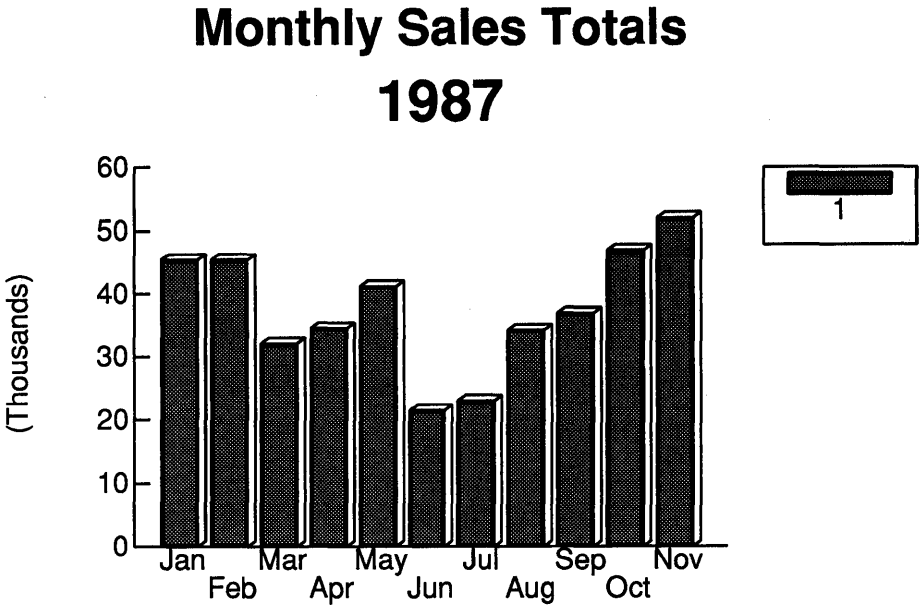


Figure 8.1: A Bar Graph Showing Sales Trends

And the pie chart in Figure 8.2 shows how much each business expense contributes to the whole.

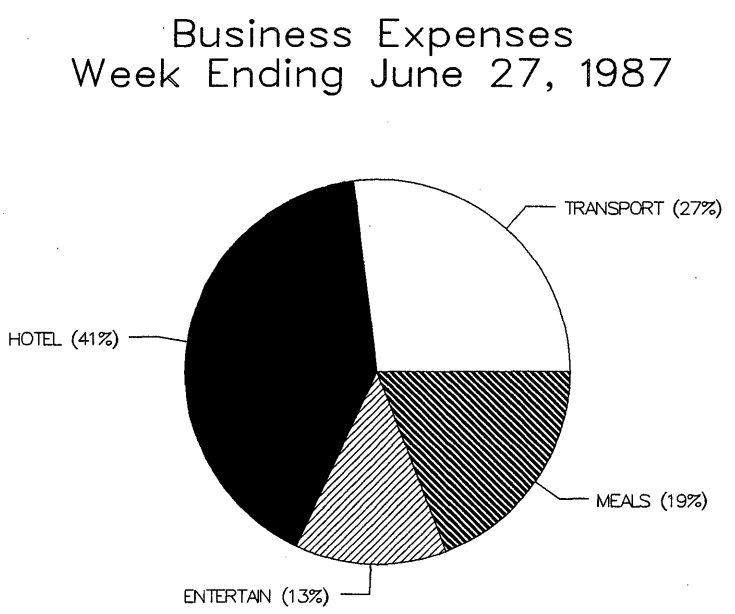


Figure 8.2: A Pie Chart Shows Percentages

Often a graph will uncover a trouble spot or pinpoint the beginning of a new pattern. You can then return to the spreadsheet data for a look at the data behind such areas.

Graphs help both with analyzing past or present data and with visualizing future situations. Just as you can set up a database to create "what-if" scenarios (see page 316), you can use graphs to help foresee future directions.

The Graphing Menus

All Quattro graph commands are accessed from the Graph command on the main menu. When you select this command, the Graph menu is displayed (Figure 8.3). It is through this menu that you do all your work with Quattro graphs: building, customizing, and printing.

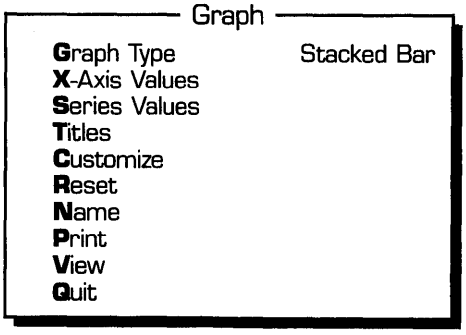


Figure 8.3: The Graph Menu

Graph Type lets you choose from 10 types of graphs.

***X*-axis Values** lets you specify the cell entries on your spreadsheet that you want to use as *x*-axis values (for a XY graph) or to label your *x*-axis values (on all other graphs).

Series Values lets you specify up to six series of spreadsheet values to plot on your graph.

Titles lets you add a main title, a subtitle, and axis titles to the graph. It also lets you change the size and type style of the titles.

Customize lets you embellish your graph with an array of options, including grids, titles, and legends. You can also alter the colors, marker symbols, scale, and fill patterns used within a graph.

Reset lets you return to the previous menu settings for the entire graph, or for individual series of values plotted.

Name lets you store a graph with the current spreadsheet, display a graph that was previously stored with the spreadsheet, and delete one or all named graphs. Named graphs include settings only and reflect the current data in the spreadsheet.

Print lets you print your graph. You can indicate the size and placement of the graph on the printed page, and specify information about the printer you're using.

View displays the current graph on the screen. To return to the Graph menu, press *Esc*.

Quit returns you to the main menu.

The Graph menu is the gateway to numerous graphing menus. (See the fold-out on the inside front cover of the *Quattro Reference Guide* for a

complete map of graphing menus.) Each of the menus contains the View command, so you can instantly view the current graph no matter where you are.

To return to the previous menu, press *Esc*. To display a help window containing information about the current area, press the HELP key, *F1*. To redisplay the current graph from within the spreadsheet, press the GRAPH key, *F10*.

Graphing Terminology

If you've never worked with business graphs before, there are several terms you may not be familiar with:

Axis. All graphs (except for pie charts) contain two axes: the *x*-axis runs horizontally along the bottom of the graph; the *y*-axis runs vertically at the left of the graph. Values are plotted on the graph using intersections of both axes.

Fill Pattern. The pattern used to fill bars in a bar graph or slices of a pie chart. Each value or series of values is assigned a different fill pattern.

Font. A type style used to print or display characters in a graph. Quattro offers several different fonts to choose from.

Label. In a spreadsheet, a label is a textual cell entry. In a graph, labels are either textual or numeric spreadsheet entries used to define values plotted on a graph.

Legend. A table displayed to the right of a graph that lists the colors, marker symbols, or fill patterns for each series of values graphed.

Plotter. A special machine that prints multi-colored graphs on plotting paper or transparency film using automatically controlled plotter pens.

Scale. The range of values marked off (with ticks) at regular intervals along an axis. It is these values that determine the placement of bars, markers, and lines in a graph. You can alter these values by *rescaling* a graph.

Series. A set of values plotted sequentially on a graph.

Tick marks. Small lines placed at regular intervals along an axis, used to indicate scale.

Value. A cell entry on the spreadsheet. Each value in a given series is plotted on a graph.

The Basics of Creating a Graph

The general procedure for building a graph is as follows:

1. Select the type of graph you want to use.
2. Specify the data (on the spreadsheet) that you want to plot on the graph. (You can specify up to six groups, or *series*, of spreadsheet values.)
3. Use spreadsheet entries to label the *x*-axis (if desired).
4. View the graph. (You may want to try different graph types to see which best displays your data.)
5. Use graph customize commands to perfect the graph display, viewing the graph between changes, if you like.
6. When you're satisfied, print the graph or save it in a file for future use.

Of course, each of these steps includes many options and sometimes differs, depending on the type of graph you're building. A little experimentation is often required to get the exact result you want. The rest of this chapter gives you all the details you need to create the perfect graph.

Graph Types

Quattro offers 10 different types of graphs. You can also combine graph types; for example, you could use bars to show one series and lines to show another.

You can select or change the graph type at any time. If you don't select a graph type, a stacked bar graph is used.

Figure 8.4 shows four different graphs all created using the same values in the sample spreadsheet (shown in Figure 8.5).

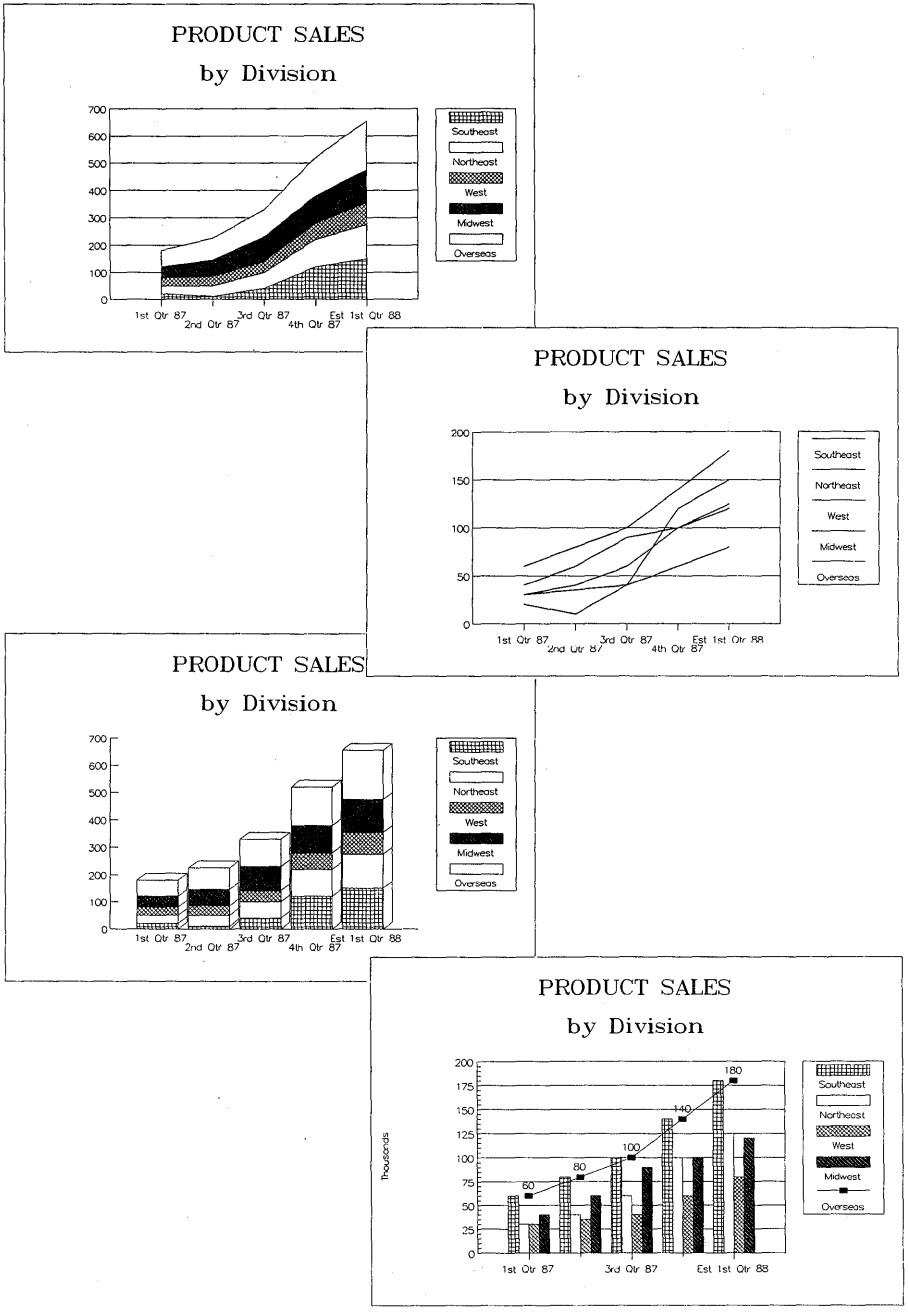


Figure 8.4: Different Graphs Plotting the Same Information

	1st Qtr 87	2nd Qtr 87	3rd Qtr 87	4th Qtr 87	Est 1st Qtr
Revenues					
Southeast	20	10	40	120	150
Northeast	30	40	60	100	125
West	30	35	40	60	80
Midwest	40	60	90	100	120
Total	120	145	230	380	475
Product Cost					
Books	1	2.5	2.2	3	2
Disks	1	2.5	2.3	2	2
Wrap	0.1	0.3	0.5	0.6	1
Assembly	0.1	0.5	0.4	0.1	0.5
Total Cost	2.2	5.8	5.4	5.7	5.5
Other Costs	40	87	138	228	285
Total Costs	42.2	92.8	143.4	233.7	290.5
Total Profit	77.8	52.2	86.6	146.3	184.5

Figure 8.5: The Spreadsheet Used to Create Sample Graphs

Most graphs use two axes to plot data: the *x*-axis and the *y*-axis. The *x*-axis is the horizontal line at the bottom of the graph. Values in each series are plotted along this axis, from left to right, in the original sequence of the series. This axis is used to show progression of values.

The *y*-axis contains numbers that are scaled automatically to fit the graph's data. The numbers on this axis are used to place the lines and/or markers on the graph.

Exceptions to this are the pie chart, which illustrates values as a percentage of a circle, the rotated bar graph, which switches positions of the *x*- and *y*-axes, and the XY graph, which lets you scale the *x*-axis with values from a series.

The following pages describe each available graph type. You can also combine certain graph types in a single graph, showing, for example, bars for one series of values and lines for another.

The next section, "Choosing a Graph Type," tells how to select a type of graph and explains which graph types are best suited for presenting certain kinds of information. "Overriding the Graph Type" on page 250 describes how to combine different graph types in one graph.

Line

The line graph is probably the most common type of business graph. It maps a series of values with a line. If more than one series is plotted, a separate line is used for each. Values are plotted from left to right, in the order in which they appear in the spreadsheet.

The layout of a line graph makes it easy to see dips and rises in a series of values. For this reason, line graphs are often used to plot data over time, both to review patterns and predict trends.

Figure 8.6 is a line graph showing monthly sales totals for 1987. The high summer sales and declining trend are clearly shown.

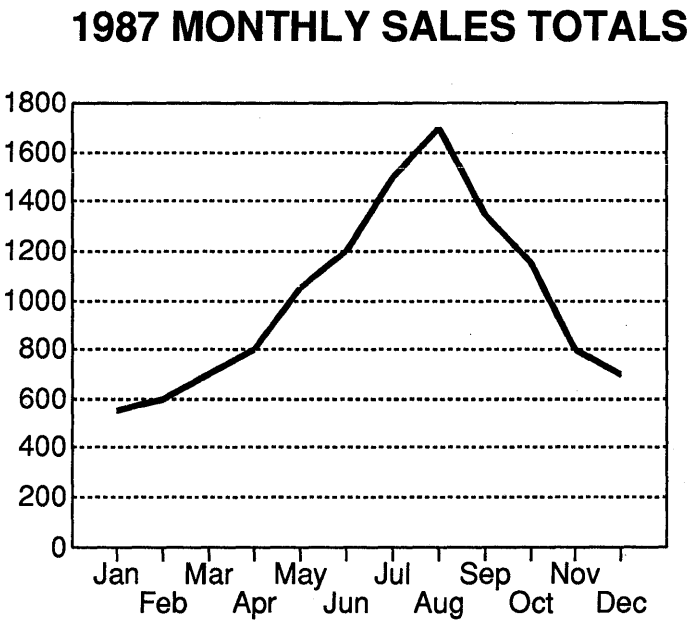


Figure 8.6: A Single Series Plotted on a Line Graph

By adding further series of values to a line graph, you can compare patterns. Figure 8.7 shows the same information as the last, but with the sales figures for previous years added. You can now see that the sales dip in winter is an expected trend, and in fact, the company is doing better this year than ever before.

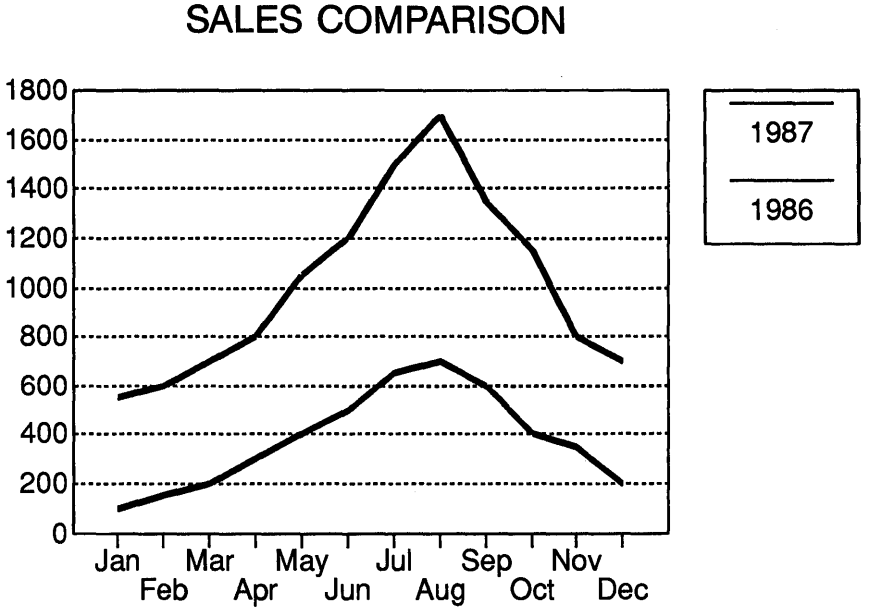


Figure 8.7: A Line Graph with Multiple Series

Bar

A bar graph uses vertical bars, extending upward from the *x*-axis, to indicate each value in a series. Each bar's value is determined by the bar's height, set according to the scale given on the *y*-axis.

When more than one series is plotted, the bars for each are shown side by side to emphasize the differences, and each series is assigned a different fill pattern and/or color. The width of the bars is determined by the number of values plotted—the more values plotted, the narrower the bars.

Bar graphs are usually used to compare the values of different items at specific points in time. Figure 8.8 shows a bar graph charting yearly sales for each region over five years. The contrast between bar sizes emphasizes the difference between totals for each region.

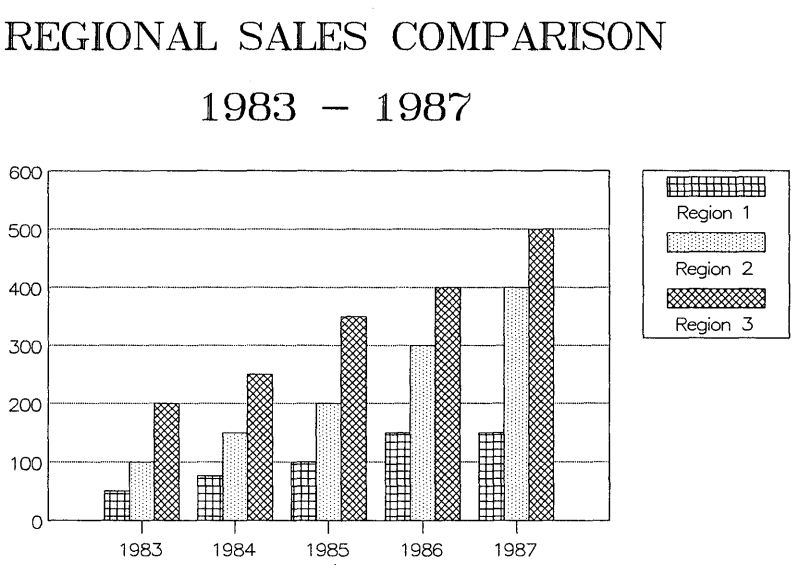


Figure 8.8: A Bar Graph

Three-Dimensional Bar

A three-dimensional bar graph differs from a standard bar graph only in that the bars are given "shadows" that make them appear three-dimensional. This is a cosmetic feature only and works best with wider bars (which appear when fewer points are graphed).

Figure 8.9 shows a sample three-dimensional bar graph showing fund-raising totals for 1987.

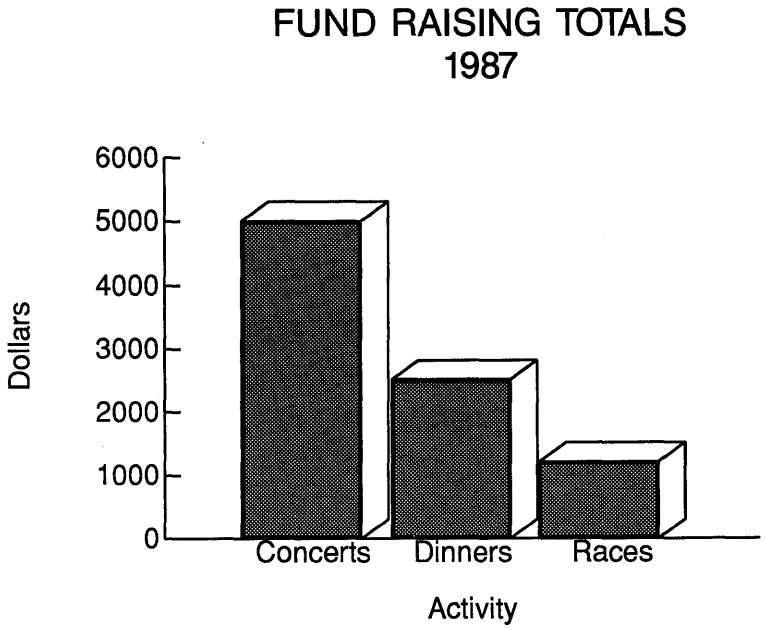


Figure 8.9: A Three-Dimensional Bar Graph

XY

An XY graph looks like a line graph, but the way values are plotted on it is very different. You assign values to both the *x*- and *y*-axes. These values not only determine the scale on both axes, but also the intersection of the values plotted on the graph. You can use an XY graph to show the relationship between two or more variables.

For example, suppose you have a spreadsheet that shows units sold and advertising expenses over six months. You could create an XY graph showing the progression of units sold in relation to advertising expenses by assigning units sold to the *x*-axis and advertising to the *y*-axis. The *x*-axis would show how many units were sold, and the *y*-axis would be automatically scaled to show advertising expenses. The points plotted on the graph would show the units sold and advertising for each of the six months. (The first point would be positioned at the intersection of the first value on the *x*-axis and the first units sold value, and so on.) Figure 8.10 shows such a graph.

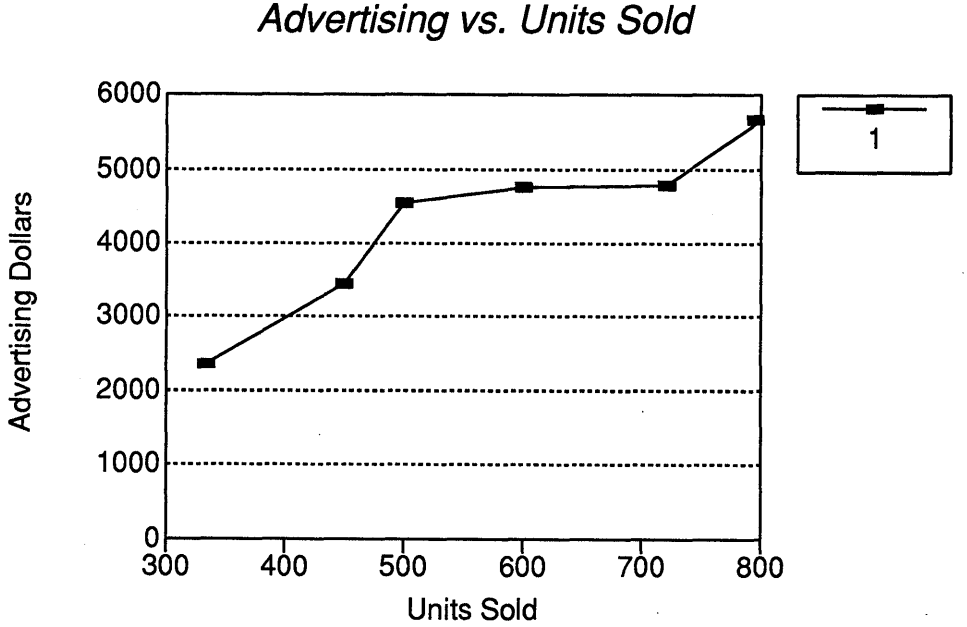


Figure 8.10: Profits and Advertising Expenses Shown on an XY Graph

You can plot up to six series of values on an XY graph. Each series plotted shows the relationship between the values in the series and those on the *x*-axis. Figure 8.11 shows the same graph as above but with two more factors added.

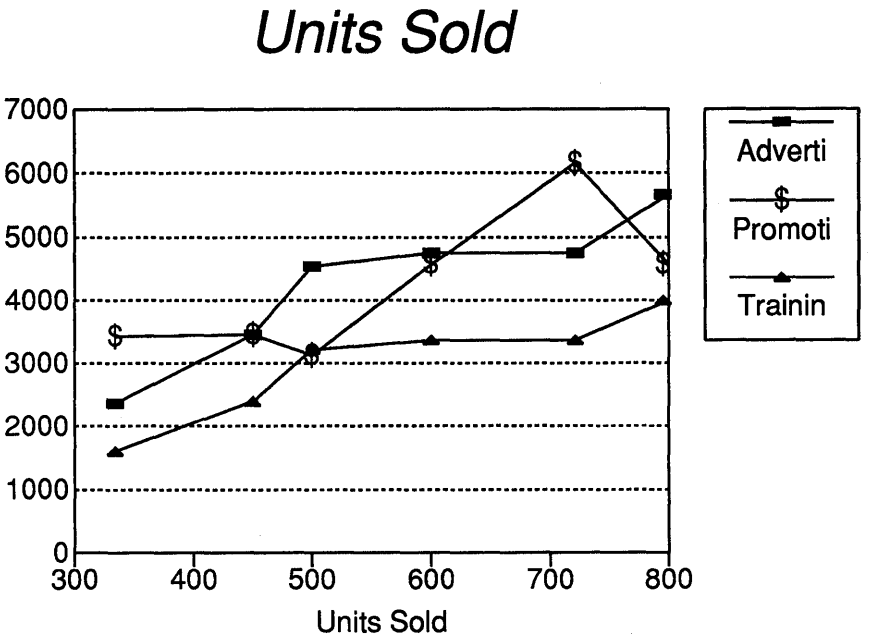


Figure 8.11: Three Series Plotted on an XY Graph

To define the information being graphed, you can add titles to both the *x*- and *y*-axes (see page 237).

Note: An XY graph uses lines to show values. You can add markers to show the individual values in a series using the **C**ustomize **S**eries **O**verride Type command (see page 250).

Stacked Bar Graph

A stacked bar graph uses bars to indicate values but, like an area graph (see page 226), it stacks series of values one on top of another, showing cumulative values. The first series of values is plotted on the bottom of the graph, and each progressive series is stacked on top of the previous one. This shows not only the total reached by the combined values, but the relationship between each value and the whole.

Figure 8.12 shows the number of subscriptions sold each month for each of four regions. The top of each bar reflects the total number of subscriptions sold per month. By comparing the sizes of bar sections created by each series, you can see that, in general, subscription sales are highest in the Northeast and lowest in the South.

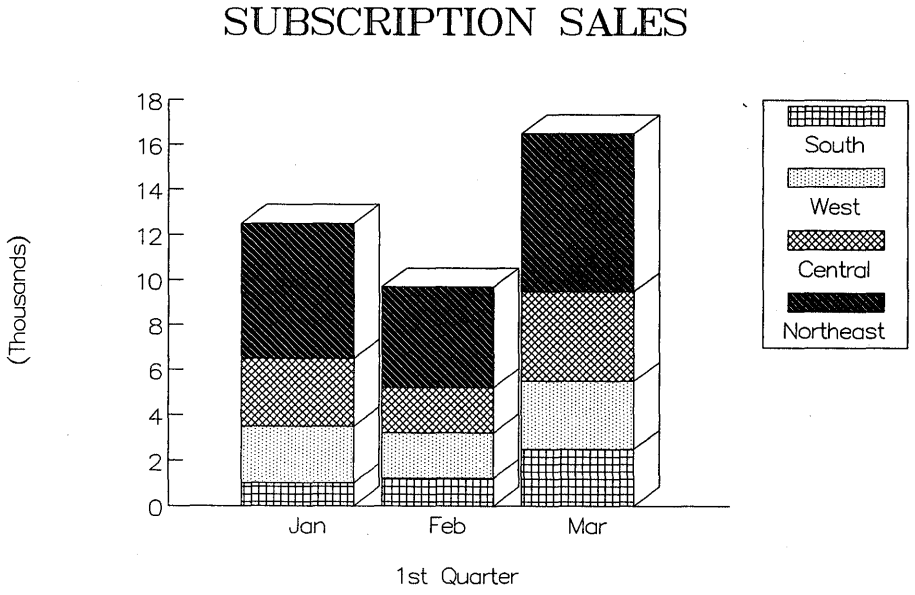


Figure 8.12: A Stacked Bar Graph

Stacked bar graphs are similar to area graphs in that they show cumulative totals, but they focus more on the individual points on the *x*-axis rather than showing collective trends.

Pie Chart

A pie chart uses a circle, or *pie*, to show each value in a single series. The pie is split proportionally by the values graphed, with each value shown as a percentage, or *slice*, of the whole pie.

Note: A pie chart can plot only one series of values at a time (assigned with the **1**st Series command). If you assign more, they are disregarded.

Figure 8.13 shows total business expenses for 1987. You can clearly see that rent is the largest expense, with supplies and entertainment following.

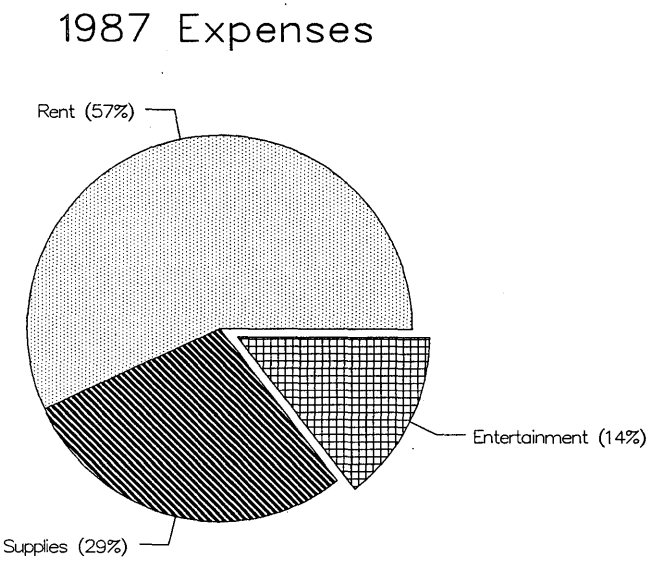


Figure 8.13: A Pie Chart

The percentage values are figured automatically and placed around the pie. To add other labels, such as those describing the expenses in Figure 8.13, use the *X*-Axis Values command (see page 235). You can further alter the appearance of a pie chart by "exploding" (pulling out) slices for emphasis or changing the color or pattern assigned to slices. You can also display the actual values instead of percentages. (See "Customizing a Pie Chart" on page 265).

Note: A pie chart cannot display negative numbers. Any negative values in the series graphed will be converted to absolute (positive) numbers.

If a pie chart appears oblong on your screen, you can adjust it with the Aspect Ratio command on the Default Hardware Screen (*/DHSA*) menu (see page 123).

Area

An area graph, like a line graph, uses lines to plot values, but instead of plotting actual values, it plots *cumulative* values. In other words, the first series is plotted as usual along the *x*-axis. The second series is then stacked on top of the first, so that the points graphed represent the total of correlating values from both series. The third series is then placed on top of that, and so forth. The area beneath each line is filled with a different color and/or pattern to dramatize the difference between series.

Area graphs are often used to show how different spreadsheet components affect the performance of the whole over a period of time. Although only the first line plotted is an accurate pattern (a dip in a further series might appear as a rise if values under it are high), the different patterns and colors beneath each series make it easy to compare general size and contribution.

The top line of an area graph not only shows the total of all values graphed, but it also reveals the pattern created by averaging the values in each series.

Figure 8.14 is an area graph, showing monthly sales for each of four divisions of a company. The top line shows total sales for all four. You can see that even though sales for the Southern Division were very low in April, sales for the other three divisions were high enough to keep the graph from dipping that month.

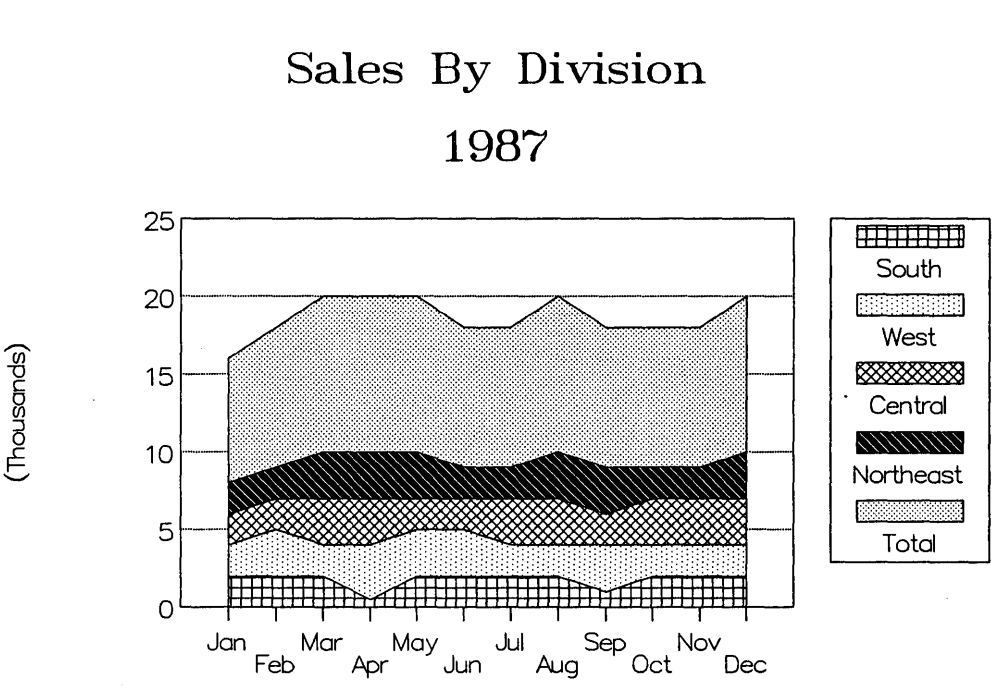


Figure 8.14: An Area Graph

You can alter the colors, shades, or patterns used to fill in each area with the **C**ustomize **C**olors and **C**ustomize **S**eries **P**atterns commands (see pages 263 and 245).

Rotated Bar

A rotated bar graph is identical to a standard bar graph except that it reverses the positions of the *x*- and *y*-axes, extending the bars horizontally from left to right.

Like a standard bar graph, this graph type is used to compare and contrast values. The repositioning of axes is merely a matter of presentation preference.

Figure 8.15 shows a rotated bar graph that plots fundraising figures shown in Figure 8.9. The left-to-right presentation adds a goal-oriented focus.

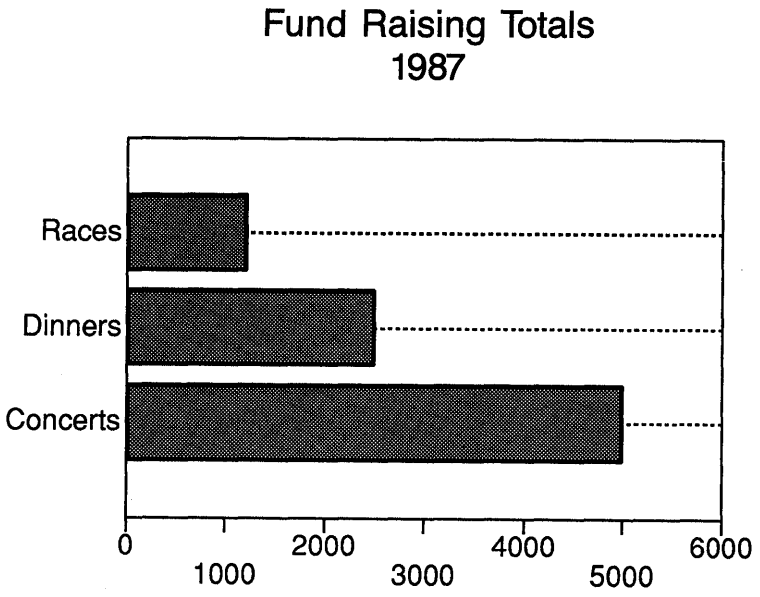


Figure 8.15: A Rotated Bar Graph

Markers

A markers graph uses markers to plot values, but, unlike the "combined lines and markers" graph, does not connect all markers in a series with a line. This type of graph is used to focus on individual values rather than their progression.

Figure 8.16 is a markers graph showing hourly temperatures recorded over one week. The markers group together to show a general rise and fall in temperature at given times.

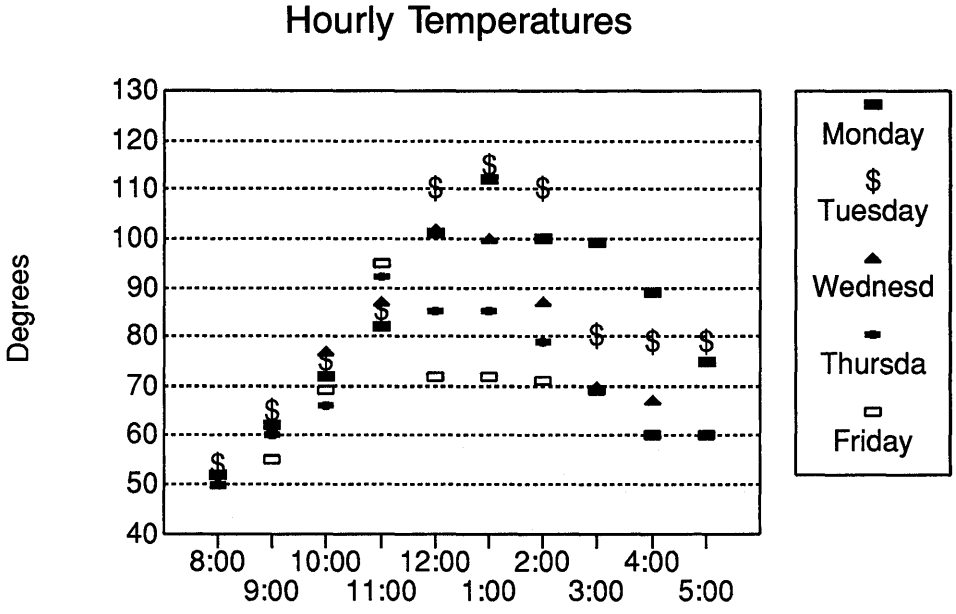


Figure 8.16: A Markers Graph

Combined Lines and Markers

A "combined lines and markers" graph adds symbols, or *markers* to a line graph to indicate individual values. If more than one series is plotted, a different marker symbol is used for each. Markers not only give more focus to the values themselves, but they help to differentiate between series.

Figure 8.17 shows a "combined lines and markers" graph that tracks daily production totals over one week. The markers indicate the totals for each day, and the lines show the production pattern for that week, which reached its peak on Wednesday.

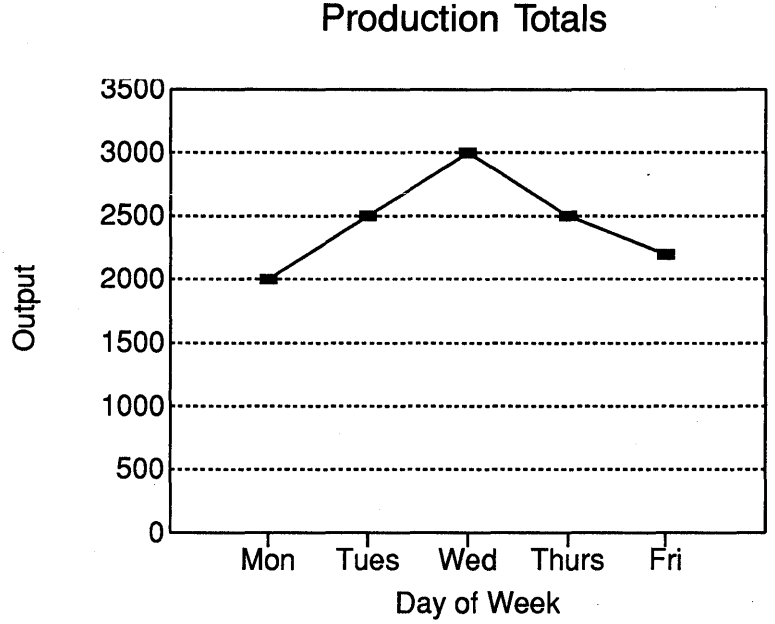


Figure 8.17: A "Combined Lines and Markers" Graph

You can change the markers used for each series with the **Customize Series Markers** command (see page 244).

Choosing a Graph Type

The data you assign to a graph and how you choose to customize the graph depend on the type of graph you choose. Therefore, even though you can switch to a different type of graph at any time in the graph-building process, it's a good idea to decide which general type you want *before* building the graph.

The type of graph you choose is often only a matter of preference, but sometimes it depends on the type of analysis you want to perform. Before you choose a graph type, think about what it is you want to illustrate. Total sales dollars for each division of a company? The number of products produced each month of a year? How numbers of hours worked affects productivity?

The kind of information you're dealing with affects the type of graph you might choose. Certain types of graphs are best suited for plotting certain types of data:

- **Line graphs** (including "combined lines and markers") are best for showing progression of values over a period of time—to track sales, for example. Use them to help illuminate patterns and trends over time.
- **Bar graphs** (including rotated and three-dimensional) are good for comparing values of different items at specific points in time—for example, to contrast monthly commissions for each sales representative.
- **Markers graphs** are best when the data you're graphing is in random order, and it would be difficult to see the values plotted on a line graph.
- **Stacked bar graphs** show the relationship between individual values and the total—for example, how total sales are divided between regions.
- **Area graphs**, like stacked bars, show each series' contribution to the total, but because they use lines to track values, they show the patterns created by averaging the values in all the series. For this reason, they are better used to illustrate how different spreadsheet components affect the performance of the whole over a period of time.
- **Pie charts** compare the individual values within one series and show how they affect the whole—for example, how yearly expenses break down into categories. Use them to focus on the individual values in a single series.
- **XY graphs** plot values in one series against those in another—to show the relationship between salary and length of employment, for example.

If you don't specify a graph type, Quattro automatically creates a stacked bar graph. You can switch to a different graph type at any time. In fact, you will probably want to experiment with different graph types to see how your data is best displayed.

To change graph type, press */GG* to select Graph Type from the Graph menu. The Graph Type menu is displayed (Figure 8.18).

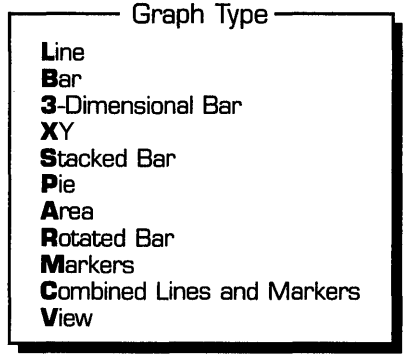


Figure 8.18: The Graph Type Menu

Select a type of graph. If you've already assigned values to the graph, you can select View to see how the graph displays your data.

Assigning Values to a Graph

Before you can build a graph, you must tell Quattro the values you want to plot on the graph. You do this by specifying blocks of data on your spreadsheet as sets of values to be plotted. For all but a pie chart, you can specify up to six sets, or *series*, of values with the Series Values command on the Graph menu. A pie chart displays only one series of data at a time.

Another graph command, X-Axis Values, also lets you specify spreadsheet values to be displayed in the graph. In all but XY graphs, this command is used to display labels beneath the *x*-axis, defining the data being graphed. In XY graphs, this command is used to scale and plot data on the *x*-axis.

XY graphs differ from all others in the way they are built. For this reason, they are discussed separately in "XY Graphs: The Exception" on page 236.

Defining Each Series of Values

To plot data on a graph, use the Series Values command on the Graph menu. When you select this command, the Series Values menu is displayed (Figure 8.19).

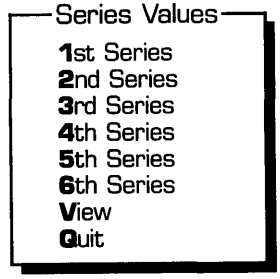


Figure 8.19: The Series Values Menu

Commands on this menu let you specify series of values from the current spreadsheet to plot on the graph. A graph can contain up to six different series of values (except a pie chart, which graphs only one series). Each is assigned a different fill pattern, color, or marker symbol to differentiate it from the others.

View displays the current graph, and **Quit** returns to the spreadsheet.

Figure 8.20 shows a simple bar graph charting two series of values. (The *x*-axis values are used to label the values being graphed.)

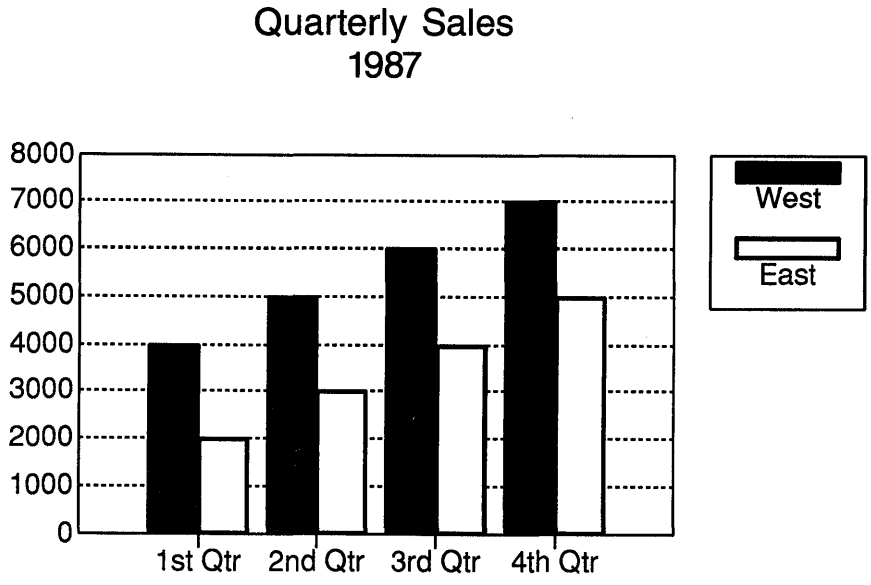


Figure 8.20: A Bar Graph with Two Series of Values

To define series for a graph:

1. Select **S**eries Values from the Graph menu (*/GS*). The Series Values menu is displayed.
2. Select **1**st Series from the menu. The menu temporarily disappears and Quattro prompts you for a cell block. If any block was previously assigned, it is shown as the default and is highlighted on the spreadsheet.
3. Enter the range of the cell block containing the values you want to plot first. The easiest way to do this is by "pointing" out the block. Use the direction keys to move the cell selector to the first value in the series you want to use. (If you're editing an existing series, you may need to unanchor the selector first by pressing *Backspace* or *Esc.*) Press the period key (.) to anchor the selection. Use the direction keys to extend the selection until the entire block you want is highlighted. Then press *Enter.*
4. Now, or at any time during the graph-building process, you can view the graph-in-progress by selecting **V**iew (press *V*). The graph fills the screen. To return to the Graph menu, press *Esc.*
5. If you want to plot more than one series, enter them in the same way: select **2**nd Series and assign a cell block; select **3**rd Series and assign a

cell block, and so on. You can assign up to six series. (A pie chart will recognize only the first series of values.)

6. To view the completed graph, select the **View** command again. Then press *Esc* to return to the menu.
7. To return to the Graph menu, press *Esc*.
8. You might want to try different graph types to see how they display this information. You can change the graph type with the **Graph Type** command on the main Graph menu.

To remove a block assignment from a series without specifying a new block, select **Reset** from the Graph menu, then select that series from the displayed menu.

The key to building comprehensive graphs is knowing which values on your spreadsheet to assign as series. This may take a little practice. You can easily experiment by assigning various values and using the **View** command to check the changes to your graph. The following guidelines will help you:

- All cell entries in the block you assign to a series must be numeric.
- Keep in mind that although there is no limit to the number of values allowed in a series, the more values graphed, the more crowded the graph will be.
- You can assign up to six data series for every graph except a pie chart, which graphs only one series.

Labeling the X-Axis

The *x*-axis is the horizontal line at the bottom of the graph. Unlike the *y*-axis, it is not normally scaled, but is simply used to place labels, from left to right, in the order of the series. With the **X**-Axis Values command, you can use spreadsheet entries to label this axis, helping to define the information plotted on it.

Note: The exception to this is XY graphs, which are discussed in the next section.

Figure 8.21 points out the *x*-axis labels on a bar graph. The labels are always displayed beneath the axis, in the order in which they appear in the spreadsheet.

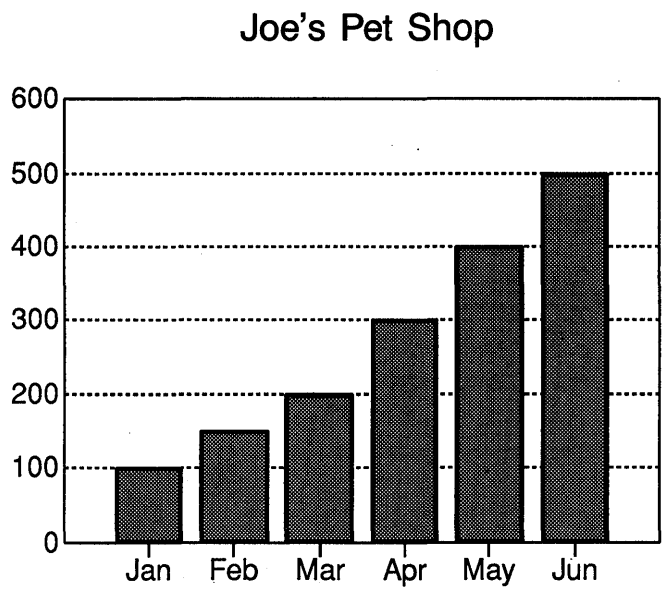


Figure 8.21: *X*-Axis Labels

To assign labels to the *x*-axis:

1. Select *X*-Axis Values from the Graph menu (*/GX*). The menu disappears and Quattro prompts you for a cell block.
2. Specify the cell block you want to use for the labels. Usually, these are row or column headings that pertain to each of the series of values plotted. You can use either label or value cells.
3. Press *V* to view the graph, then press *Esc* to return to the menu.

If the *x*-axis labels appear crowded, you may want to adjust them (see "Adjusting Ticks on the *X*-Axis" on page 257).

XY Graphs: The Exception

Values are assigned to an XY graph much differently than in other graph types. In an XY graph, you assign values to both the *x*- and *y*-axes. The graph uses these values to scale each axis, then plots the relationship between the two sets of values on the graph. If further series of values are assigned, they are plotted in relation to the *x*-axis values.

Figure 8.22 shows an XY graph plotting the relationship between employee age and salary. The highest salary is shown for age 45.

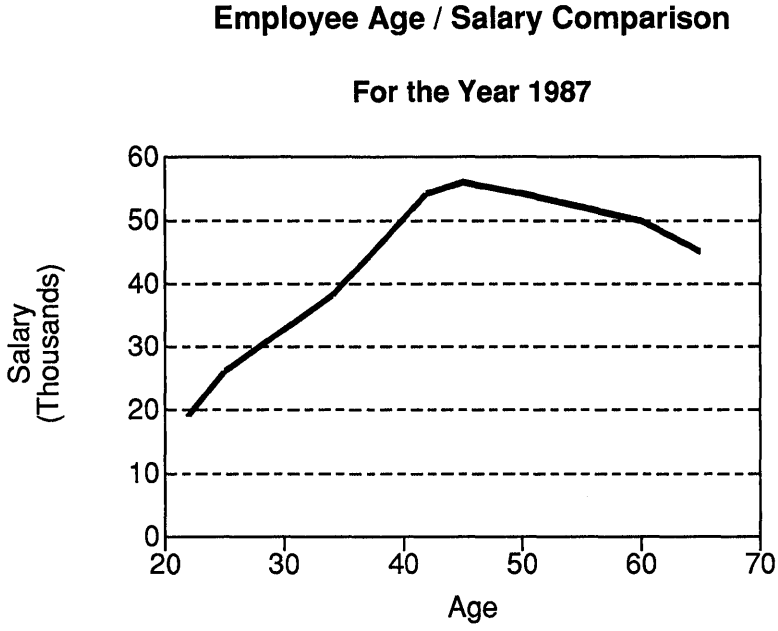


Figure 8.22: An XY Graph Showing Age and Salary of Employees

To create an XY graph, use the **X**-Axis Values command to assign values to the *x*-axis, and use the **1**st Series command to assign values to the *y*-axis. Use the **2**nd Series through **6**th Series commands to plot additional sets of values. All values you assign must be numeric values.

To help clarify the graph, you will probably want to add titles to both the *x*- and *y*-axes. Titles are discussed in the following section. Other graph adjustments are described in "The Finishing Touch—Customizing a Graph" on page 242.

To label an XY graph, assign the labels to a series, then select **N**one from **O**verride Type.

To alter the scale of either axis, use the **C**ustomize **X**-Axis and **Y**-Axis commands (see pages 256 and 261).

Titling a Graph

Titles can help to both identify and clarify a graph. Quattro lets you add up to four titles to a graph: a main title, a subtitle, and a title for each axis. You can change the color, the size, and font used for each.

Figure 8.23 shows examples of each type of title.

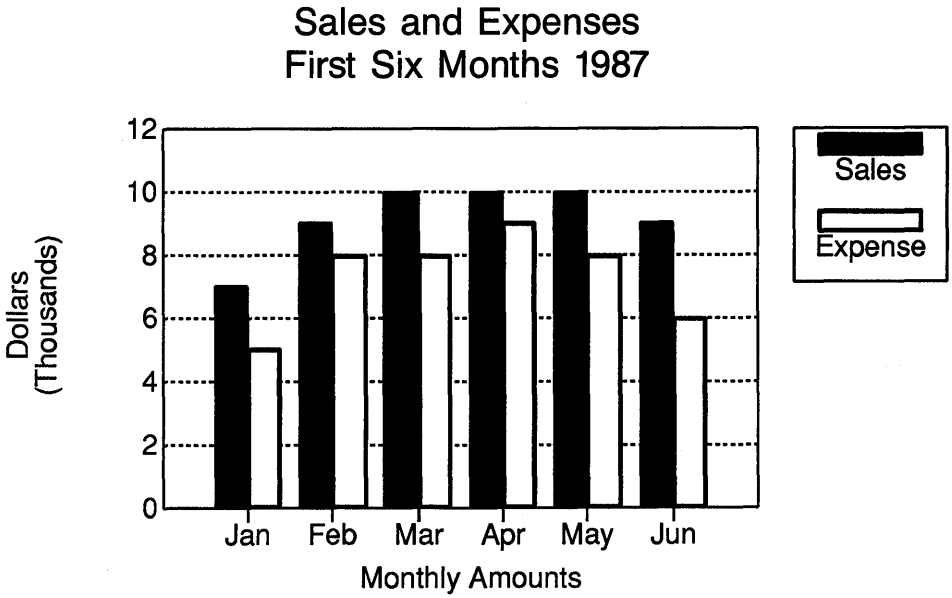


Figure 8.23: Graph Titles

When you select Titles from the Graph menu (*/GT*), the Titles menu is displayed (Figure 8.24). The top section deals with the main title only.

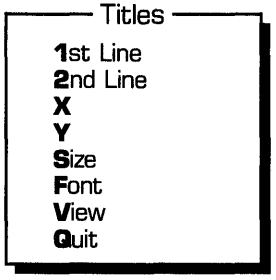


Figure 8.24: The Titles Menu

1st Line lets you specify the first line of the main title displayed above the graph.

2nd Line lets you specify the second line of the main title. It is displayed below the first line of the title in smaller type.

X lets you specify a title to be displayed beneath the *x*-axis.

Y lets you specify a title to be displayed vertically to the left of the *y*-axis.

Size lets you alter the size of each title.

Font lets you change the type style, or *font*, used to display the main title. You can choose from 11 different fonts.

View lets you view the current graph without leaving the Titles menu.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Titles menu to the Customize menu.

The following subsections describe how to enter titles and select different fonts and sizes for the titles. To change the colors used for each of the titles, use the **C**ustomize **C**olors command (see page 263).

You can also add axis titles with the **X**-Axis and **Y**-Axis commands (see pages 255 and 260).

Adding Titles

To add a title to your graph or change an existing title, select **T**itles from the Graph menu (*/GT*). Then select the title you want to add or change. Quattro prompts you for the title, showing any previous entry as the default. Press *Esc* to erase any previous entry. Type in the title you want to use, or edit the existing one, using the direction keys or backspace.

To use a cell entry as the title, type a backslash (\) followed by the cell's address. For example, `\C4` enters whatever is written in cell C4.

To erase a title without replacing it, select it from the Titles menu, press *Esc*, and then press *Enter*.

To change the color of the title, use the **C**ustomize **C**olors command (see page 263).

Using a Different Font

All graph titles are initially displayed in the default type style, or font, which displays plain block letters on the screen and prints the graph using the Triplex font. You can use a different font for the main title, if you like. Quattro offers an array of fonts to choose from—from simple to fancy. Each is demonstrated in Figure 8.25.

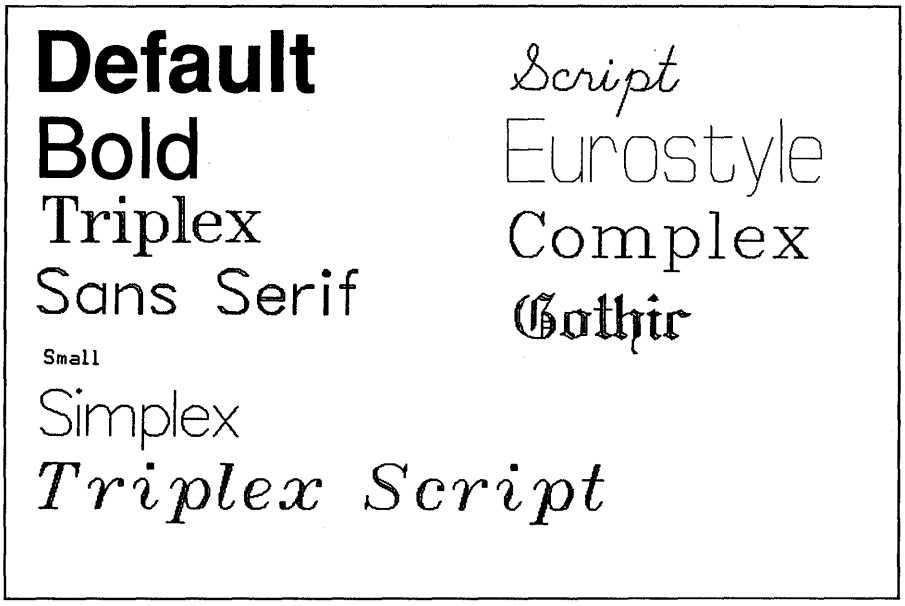


Figure 8.25: Eleven Available Type Fonts

To use a different font for your graph's main title, select **Font** from the Titles menu (*/GTF*). The Font menu is displayed (Figure 8.26).

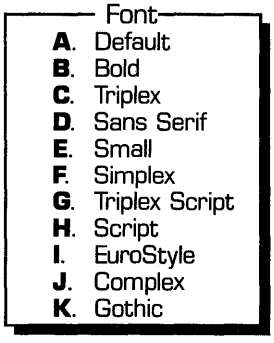


Figure 8.26: The Fonts Menu

Select the font you want to use. It affects both lines of the main title. To view the new font choice, select **V**iew. Then press *Esc* to return to the menu.

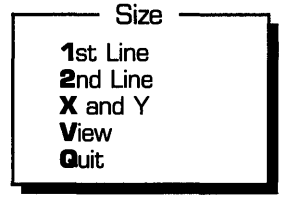
When you print a graph, your printer emulates the font specified with this command, to the best of its ability.

Adjusting Title Sizes

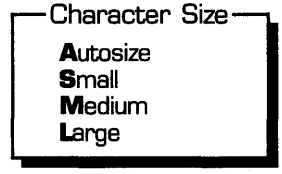
The first line of the main title is automatically sized to fit the space allotted. The longer the title, the smaller the characters will be. The subtitle and axis titles are displayed in much smaller type. You can adjust the size of each title.

To change the size of a title:

1. Select **S**ize from the Titles menu (*/GTS*). The Size menu is displayed:



2. Select the title(s) you want to adjust. The Size submenu is then displayed:



3. Select the size you want for the title(s). (The exact point size will vary depending on screen type and font choice.) The default, **A**utosize, adjusts the size according to the length of the title.
4. To check the title size you chose, select **V**iew (press *V*). To then return to the menu, press *Esc*.

The Finishing Touches—Customizing a Graph

The preceding section describes how to create a basic graph. Because it uses all defaults for graphing options, such as graph titles and legends, it may not look exactly like you want it to. The Graph Customize command offers a full menu of commands that let you alter every detail of your graph to your satisfaction.

When you select Customize from the Graph menu (*/GC*), the Customize menu is displayed (Figure 8.27).

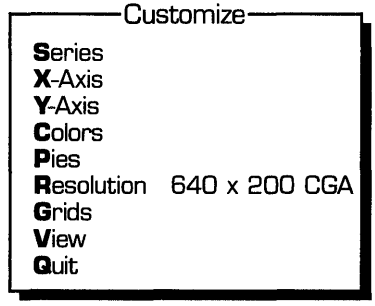


Figure 8.27: The Customize Menu

Series lets you change the way series of values are represented in the graph: the markers or fill patterns used to show each series, the legend titles, and values used to label individual points in a series.

***X*-Axis** lets you adjust the scale and display of the *x*-axis. You can also title the axis and assign new values to the axis.

***Y*-Axis** lets you adjust the scale and display of the *y*-axis. You can also title the axis and assign new values to the axis.

Colors lets you adjust the colors or hues used to display each section of the graph.

Pies lets you change the fill pattern and/or color used for each slice of a pie chart. You can also explode specific pie slices, and display percentages, currency, or actual values next to each slice.

Resolution lets you change the resolution used to display graphs on your screen.

Grids lets you change the pattern used to display grids on the graph. You can choose from six patterns, or remove the gridlines entirely.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Graph menu.

The following sections describe the options available with each of these customize commands.

Customizing Series Display

Quattro automatically assigns each series in your graph a different fill pattern or marker symbol, depending on the type of graph used. You can change the patterns and symbols used for each series with commands on the Customize Series menu. You can also label the legend used to define those patterns or symbols and add interior labels to define specific points in a graph.

When you select Series from the Customize menu (*/GCS*), the Customize Series menu is displayed (Figure 8.28).

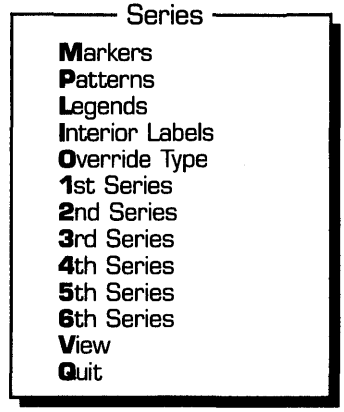


Figure 8.28: The Customize Series Menu

Markers lets you change the markers used to indicate each series of values on a markers only or "combined lines and markers" graph.

Patterns lets you change the patterns used to indicate each series of values on a bar or area graph.

Legends lets you assign names to the markers or patterns defined in the graph's legend. You can also remove the legend from the graph.

Interior Labels lets you label the individual points within a graph.

Override Type lets you specify a different graph type for an individual series of values.

1st Series ... 6th Series offer the same options as the first four items, but arrange them according to each series. This lets you set several options for a single series within one menu.

View displays the current graph.

Quit returns you to the spreadsheet.

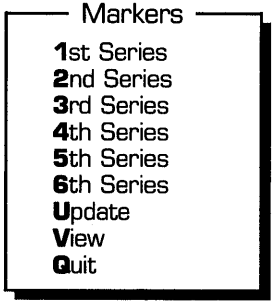
These options are all discussed in the following subsections.

Changing the Marker Symbols

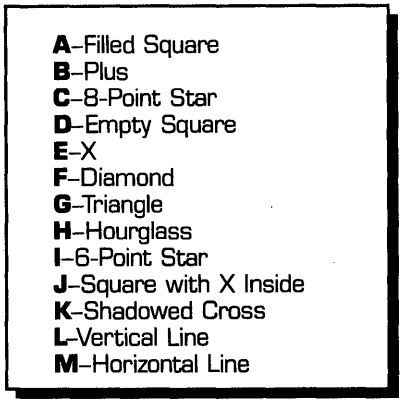
In a markers graph or "combined lines and markers" graph, each value in a series is shown on the graph with a marker. Each series uses a different marker symbol.

You can change the marker symbol used for a series with the Markers command:

1. Select Markers from the Customize Series menu, (*/GCSM*). The Markers submenu is displayed:



2. Select the number of the series for which you want to assign a new marker. A window is displayed over the Markers menu, listing available marker symbols:



3. The current marker for that series is highlighted. Select the marker you want to use to represent the series. The window disappears.
4. If you want to change the markers for other series, do so in the same way, using the corresponding **S**eries command on the Markers menu.
5. To view your changes in the graph, select **V**iew. Then press *Esc* to return to the menu.
6. To save the marker changes permanently (to be used with all graphs), select **U**pdate. (**U**pdate also saves any changes you made to the system defaults with the Default menu.)
7. To return to the main Graph menu, press *Esc* three times.

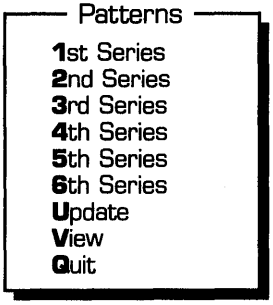
You can also change the marker symbol for an individual series by selecting that series from the Customize Series menu (see page 253).

Changing Fill Pattern

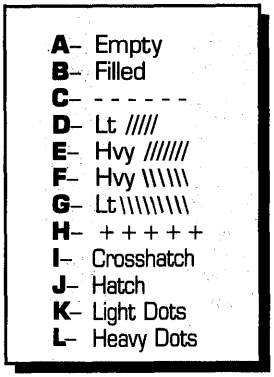
In any of the bar graphs, each value in a series is shown by a bar, the size of which corresponds to its value. All bars in a series are filled with a different pattern. This helps identify the series each bar belongs to.

You can change the fill pattern for each series with the **P**atterns command:

1. Select **P**atterns from the Customize Series menu (*/GCSF*). The **P**atterns menu is displayed:



2. Select the series you want to change the fill pattern of. A window is displayed over the Patterns menu, listing available patterns:



3. The current fill pattern for that series is highlighted. Select the fill pattern you want to use to represent the series. The window disappears.
4. If you want to change the fill pattern used for other series, do so in the same way, using the corresponding Series command on the Patterns menu.
5. To view your changes in the graph, select **V**iew. Then press *Esc* to return to the menu.
6. To save the pattern changes permanently (to be used with all graphs), select **U**pdate. (**U**pdate also saves any changes you made to the system defaults with the Default menu.)
7. To return to the main Graph menu, press *Esc* three times.

You can also change the fill pattern for an individual series by selecting that series from the Customize Series menu (see page 253).

Defining the Parts of a Legend

When you create a graph, a *legend* is automatically built to the right of the graph. Like the legend on a map, this legend defines the colors, markers symbols, or fill patterns used for each series on the graph. Each item in the legend is numbered according to the series it represents (see Figure 8.29).

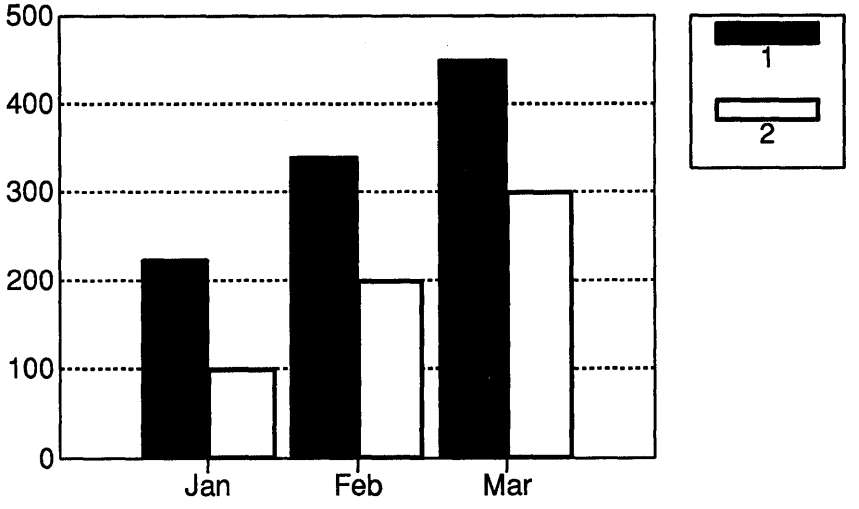
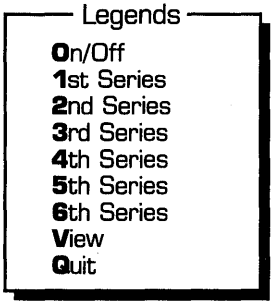


Figure 8.29: Default Legends on a Graph

To make a graph's legend more useful, you can use the **Legends** command to replace the numbers listed next to each series with a label identifying the series, such as *Feb.* or *Bob.* You can also remove the legend altogether from the graph.

When you select **Legends** from the Customize Series menu (*/GCSL*), the Legends menu is displayed:



To remove the legend from the graph, select **On**/Off and choose **D**isable. To return the legend to the screen, select **On**/Off again and choose **E**nable.

To define the series listed on the legend, select the legend number you want to redefine. Quattro prompts you for a legend name. Enter a name that helps define the series of values corresponding to that number.

Figure 8.30 shows a graph with a redefined legend.

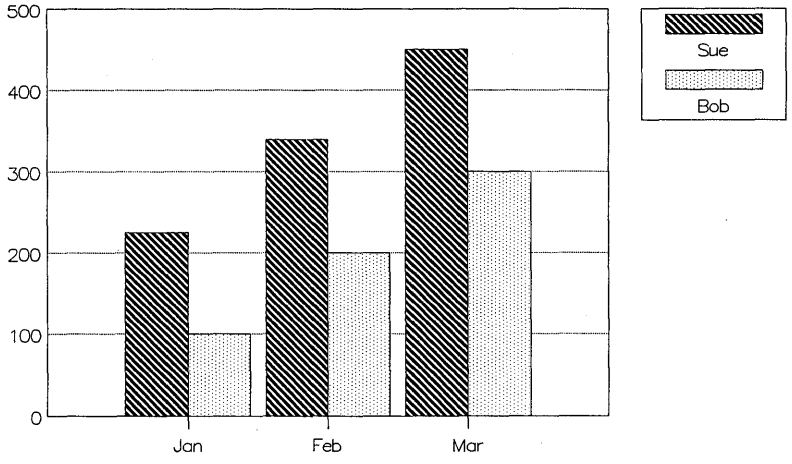


Figure 8.30: A Legend That's Been Assigned Titles

You can also assign a legend title to a single series by selecting that series from the Customize Series menu (see page 253).

Labeling Points on a Graph

The Interior Labels command lets you use data in your spreadsheet to label the individual points on a graph. These labels can offer more exact information about the graph. Figure 8.31 shows a graph with interior labels added to the first series.

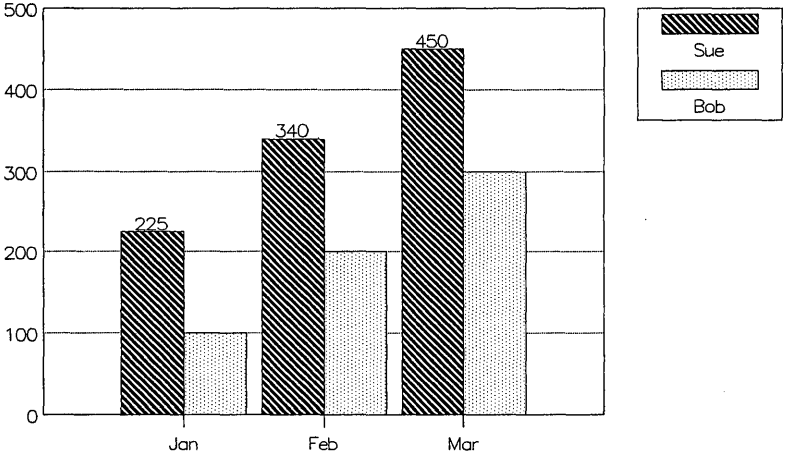
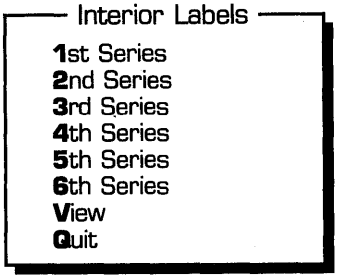


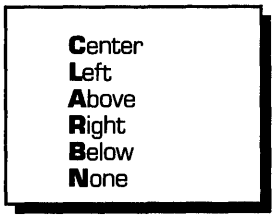
Figure 8.31: Interior Labels Help Clarify a Graph

To label points on a graph:

1. Select Interior Labels from the Customize Series menu (*/GCSI*). The Interior Labels menu appears:



2. Select the number of the series for which you want to assign labels.
3. Quattro prompts you for a cell range. Specify the cells you want to use to label the points of the series.
4. Quattro displays a menu of positions for the labels:



5. Select the option that best suits your graph. Center places the labels directly on the points graphed (except on bar graphs, in which they are placed above the bars).
6. To see the labels displayed in the graph, select View. To then return to the menu, press any key.

The cells you specify as interior labels should reflect the values entered in that series. The block can contain either value or label entries. To display the exact value of the point (as done in Figure 8.31), use the same cell block you assigned to the series.

Note: Interior labels are not shown on area graphs. On bar and three-dimensional bar graphs, interior labels always appear above the bars. On rotated bar graphs, the labels always appear to the right. On stacked bar graphs, only labels for the last (top) series are shown.

You can also assign interior labels to a single series by selecting that series from the Customize Series menu (see page 253). This menu includes a Placement of Labels command that lets you reposition interior labels without redefining them. It offers an additional option, None, that lets you remove the labels from the screen. You can then redisplay them without having to redefine the source.

Overriding the Graph Type

With the Override Type command, you can specify a different graph type for individual series of values. The type you choose for one or more series *overrides* the graph type specified with the Graph Type command.

You can use the Override Type command to combine up to five different graph types in one graph. To combine graph types, the general graph type must be set to one of the following with the Graph Type command (*/GG*):

- Lines
- Markers
- Bar
- Combined Lines & Markers
- XY

You can override the general graph type with lines, markers, combined lines and markers, or none. (Use **None** to display labels in the graph without marking the actual points.)

By combining graph types, you can give more focus to one series. For example, Figure 8.32 shows three series graphed as bars, and another as combined lines and markers. The series shown as bars appear more prominent, accentuated by the markers and lines.

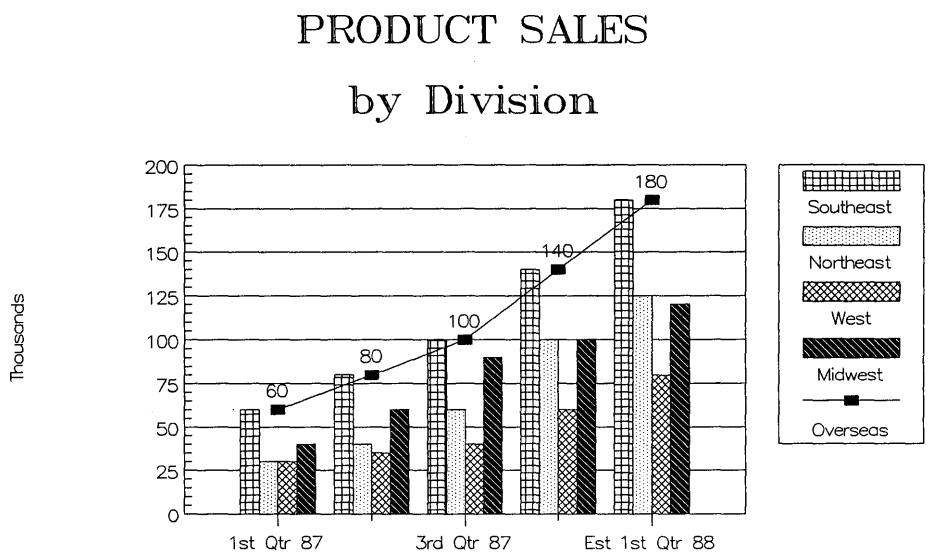
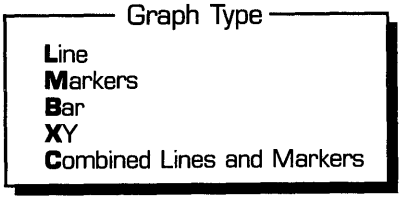


Figure 8.32: A Graph with Combined Graph Types

Combined graph types work best when the values in each series graphed represent different types of information and do not overlap much.

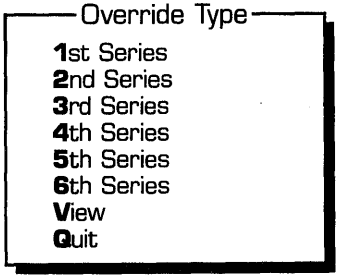
To assign overriding graph types to individual series:

1. Select **Graph Type** from the Graph menu (*/GG*) and select one of the graph types that can be used with **Override Type:**

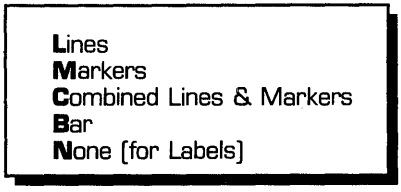


The graph type you choose will be used for any series not assigned another type.

2. Select **Override Type** from the Customize Series menu (*/GCSO*). The Override Type menu appears:



3. Select the series you want to assign an overriding type to. A window is displayed over the Override Type menu, listing the types of graphs available for combined graphs:



4. Select the graph type you want to use to plot that series of values.
5. Select **View** to see how the combined types look.
6. If you want to use an alternate type for another series, select that series from the menu and choose a graph type.
7. Repeat the procedure as necessary to assign overriding graph types to other series. Any series not assigned an individual graph type will be displayed in the type originally selected with the **Graph Type** command (*/GG*).
8. When you're finished, you can select **View** to display the graph. Then press any key to return to the menu.

Caution: The overriding graph types remain in effect until you select a different overall graph type with the Graph Type command. All alternate graph types assigned to series are then discarded.

Note: If you include bars in a combined graph, they should be assigned to the series with the lowest range of values. Otherwise, they will cross over lines or markers and make it harder to read the graph.

You can also change the overriding graph type used by an individual series by selecting that series from the Customize Series menu (see the next section, "Formatting Each Series").

Formatting Each Series

The Customize Series menu includes six commands that correspond to individual series: 1st Series through 6th Series. Each of these commands displays an identical menu that lists options for individual series on the graph (see Figure 8.33). Most of the commands on the menu duplicate commands available on other menus, but this menu groups them together for each series. This way you can set several options for a single series within one menu. (Press the grey plus key to display current settings for the menu.)

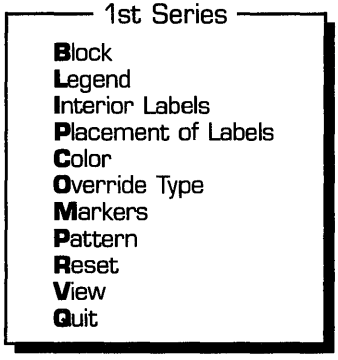


Figure 8.33: The 1st through 6th Series Customize Menu

Block displays the cell block assigned to the series. This is the same as the associated Series command on the Graph menu (see page 233). You can use this command to assign a new cell block to the series.

Legend lets you assign a title to the fill pattern or marker defined in the legend for this series. It duplicates the **L**egend command on the Customize Series menu (see page 247).

Interior Labels lets you assign a series of values on the spreadsheet to be displayed alongside corresponding points on the graph. It duplicates the **I**nterior Labels command on the Customize Series menu (see page 249).

Placement of Labels determines where the values assigned with the above command are placed in the graph. It duplicates the Placement of Labels menu shown when you use the **I**nterior Labels command on the Customize Series menu (see page 249). An additional option on this menu, **N**one, lets you remove the labels for that series from the graph. You can then redisplay them without having to respecify the source.

Color lets you change the color used to represent this series in graphs. You can also change the colors used for series with the **C**olors command on the Customize menu (see page 263).

Override Type lets you assign a type of graph to be used specifically by this series. It overrides the graph type selected with the **G**raph Type command (*/CG*). It duplicates the **O**verride Type command on the Customize Series menu (see page 250).

Markers lets you change the symbol used to represent this series in "markers only" and "combined lines and markers" graphs. It duplicates the **M**arkers command on the Customize Series menu (see page 244).

Fill Pattern lets you change the pattern used to fill the bars representing this series in bar graphs. It duplicates the **P**atterns command on the Customize Series menu (see page 245).

Reset erases all changes made to this menu, returning settings to their default values.

View displays the current graph. Press *Esc* to return to the menu.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Customize Series menu.

For details on each of the other commands on this menu, refer to the pages mentioned.

Scaling and Formatting the X-Axis

The *x*-axis is the bottom line of the graph along which values are progressively plotted. With the **C**ustomize *X*-Axis command, you can reset the scale of this axis (for XY graphs). To improve the appearance of labels on the axis, you can also change the format and placement of tick labels. When you select this command, the *X*-Axis menu appears (Figure 8.34).

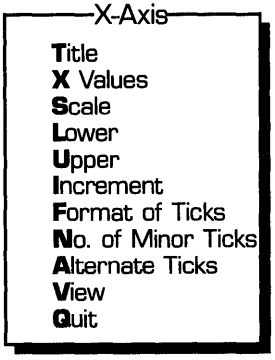


Figure 8.34: The *X*-Axis Menu

Title lets you specify a title to be displayed beneath the *x*-axis.

X Values lets you change the spreadsheet values assigned to the *x*-axis. This duplicates the *X*-Axis Values command on the Graph menu (see page 235).

Scale lets you change the numeric scale used by the graph from **A**utomatic to **M**anual. When set to **M**anual, you can specify the exact range you want.

Lower lets you specify the low end of the graph's scale. (**S**cale must be set to **M**anual to use this command.)

Upper lets you specify the high end of the graph's scale. (**S**cale must be set to **M**anual.)

Increment lets you specify placement of numeric values on ticks along the *x*-axis scale. For example, if **L**ower is set to 0, **U**pper to 500, and **I**ncrement to 100, ticks would be set for every hundredth value: 100, 200, 300, 400 and 500. (**S**cale must be set to **M**anual to use this command.)

Format of Ticks lets you change the format used to display numeric values along the *x*-axis, either as tick marks or labels (for XY graphs only).

No. of Minor Ticks lets you skip some of the *x*-axis labels, replacing them with minor tick marks. For example, if you specify 3 with this command, Quattro displays the first label in the series, skips the next three (showing minor ticks instead), displays one, replaces the next three with ticks, and so on.

Alternate Ticks displays *x*-axis labels or tick values on two levels, alternating levels for each item in the sequence. This makes the display more readable when the labels are crowded.

View displays the current graph. Press any key to return to the menu.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the X-Axis menu to the Customize menu.

The following subsections describe how to use these commands to adjust the scale of the *x*-axis and change how ticks are displayed along the *x*-axis.

Titling the *X*-Axis

With the ***X***-Axis **T**itle command, you can specify a title to be displayed beneath the *x*-axis. When you select this command, Quattro prompts you for a title. Press *Esc* to erase any previous entry. Enter the text you want displayed.

To view the title on the graph, select **V**iew from the *X*-Axis menu. Then press *Esc* to return to the menu.

This command is also available on the Titles menu (see page 238).

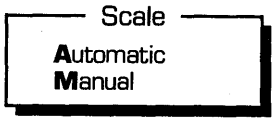
Adjusting the *X*-Axis Scale

On XY and rotated bar graphs, the *x*-axis scale is adjusted automatically to best fit the range of numbers assigned to the axis. You can change this scale, however, to fine tune a graph, or zoom in on a specific area.

Note: The *x*-axis scale can be adjusted on XY and rotated bar graphs only.

To adjust the *x*-axis scale:

1. Select ***X***-Axis from the Customize menu (*/GCX*).
2. Select **S**cale from the *X*-Axis menu. The following menu appears:



3. Select **M**anual. The submenu disappears and you're returned to the *X*-Axis menu.
4. Select **L**ower. Quattro prompts you for a number to use as the low end of the scale, with the current value shown as the default.
5. Enter the first number you want to appear on the *x*-axis. If you want all your values to appear on the graph, make sure this number is less than the lowest number assigned to the axis.
6. Select **U**pper. Quattro prompts you for a number to use as the high end of the scale, with the current value shown as the default.
7. Enter the last number you want to appear on the *x*-axis. If you want all your values to appear on the graph, make sure this number is more than the highest number assigned to the *x*-axis.
8. Select **I**ncrement. Quattro prompts you for an increment number with the current value shown as the default.
9. Enter the number of the interval you want between tick marks on the *x*-axis. Quattro adds tick marks from the **L**ower value to the **U**pper value based on the **I**ncrement value. If you leave this value at 0, Quattro inserts the tick marks automatically to scale.
10. To view the graph with your scale changes, select **V**iew. Then press *Esc* to return to the menu.

You may need to experiment with changing your graph's scale before you find the range that best suits your graph. Because you are limited by the width of the screen, you need to be careful not to specify too great of a scale range. Otherwise, your graph may be compressed beyond readability.

Adjusting Ticks on the *X*-Axis

Quattro marks off each incremental value on the *x*-axis with a tick mark—a short vertical line below the axis. There are three things you can do to adjust these ticks for all graphs except pie charts:

- Change the format used to display numbers along the *x*-axis.
- Replace some of the axis labels with small unlabeled tick marks at regular intervals.
- Display tick mark labels on two levels, to allow more room for each label.

Each of these adjustments can be made with commands on the *X*-Axis menu.

Format of Ticks

The Format of Ticks command lets you change the format in which labels on the *x*-axis are displayed for an XY graph. When you select this command from the *X*-Axis menu, the Format graph menu is displayed (Figure 8.35). This is the same menu as that displayed with the **B**lock **D**isplay Format command (*/BD*).

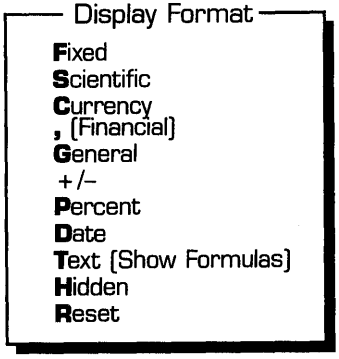


Figure 8.35: The Display Format Menu

Use the arrow keys to scroll the menu. Select the format you want to use to display your *x*-axis values or labels. (To select **T**ime, select **D**ate, then **T**ime.) Select **R**eset to reinstate the default format (**G**eneral). Table 4.2 on page 78 describes each available format.

On an XY graph, the format affects the values on the *x*-axis scale. On all other graphs, it affects any numeric values used to identify the values plotted along the *x*-axis.

Number of Minor Ticks

If the labels you use to define values along the *x*-axis don't all fit on the screen, they overlap. To avoid this problem, you can use the **N**o. of Minor Ticks command to replace some of the labels in the series with minor tick marks. (Of course, this is only a solution when the labels in between those displayed are obvious, such as with numbers, or the months of the year.)

Figure 8.36 shows a graph after replacing every other *x*-axis label with a minor tick mark.

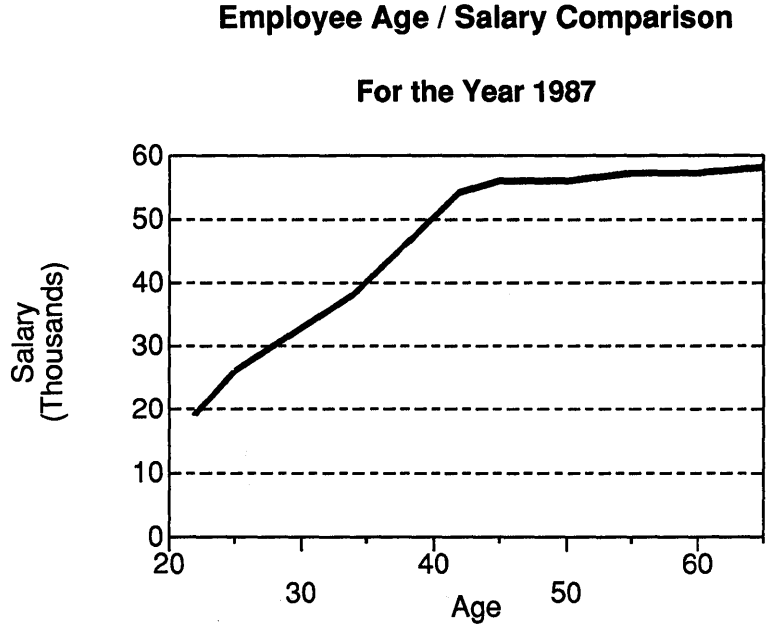


Figure 8.36: Using Minor Tick Marks

When you select the **No. of Minor Ticks** command, Quattro prompts you for a number. Enter the number of labels you want to skip over. (To display every other label, enter 1; to display every third label, enter 2, and so on.) To redisplay all *x*-axis labels, select the command again and enter 0.

The **No. of Minor Ticks** command affects all types of graphs except pie charts and XY graphs. On XY graphs, the same effect can be reached by adjusting the **Increment** command (see "Adjusting the X-Axis Scale" on page 256).

Alternating Ticks

Another solution to *x*-axis labels that won't fit on the screen is to display them on two levels with the **Alternate Ticks** command. This not only allows more room for the labels, but also allows each label to be displayed.

Figure 8.37 shows a graph with alternated *x*-axis labels.

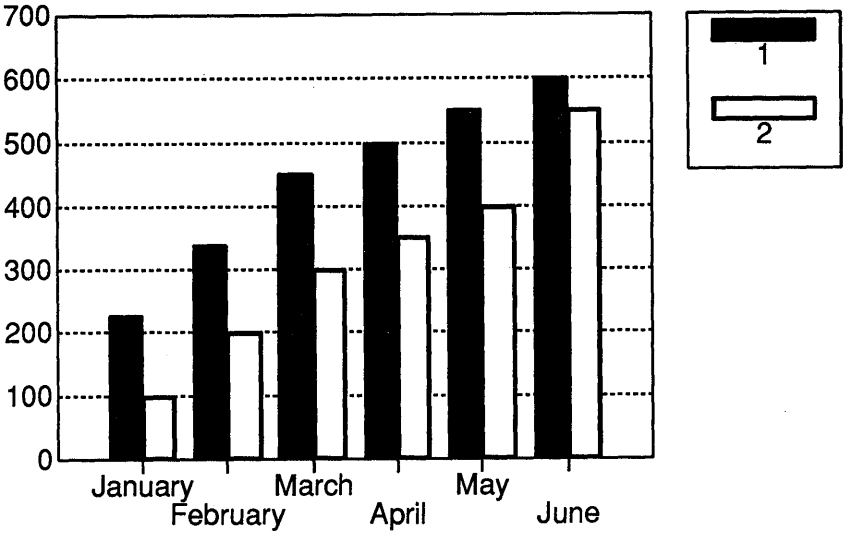


Figure 8.37: A Graph with Alternated Labels

When you select **A**lternate Ticks from the *X*-Axis menu, a submenu appears with two options: **N**o and **Y**es. Select **Y**es to alternate the labels. Select **N**o to return them to the same line.

Alternated labels do not affect pie charts.

Scaling and Formatting the Y-Axis

The *y*-axis is the vertical line on the left side of the graph. It contains a range of numbers, or *scale*, against which values on the graph are plotted. With the **Y**-Axis command, you can adjust this scale manually to any range you like. You can also change the format of the numbers used to mark the scale and replace some of the labels used along the *y*-axis with minor tick marks.

When you select **Y**-Axis from the Customize menu, the Customize *Y*-Axis menu appears (Figure 8.38).

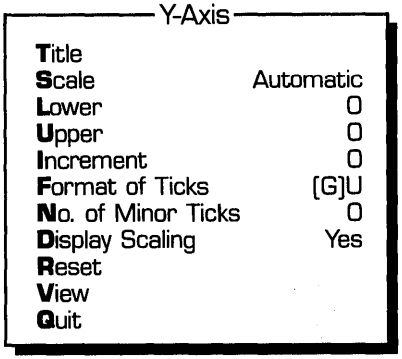


Figure 8.38: The Customize *Y*-Axis Menu

This menu contains most of the commands found on the *X*-Axis menu. The only difference is that they affect the *y*-axis. For definitions of each command, see page 255. It also includes one additional command: **D**isplay Scaling.

Display Scaling determines whether or not the scale measurement (hundreds, thousands, and so on) is displayed next to the *y*-axis.

Titling the *Y*-Axis

With the *Y*-Axis **T**itle command, you can specify a title to be displayed to the left of the *y*-axis. When you select this command, Quattro prompts you for a title. Enter the text you want displayed.

To view the title on the graph, select **V**iew from the *Y*-Axis menu. Then press *Esc* to return to the menu.

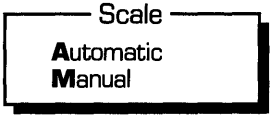
This command is also available on the Customize Titles menu (see page 238).

Adjusting the *Y*-Axis Scale

The *y*-axis of any graph is automatically numbered to include and best display all values in each series being plotted. You can change the numbers shown, however, to any range you like, using commands on the *Y*-Axis menu.

To change the scale of the *y*-axis:

1. Select *Y*-Axis from the Customize menu (*/GCY*).
2. Select Scale from the *Y*-Axis menu. The following menu appears:



3. Select Manual. The menu disappears and you're returned to the *Y*-Axis menu.
4. Select Lower. Quattro prompts you for a number to use as the low end of the scale, with the current value shown as the default.
5. Enter the first number you want to appear on the *y*-axis. If you want all your values to appear on the graph, make sure this number is less than the lowest number plotted.
6. Select Upper. Quattro prompts you for a number to use as the high end of the scale, with the current value shown as the default.
7. Enter the last number you want to appear on the *y*-axis. If you want all your values to appear on the graph, make sure this number is more than the highest number plotted.
8. Select Increment. Quattro prompts you for an increment number with the current value shown as the default.
9. Enter the number of the interval you want between tick marks on the *y*-axis. Quattro adds tick marks from the Lower value to the Upper value based on the Increment value. If you leave this value at 0, Quattro inserts the tick marks automatically to scale.
10. To view the graph with your scale changes, select View. Then press *Esc* to return to the menu.

Be careful not to specify too wide a range for the scale; otherwise, your graph may appear very compressed.

Adjusting Ticks on the *Y*-Axis

There are two adjustments you can make to tick marks on the *y*-axis:

- Change the format of numbers used to mark the scale.
- Replace some of the *y*-axis labels with minor tick marks.

Each of these adjustments works the same as with the *x*-axis and is described in "Adjusting Ticks on the *X*-Axis" on page 257.

Scaling Display

Normally, the scale measurement for values on the *y*-axis is displayed vertically to the left of the graph. For example, in Figure 8.39, the word THOUSANDS is displayed next to the *y*-axis. This indicates that the numbers on the *y*-axis scale are multiplied by 1,000. So that 10 represents 10,000, 20 represents 20,000 and so on.

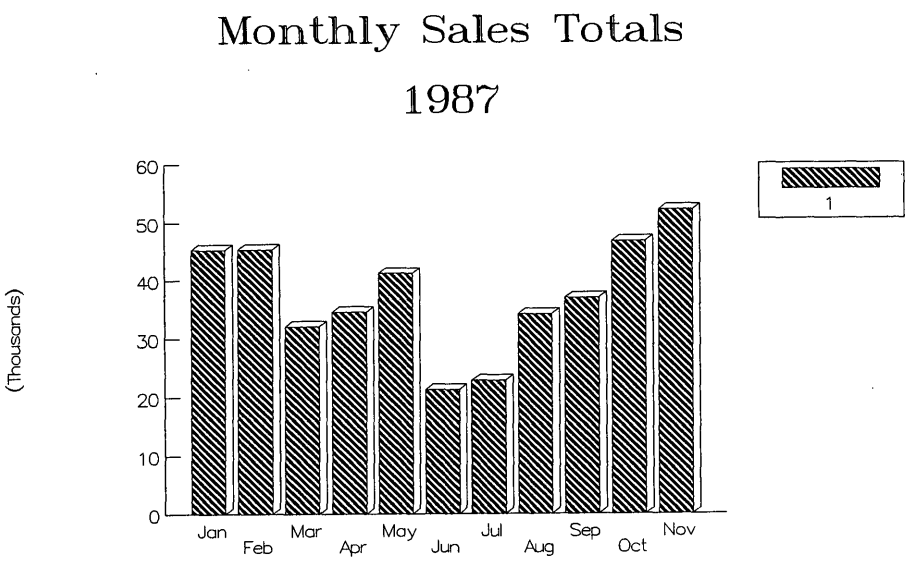


Figure 8.39: The *Y*-Axis Scaling Display

To remove the scaling label from the screen, select **D**isplay Scaling from the Customize *Y*-Axis menu (*/GCYD* and select **N**o. To return scaling to the screen, set this command back to **Y**es.

Changing Colors of the Graph

If you have a color monitor, Quattro displays your graphs in color using the default graph colors. With the **C**ustomize **C**olors command, you can change the colors used for any part of a graph: titles, background, grid, and each series.

When you select **C**olors from the Customize menu (*/GCC*), the Graph Colors menu is displayed (Figure 8.40).

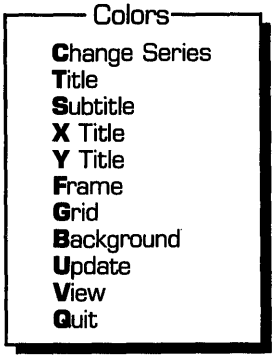


Figure 8.40: The Graph Colors Menu

Change Series lets you change the colors used to display each series of values graphed.

Title affects the color of the main title.

Subtitle affects the color of the graph's subtitle.

X Title affects the color of the graph's *x*-axis title.

Y Title affects the color of the graph's *y*-axis title.

Frame determines the color of the border around the graph and the border around bars (on a bar graph), the border around markers (on a markers graph), or the pie's border on a pie chart.

Grid affects the color of the graph's grid.

Background determines the color underlying the graph.

Update lets you save the color changes as the new defaults, to be used from now on.

View lets you display the current graph without leaving the Graph Color menu.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Customize menu.

To change the color of an area in your graph, select the corresponding item from the Graph Colors menu. A color menu appears listing available colors, with the current color highlighted. (Available colors vary depending on the type of monitor you have and the **R**esolution setting.) Highlight the color you want to use and press *Enter*.

Note: If you have a CGA card, 16 colors are listed on the menu for the **B**ackground color. For all other areas, three colors and **U**nderlying are listed as menu options. The **U**nderlying option displays whatever color is specified for the **B**ackground setting. You can switch between two sets of colors using the **R**esolution command.

For more information about the colors available with different screen modes, see "Changing Your Screen's Resolution" on page 271.

To view the color changes you made, select **V**iew. Then press any key to return to the menu. To exit the menu, select **Q**uit.

To save the colors you changed as the new defaults for use with all graphs, select **U**pdate from the Graph Colors menu. (**U**pdate also updates any changes you made to the Default menu settings.)

Unless specified otherwise, Quattro uses the colors displayed on the screen to print graphs on a color plotter. You can specify different colors for printing with the **G**raph **P**rint **C**olors command (see page 285).

To change the colors used for individual slices in a pie chart, use the **C**olor command on the Slices in Pies menu (see page 270).

Customizing a Pie Chart

Pie charts are significantly different from the other types of graphs. Not only is their presentation different (using a circle instead of axes), but they focus on the values of only one series.

Quattro offers several formatting options specifically for pie charts. These are all available with the **P**ies command. When you select this command, the Pies menu is displayed (Figure 8.41).

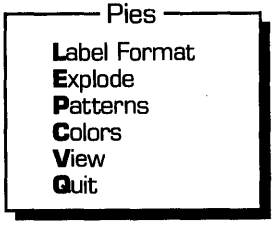


Figure 8.41: The Pies Menu

Label Format specifies the format in which labels for the slices are displayed.

Explode lets you pull out, or *explode*, up to nine specific slices of the pie.

Patterns specifies the patterns used to display each slice of the pie.

Colors specifies the colors used to display each slice of the pie.

View displays the current graph. To return to the menu, press *Esc*.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Customize menu.

The following subsections describe these options for pie charts.

Label Format

In a pie chart, each slice is automatically labeled with the percentage that slice contributes to the whole (see Figure 8.42). (If *x*-axis labels are assigned, these appear next to the percentages.)

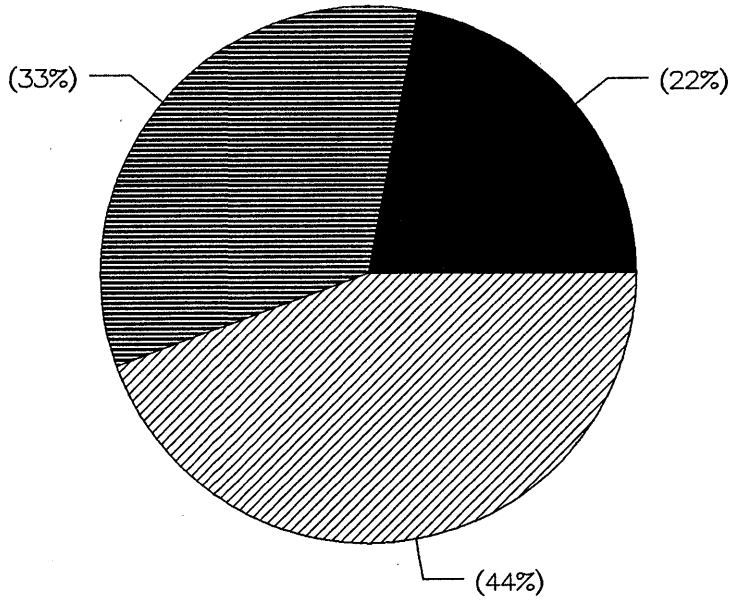


Figure 8.42: A Pie Chart Showing Percentages

You can change these labels with the Label Format command. When you select this command (*/GCPL*), the Label Format menu is displayed (Figure 8.43).

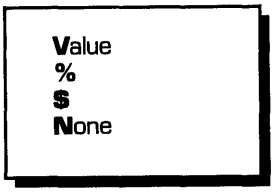


Figure 8.43: The Label Format Menu

Value displays the cell entries exactly as shown in the spreadsheet.

% shows the percentage of each value in relation to the whole pie.

$ shows the spreadsheet values preceded by a dollar sign.

None removes the labels from the chart.

The **L**abel Format command does not affect labels assigned to the pie with the *X*-Axis command. If assigned, these appear alongside the other labels. To display both spreadsheet values and percentages, specify the spreadsheet values with the **X**-Axis Values command (*/GX*), and leave the **L**abel Format command set to %.

Exploding Pie Slices

There may be one or more slices of your pie chart that you'd like to highlight or draw attention to. You can do this by *exploding* individual slices. This pulls the slice slightly away from the rest of the pie. Figure 8.44 shows a pie chart with two slices exploded.

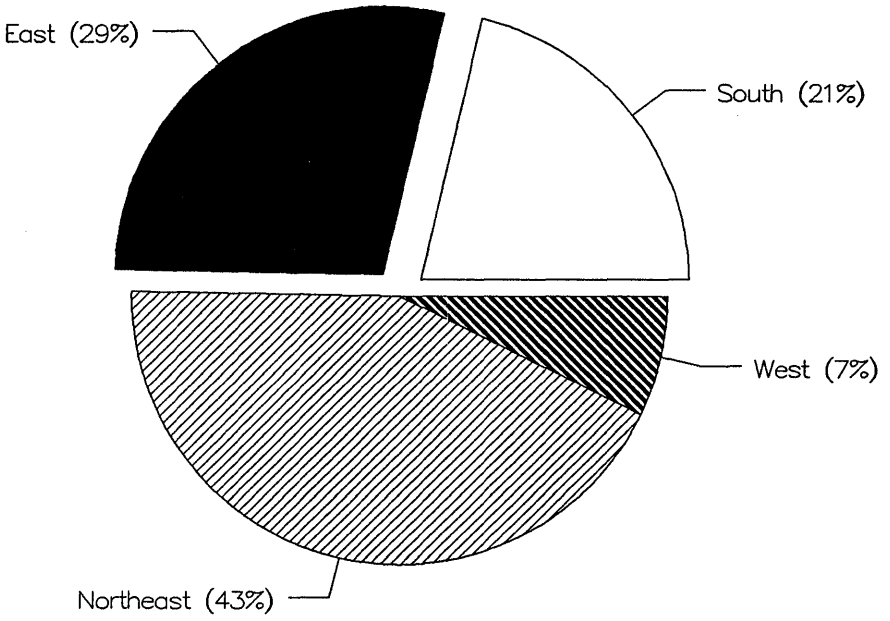


Figure 8.44: A Pie Chart with Exploded Slices

When you select Explode from the Pies menu (*/GCPE*), the Explode menu is displayed (Figure 8.45).

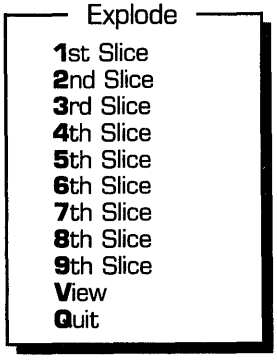


Figure 8.45: The Explode Menu

You can explode any of the first nine slices of a pie. To explode a slice, select the corresponding slice command from the menu. The first slice begins at the 0 degree mark (3:00 on a clock) and proceeds counter-

clockwise. A window is displayed over the Explode menu, listing two items:

Select **Explode** to pull the slice away from the pie. Select **Don't Explode** to return it to its original position.

To view the explosions in the pie chart, select **View**. Then press *Esc* to return to the menu.

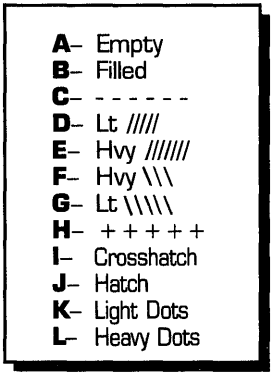
To exit the Slice menu and return to the Pies menu, press *Esc*.

Changing Fill Patterns for Pie Slices

Each slice of a pie chart is displayed in a different pattern on your screen. The default patterns are designed to best differentiate between slices, but you can change the pattern of any slice in the chart.

To change the patterns used for pie slices:

1. Select **Patterns** from the Pies menu (*/GCPP*). The Patterns menu is displayed, which is identical to the Explode menu (see Figure 8.45).
2. Select the slice you want to change the pattern of. Nine slices are shown. If your pie contains more than nine slices, the patterns will be repeated. In other words, slice 10 will have the same pattern as slice 1, slice 11 will be the same as 2, and so on. A window listing available fill patterns is displayed over the menu:



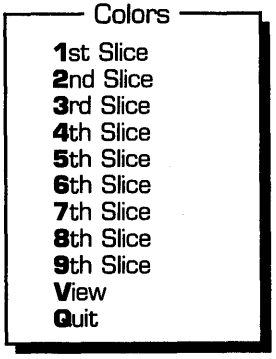
3. Select the pattern you want to fill the slice with. The window disappears.

4. If you want to change the patterns of other slices, select the corresponding slice commands and choose new patterns for each.
5. To view the pattern changes in your pie chart, select **V**iew. When you're ready to return to the menu, press *Esc*.
6. When you've made all the pattern changes you want, press *Esc* to return to the Pies menu, or select **Q**uit to return to the spreadsheet.

Changing the Color of Pie Slices

As well as pattern variations, pie slices are also assigned different colors. You can change the color assigned to any slice in your pie chart:

1. Select **C**olors from the Pies menu (*/GCPC*). The Pie Colors menu is displayed:



2. Select the slice you want to change the color of. If your pie contains more than nine slices, the colors will be repeated. (Slice 10 will have the same color as slice 1, and so on.) A color menu listing available colors is displayed. (These vary depending on the type of color card you have and the screen resolution chosen.)
3. Select the color you want to assign to the slice.
4. If you want to change the colors of other slices, select the corresponding slice commands and choose new colors for each.
5. To view the color changes in your pie chart, select **V**iew. When you're ready to return to the menu, press *Esc*.
6. When you've made all the color changes you want, press *Esc* to return to the Pies menu, or select **Q**uit to return to the spreadsheet.

To change the color of other parts of the pie chart, such as the background or titles, use the **C**olors command on the Customize menu (see page 263).

If you have a CGA card, you can switch to a different set of colors with the **R**esolution command (see the following section).

Changing Your Screen's Resolution

If you have a color monitor, you can change the resolution (and sometimes the colors) used to display Quattro graphs with the **R**esolution command on the Customize menu (*/GCR*).

The menu displayed when you select **R**esolution varies, depending on the type of monitor you're using. Table 8.1 lists the resolution modes available for each type of color card. (If you don't have a color monitor, no options are listed.)

Table 8.1: Screen Resolutions for Each Color Card

	Resolution	**Colors**
CGA	320x200	red, green, yellow, & black
	320x200	cyan, magenta, white, & black
	640x200	black & white
EGA	640x350	16 colors
	640x200	16 colors
VGA	640x480	black & white
	640x480	16 colors
MCGA (Model 30)	640x480	black & white
IBM 8514A	640x480	16 colors
Hercules	720x348	black & white
AT&T (400 line)	640x400	black & white

The highest resolution available with color is the default for each screen type. In some cases, you can gain better resolution by switching to a black and white display. If you have a CGA monitor, you can change the set of colors used in graphs. For best results, an EGA adapter is recommended if you have a CGA card.

Adjusting Gridlines

When first created, your graph includes horizontal dotted lines at regular intervals. These lines are called *gridlines* and they usually make it easier to pinpoint values on a graph. You can change the pattern and color used to create these gridlines. You can also add a frame around the graph.

To change a graph's gridlines, select **G**rids from the Customize menu (*/GCG*). The Grids menu appears (Figure 8.46).

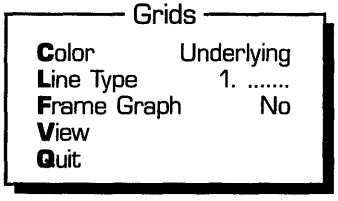
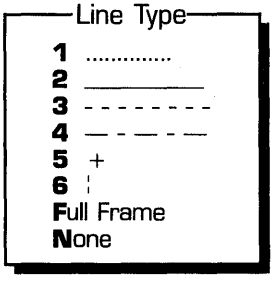


Figure 8.46: The Grids Menu

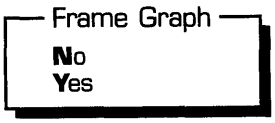
Color lets you change the color used for gridlines. It displays a menu of colors available for your screen. Select the color you want. (You can also change the color of gridlines with the **C**ustomize **C**olor **G**rids command (*/GCCG*).

Line Type lets you change the pattern used to create gridlines. It displays a menu listing possible patterns:



Enter the number corresponding to the grid pattern you want. The plus sign (5) creates both horizontal and vertical gridlines. The vertical line (6) creates only vertical gridlines. None removes them altogether, leaving an "open frame" (bottom and left borders). Full Frame removes the grids, leaving a full frame around the graph.

Frame Graph lets you surround the graph and legend with a rectangular box, the same color as the gridlines. It displays a menu with two items:



Select Yes to include the frame, No to remove it.

View lets you view the graph with the grid changes. To return to the Grids menu, press *Esc*.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Grids menu to the Customize menu.

Resetting a Graph

You can return all or some of the graph commands to their default settings with the **R**eset command on the Graph menu. When you select this command (*/GR*), the Reset menu is displayed (Figure 8.47).

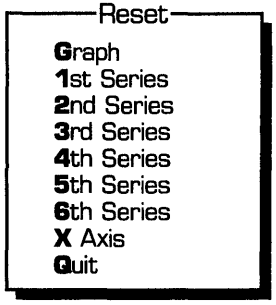


Figure 8.47: The Reset Menu

Select **G**raph to erase the entire graph, returning all graph command settings to their defaults.

When you select any of the series commands from this menu, the cell block assigned to the series is removed from the graph, and all format settings for that series are returned to their defaults. (This is the same as selecting **R**eset from any of the menus displayed by selecting **1**st Series...**6**th Series from the Customize Series menu.

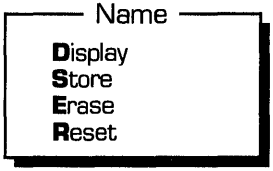
Select *X*-Axis to remove the cell block assigned to the *x*-axis and to return all settings on the Customize X-Axis menu to their defaults.

Storing and Displaying Saved Graphs

When you save a spreadsheet with the File Save command (*/FS*), the last graph you created is saved with the file. You can save more than one graph with a spreadsheet with the Graph Name command. All graphs you save with a file can be retrieved again from within that same spreadsheet.

To save a graph:

1. Select Name from the Graph menu (press */GN*). The Name menu is displayed:



2. Select Store from the menu. Quattro prompts you for a name to give the graph and displays a list of existing graph files. If you have previously saved this graph, it shows the name already given to it.
3. Enter a graph name and press *Enter*. If the graph name already exists, Quattro overwrites it.

The settings used to create the graph are saved under the name you specified. You will be able to retrieve the settings at any time when the spreadsheet it was built with is displayed. The graph created by the settings will reflect the data currently in the spreadsheet.

Note: Graphs saved with the Name Store command cannot be used with other spreadsheets. (To save a graph for future printing, apart from a spreadsheet, use the Graph Print command. (See "Specifying Destination" on page 280 for more information.)

To display a previously saved graph:

1. Select Name from the Graph menu (press */GN*).
2. Select Display from the Name menu. Quattro prompts you for the name of the graph you want to retrieve and displays a list of existing graph files in your data directory.
3. Select a graph name from the list, or type it in.

The graph you asked for is retrieved. Select View from the Graph menu (*/GV*) to see it. It plots the current spreadsheet's data—whatever data is stored in the cell blocks assigned to the *x*-axis and series.

To delete a previously saved graph, select **Erase** from the Name menu (*/GNE*) and select the graph name from the displayed list or type in a name.

To delete *all* saved graphs, select **Reset** from the Name menu (*/GNR*). Then select **Yes** from the displayed confirmation menu.

Printing Graphs

To print a graph that you've created, use the **Print** command on the Graph menu. When you select this command (*/GP*), the Graph Print menu is displayed (Figure 8.48).

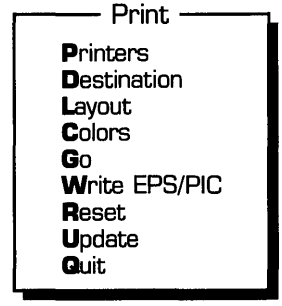


Figure 8.48: The Graph Print Menu

Printers lets you specify the type of printers you're using to print graphs, as well as printer specifics such as whether the printers are serial or parallel and whether you're using single-sheet paper or not.

Destination lets you send your graph, including print information, to a file for future use.

Layout lets you specify the exact size and placement of the graph on the page.

Colors lets you print with different colors than those used to display the graph on the screen (if you have a color printer).

Go begins printing.

Write EPS/PIC stores the current graph in an EPS file (used with word processing programs) or a PIC file (used with Lotus 1-2-3).

Reset returns all the graph print commands to their default settings.

Update stores any changes to the graph print commands as the new defaults.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Graph Print menu.

Defining the Printers

In order to print precise, attractive graphs, Quattro needs to know exactly what type of printer you're using, including make, model, and mode. If you have two graphics printers, you can enter information about both.

When you select **P**rinters from the Graph Print menu (*/GPP*), the Printers menu is displayed (Figure 8.49).

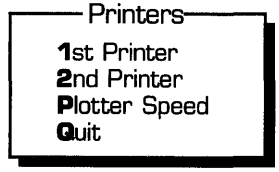


Figure 8.49: The Printers Menu

1st Printer lets you specify information about your primary graphics printer.

2nd Printer lets you specify information about a second graphics printer.

Plotter Speed prompts you for the speed at which you want to run your color plotter. The default, 0, uses the fastest speed allowed by your plotter, or whatever speed your plotter is set to. 1 is the slowest speed and 9 is the fastest. A setting of 2 is recommended for printing on transparencies. As the pins on your plotter get older, you may want to reduce speed to improve print quality.

Selecting either 1st or 2nd Printer takes you to the same menu (Figure 8.50).

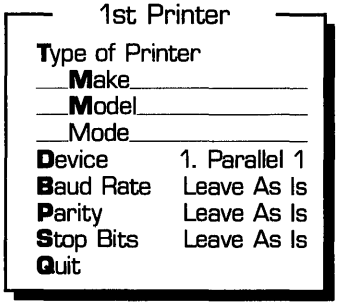


Figure 8.50: The Graphics Printers Submenu

Type of Printer lets you indicate the make, model, and mode of the printer.

Make displays the manufacturer you select with the **T**ype of Printer command.

Model displays the model you select with the **T**ype of Printer command.

Mode displays the printer mode you select with the **T**ype of Printer command.

Device displays a list of possible printer connections: Parallel 1 or 2, Serial 1 or 2, or one of four DOS LPT connections. The initial default is Parallel 1.

Baud Rate specifies the baud rate (110-19200) your printer is set to, if you're using a serial printer. The initial default, **L**eave As Is, uses the baud rate set by the DOS MODE command.

Parity specifies the type of parity your serial printer uses. You can set this to **O**dd, **E**ven, **N**one, or **L**eave As Is. The initial default, **L**eave As Is, uses the parity set by the DOS MODE command.

Stop Bits specifies how many stop bits are stored at the end of each byte (if you're using a serial printer). You can set this to **1**, **2**, or **L**eave As Is. The initial default, **L**eave As Is, uses the number of stop bits set by the DOS MODE command.

Quit returns you to the spreadsheet.

Press *Esc* to back out of this menu to the Graph Print menu.

Note: The baud rate, parity, and stop bit commands are relevant only if you're using a serial printer. The initial default for these commands, **L**eave As Is, incorporates the setup used by DOS. If you've already set up your computer to work with this particular printer, the **L**eave As Is setting will supply the correct specifications.

When you've specified information about your printer(s), press *Esc* twice to return to the Graph Print menu and select Update. This stores the information for future use.

Specifying Printer Type

To print a graph correctly, you must first specify the type of printer you'll be using, including make, model, and mode. If you'll be using two different types of printers, you can specify information about both, then tell Quattro which printer to use with the **D**estination command.

To specify printer type:

1. Select **P**rinters from the Graph Print menu (*/GPP*).
2. Select the printer you want to define (**1**st Printer for the printer you'll use most often, **2**nd Printer for the alternate).
3. Select **T**ype of Printer from the **1**st Printer menu. A menu listing different printer makes (manufacturers) is displayed.
4. Select the manufacturer that produced your printer (or the one closest in compatibility). A menu listing different models of printers produced by that manufacturer is then displayed.
5. Select the model of your printer (or the one closest in compatibility). A menu listing possible modes for the model of printer is displayed.
6. Select the mode you want to use. Quattro returns to the **1**st Printer menu.

If you specified a dot matrix printer as the printer model, the modes listed show possible *dpi* (dots per inch) options. If you want high-quality printing, choose the greatest dpi. If you want *fast* printing, choose a lower dpi. You may want to experiment to find a medium ground between speed and quality.

If you specified a plotter as the printer type, Quattro lists three possible modes—**A**utomatic, **M**onochrome, and **M**anual. **A**utomatic uses the current color pins to print the graph. **M**anual pauses printing at each color change so you can change the color pins. **M**onochrome prints the graph in one color.

In most cases, specifying printer type gives Quattro sufficient information about your printer. If you're using a serial printer, however, or a printer attached to other than the first parallel port, you'll need to specify this as well (see the following section).

When you're finished specifying information about your printer(s), press *Esc* twice to return to the Graph Print menu and select **U**pdate. This stores the information for future use.

Specifying Other Printer Information

Quattro assumes that your printer is a parallel printer attached to your computer's first parallel port. If this is not the case, you need to specify the printer connection with the **D**evice command.

Note: The **D**evice command is available on both the Graphics Printers submenu and the Default Hardware Text Printer menu. If you've already specified printer connection for this printer with the Text Printer menu, there's no need to specify it again.

When you select the **D**evice command, a menu of possible device connections is displayed (Figure 8.51). Choose the one that reflects your setup.

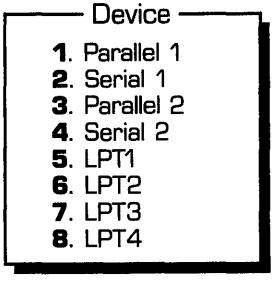


Figure 8.51: The Device Connection Menu

If you select a serial device, Quattro uses the printer setup established by DOS to determine baud rate, parity, and number of stop bits. If you've already set up your computer to work with this printer, you won't need to adjust these settings. If not, you may need to use the **B**aud Rate, **P**arity, and **S**top Bits commands (see "Text Printer Defaults" on page 123 for details).

When you're finished specifying printer information, press *Esc* twice to return to the Graph Print menu and select **U**pdate. This saves the information for future use.

Specifying Destination

When you print a graph, Quattro can send the graph to the first printer you specified information about, the second printer, or to a disk file.

Normally when you print a graph, it's sent immediately to the first printer you specified information about. If you want to send it to a second printer, or if you want to send it to a file for future printing, you specify this with the **D**estination command.

When you select **D**estination from the Graph Print menu (*/GPD*), the Destination menu appears (Figure 8.52).

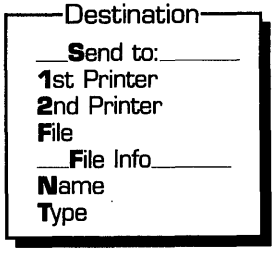


Figure 8.52: The Destination Menu

1st Printer sends the graph to your first printer, as defined by the **P**rinters **1**st Printer command (*/GPP1*).

2nd Printer sends the graph to your second printer, as defined by the Printers **2**nd Printer command (*/GPP2*).

File stores the graph in a file for future printing, under the name given with **N**ame.

Name lets you specify a file name for storing the graph.

Type lets you specify a different printer for future printing the graph file. Quattro then saves information about that printer with the file.

Before you specify destination, you must first use the **P**rinters command on the Graph Print menu (*/GPP*) to specify information about your printer.

When you select **F**ile, Quattro prompts you for a file name. Enter the name you want to give the file. Unless you specify otherwise, Quattro automatically assigns the file-name extension .PRN. It then stores the graph, along with all printing information, on disk under that name.

Printing a graph to disk is very different from saving a graph in a file. When you save a graph with the **G**raph **N**ame command (see page 274),

Quattro then saves the graph with the current spreadsheet. The graph can only be retrieved again from within that spreadsheet, and then it reflects the spreadsheet's current data.

When you print a graph to a disk file:

- Quattro records the current data used to build the graph, much like a snapshot. The "printed" graph cannot be used with any other data.
- You cannot use the DOS PRINT command to print a graph file. You can, however, send the file to the printer with the DOS COPY command. You can print the graph from DOS by typing `COPY FILE.PRN /B LPT1` *Enter*. This sends a binary file (*/B*) to the LPT1 printer port. If your printer is connected to a different port (such as COM1 or PRN), specify it instead.
- The "printed" graph cannot be used with Quattro again. You can, however, use it with other software programs.

See also "Saving and Retrieving Graphs" on page 274.

Changing Graph Layout

The Layout command on the Graph Print menu lets you indicate how you want your graph printed on the page. When you select this command, the Graph Print Layout menu is displayed (Figure 8.53).

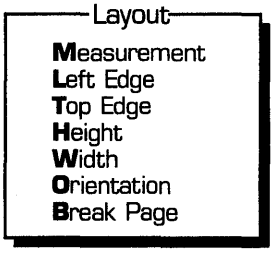


Figure 8.53: The Graph Print Layout Menu

Measurement lets you specify centimeters to measure graph size, instead of inches.

Left Edge specifies how many inches or centimeters from the left edge of the paper to print the graph.

Top Edge specifies how many inches or centimeters from the top edge to print the graph.

Height specifies how tall you want the graph to be when printed.

Width specifies how wide you want the graph to be when printed.

Orientation lets you print your graph upright instead of sideways.

Break Page determines whether or not page breaks are inserted after each graph you print. The default, **Yes**, moves the paper to the top of the next page after printing a graph. To print more than one graph per page, set this command to **No**.

The default settings on the Print Graph menu print your graph horizontally on a full page. The graph is sized automatically to fit best on the page. You can change these settings to resize your graph and position it anywhere on the page.

If you want to print your graph upright on the page, select **O**rientation from the Print menu and choose **P**ortrait. **P**ortrait, like a portrait photo, prints your graph vertically. To print graphs sideways again, select **L**andscape from the Orientation menu. **L**andscape, like a landscape photo, offers the greatest width for your graph.

You can indicate specific dimensions in which you want a graph printed, including both size and position. If you want to specify the dimensions in centimeters rather than inches, select **M**easurement and choose **C**entimeters.

The **L**eft Edge and **T**op Edge commands tell Quattro where to begin printing the graph. Quattro then tries to fill the space allotted. If you want to print a graph at the bottom or right of a page, you can increase these settings accordingly. If you want to also increase the right or bottom margin, to center a graph, for example, use the **H**eight and **W**idth commands.

The **H**eight and **W**idth commands tell Quattro to print a graph in a designated size. You can use them to indicate the right and bottom margins you want. For example, if you're printing on paper 8.5 inches wide and you want to leave 2-inch margins on both sides of the page, specify 2 inches with the **L**eft Edge command and 4.5 with the **W**idth command.

You can specify any width from 0 to 8.5 and any height from 0 to 11. The graph will be compressed or expanded to fit whatever dimensions you specify.

Figure 8.54 shows a graph printed with the following **Graph Print** settings:

Orientation: Portrait
Measurement: Inches
Left Edge: 1.5
Top Edge: 6
Height: 4
Width: 5.5

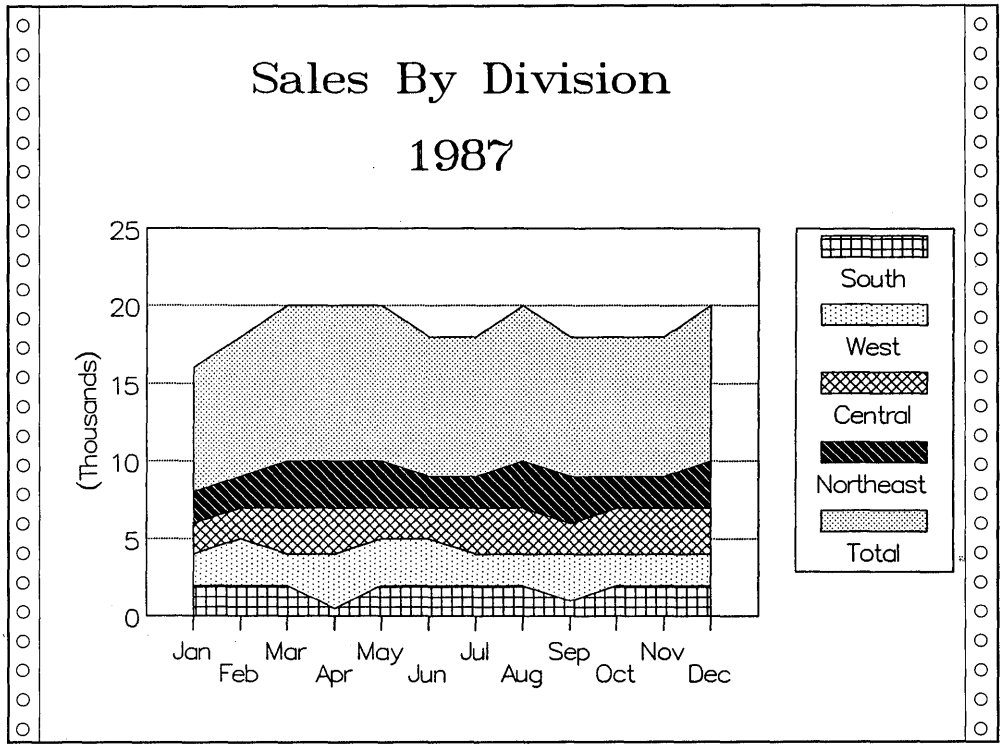


Figure 8.54: A Printed Graph

Figure 8.55 shows a rotated graph printed with the following settings:

Orientation: **L**andscape
Measurement: Inches
Left Edge: 1.5
Top Edge: 6
Height: 4
Width: 5.5

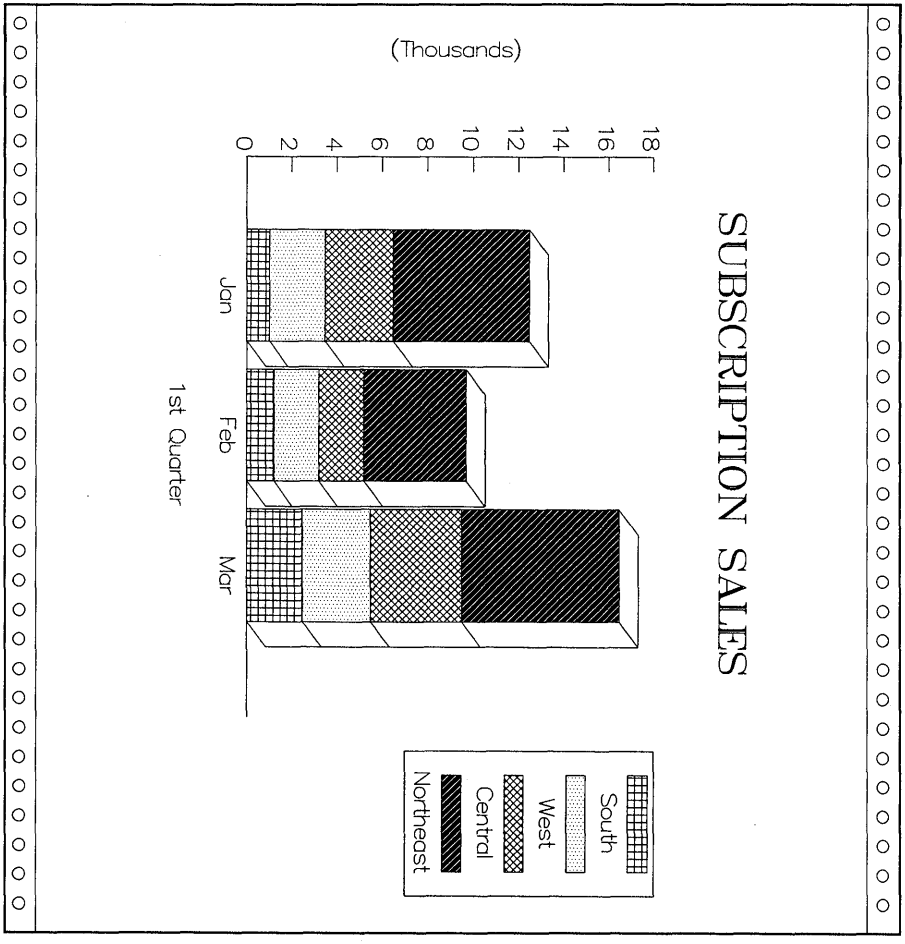


Figure 8.55: A Graph Printed Sideways

Changing the Colors Used to Print Your Graph

If you're printing on a color printer or plotter, you can print your graphs in color. Normally, the printer will use the same colors as those used to display the graph on your screen (or the closest approximation). You can specify printing the graph with colors different from those used on the screen with the **Print Colors** command.

When you select **Colors** from the Graph Print menu (*/GPC*), the Print Colors menu is displayed (Figure 8.56).

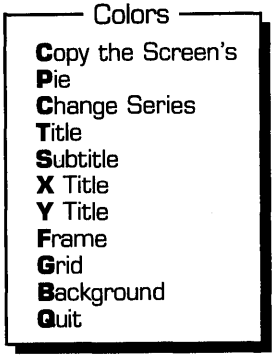


Figure 8.56: The Print Colors Menu

Copy the Screen's returns all print colors to the screen's settings and uses those colors to print the graph.

Pie displays a menu listing the first nine slices of a pie chart. Selecting a slice displays a scrollable list of possible colors. You can specify different colors for up to nine slices. After the ninth slice, the colors are rotated.

Change Series displays a menu listing each of the six possible series. Selecting a series displays the menu of colors. You can specify a different color for each of the series.

Title lets you change the color used to print the main title.

Subtitle lets you change the color used to print the subtitle.

X Title lets you change the color used to print the x-axis title.

Y Title lets you change the color used to print the y-axis title.

Frame lets you change the color used to print the frame around the graph. (If the **Frame Graph** command on the Customize Grids menu (*/GCGF*) is set to **No**, the frame will not be printed.

Grid lets you change the color used to print the gridlines on the graph. (If the Line Type command on the Customize Grids menu (*/GCGL*) is set to None, no gridlines will be printed.)

Background lets you change the color used to print the background of the graph.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Print Colors menu to the Graph Print menu.

You can change the colors used to print each of these parts of the spreadsheet. If you select the Copy the Screen's command, any changes you made are discarded, and the graph is printed in the same colors used to display it on the screen.

Beginning Printing Your Graph

When you've set up all your graph print information, you're ready to print. Simply select Go. Quattro begins printing your graph immediately to the specified destination.

To halt printing before the graph is complete, press *Ctrl-Break*. Printing stops as soon as the memory buffer in your printer is empty.

Once you've specified and updated the initial information about your printer, layout, and colors, you can print most graphs with a minimum of effort. Just press *PG* with the Graph menu displayed.

Writing to an EPS or PIC File

If you want to use your graph with Lotus 1-2-3 or with a word-processing program that supports PostScript, you can save it in a special file with the Write EPS/PIC command */GPW*. When you select this command from the Graph Print menu, a submenu is displayed with two options: EPS and PIC.

To store the graph in a file for future printing with Lotus 1-2-3, select PIC. To store the graph in a PostScript file, select EPS. You can use PostScript files with many word-processing programs, including Borland's Sprint.

Quattro stores the graph in the chosen file as soon as you select it.

Resetting Graph Print Commands

After you've changed command settings on the Graph Print menu, you can return the original settings with the **R**eset command. When you select this command, any settings that have been changed since the last time you selected **U**pdate revert to their previous values.

You cannot reset commands settings that have been updated with the **P**rint **U**pdate command. To return updated settings to their previous values, you must enter the values individually.

Updating Graph Print Commands

After you've specified general graph printing information, such as printer type, margins, and colors, you need to select **U**pdate from the Graph Print menu to store that information with Quattro. Otherwise, the next time you use Quattro, you'll have to specify the information all over again.

When you select **U**pdate from this menu, all printer, layout, and color command settings are saved. Once you've updated a command setting, you cannot reset it with the **R**eset command. You must set it back to the old value yourself.

C H A P T E R

9

Working with Your Database

The basic spreadsheet format is perfect for most accounting applications, such as budget analysis, expense records, and even real estate calculations. But what if you want to sort a sales list by customer name? Or search through your budget for expenses of $1,000 or more? For applications such as these, Quattro offers an additional dimension to the traditional spreadsheet: a *database manager*.

This chapter describes:

- what a database is and how to set one up
- how to sort data in a database
- how to search through a database for records meeting specified criteria, and how to copy those records to a different part of the spreadsheet or delete them
- how to set up the spreadsheet as a form for easy data entry

More advanced functions that can be used to analyze database information (such as sensitivity and distribution tables) are covered in Chapter 10, "Working with Statistics and Analyzing Data."

The Database Menu

All Database commands are found on the Database menu (Figure 9.1), which is accessed through the Advanced command on the main menu

(*/AD*). This menu provides basic database functions to help you work with your data.

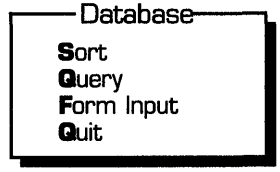


Figure 9.1: The Database Menu

Sort lets you specify the order in which you want information displayed in your database.

Query lets you search through your database for specific data. Optionally, you can copy the data you find to another part of the spreadsheet, or delete it.

Form Input lets you set up the spreadsheet like a form for easy data entry.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Database menu to the Advanced menu.

In addition, all standard spreadsheet functions (discussed in the previous chapters) apply to a database setup.

What Is a Database?

A database differs from a standard spreadsheet in that it separates information into sections, each containing similar information—much like a card file (see Figure 9.2). You can use a database to keep track of all kinds of information, from simple mailing lists to detailed statistics.

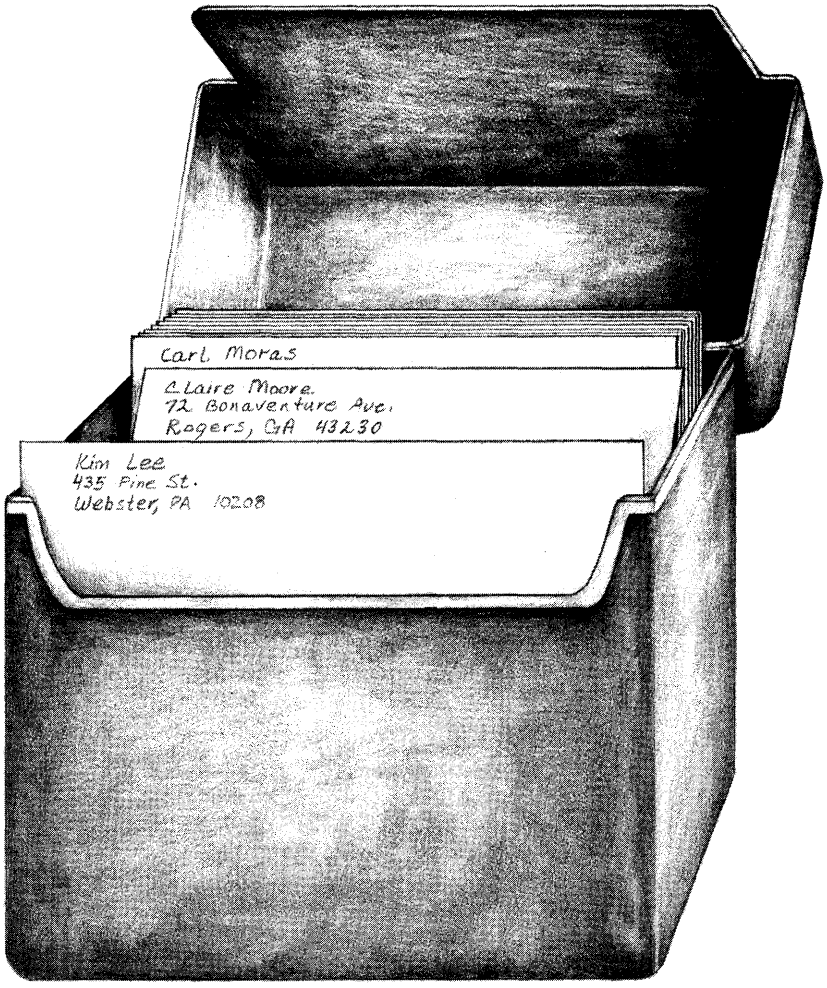


Figure 9.2: A Card-File Database

A traditional database program lets you set up your screen like a form, into which you then enter information. The form contains a set of entry blanks, called *fields*, each defined by preceding *field names*. To fill in a form, you simply move the selector to each blank field and type in data relating to the field name. A filled-in form constitutes a *record*. A database is comprised of many such records. To create another record, you save the first, call up a blank form, then fill it in.

Figure 9.3 shows a database form used in Reflex, Borland's database program. This particular form is used to input information on sales contacts.

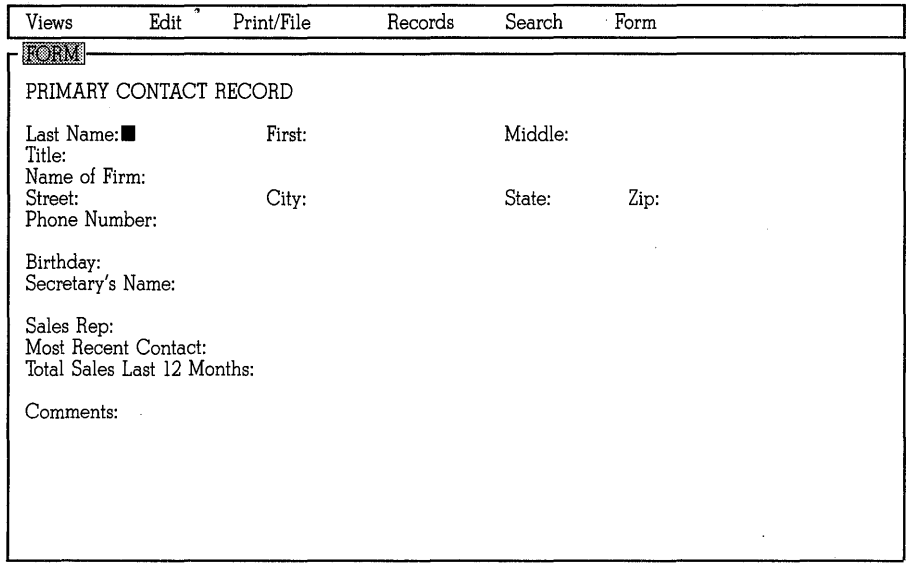
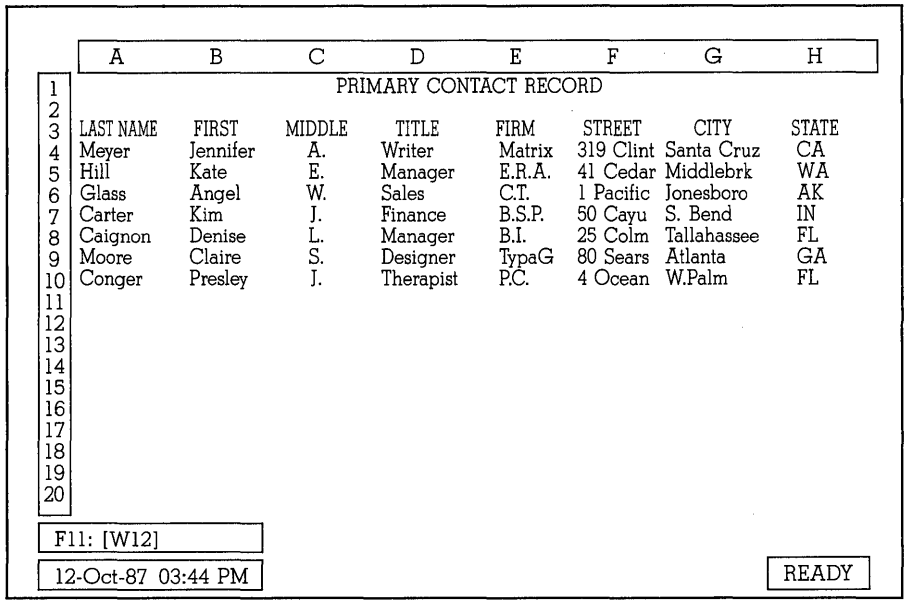


Figure 9.3: A Reflex Database Form

Although Quattro allows you to set up a form and enter data into it (see "Setting Up a Form for Data Entry" on page 313), the standard spreadsheet can easily be set up for database use.

Figure 9.4 shows a Quattro spreadsheet with the same database used in Figure 9.3. The field names are shown as column headings with correlating field entries underneath. (Additional headings are stored off the screen to the right.) Each row of the spreadsheet contains one record of the database.



	A	B	C	D	E	F	G	H
1				PRIMARY CONTACT RECORD				
2								
3	LAST NAME	FIRST	MIDDLE	TITLE	FIRM	STREET	CITY	STATE
4	Meyer	Jennifer	A.	Writer	Matrix	319 Clint	Santa Cruz	CA
5	Hill	Kate	E.	Manager	E.R.A.	41 Cedar	Middlebrk	WA
6	Glass	Angel	W.	Sales	C.T.	1 Pacific	Jonesboro	AK
7	Carter	Kim	J.	Finance	B.S.P.	50 Cayu	S. Bend	IN
8	Caignon	Denise	L.	Manager	B.I.	25 Colm	Tallahassee	FL
9	Moore	Claire	S.	Designer	TypaG	80 Sears	Atlanta	GA
10	Conger	Presley	J.	Therapist	P.C.	4 Ocean	W.Palm	FL
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Figure 9.4: A Database in the Quattro Spreadsheet

Setting Up a Database

Once you have an idea of the kind of data you want to include in your database, it's fairly easy to set up. Generally, you enter the field names as labels in the top row, then fill in the rows underneath. Specifically, you need to adhere to these rules when setting up your database:

- The area used must be rectangular, although it can contain any number of blank cells.
- Use the same type of data throughout each column. In other words, don't mix labels (except for the field name) and numeric data in the same column.
- Do not separate the row of field names and the first record with a blank or decorative row.
- Make sure to use unique names for your field names. To avoid confusion, they should be different from any of your block names.

Sorting a Database

A Quattro database can store as many as 8,191 records. You can make it easier to locate and view information in a database by sorting it.

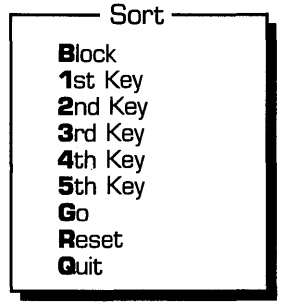
When you sort a database, you arrange the records (or rows) in a specific order—according to the entries in one or more fields. For example, you could alphabetize entries in the Name field and/or sort them chronologically using a Date field.

The fields used to sort a database are called *sort fields*. You can have up to five sort fields. Records are first sorted by the primary sort field, then the secondary, and so on. For example, if you specified City as the primary sort field and Date as the second, the records would be arranged by city; then, if there were more than one record for a single city, they would be arranged chronologically by date within that city group.

Caution: Formulas that reference cells outside their own row are not updated when records are resorted. If you have such formulas in your records, convert them to their end values (see page 91) before sorting them.

To sort your database:

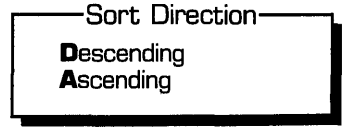
1. Press */ADS* to select **S**ort from the Database menu. The **S**ort menu is displayed:



2. Press *Enter* to select **B**lock. Quattro prompts you for a cell block. Specify (either by pointing or typing) the cell block containing all the records you want to sort. Be sure to include the entire records. *Do not include* the column headings (field names). Quattro then returns you to the Sort menu.

Warning: Be sure to specify *all* the cells of each record you want to sort; otherwise, the fields of your database will be mismatched. You will then have to retrieve your file again or re-enter the records.

3. Press *1* to select **1**st Key. Again, you are prompted for a cell block. This time, specify the field on which you want the primary sort performed. (For example, the primary sort can be by zip code and the secondary sort by name.) Specify any cell in the column you want to use or the field name. The Sort Direction menu is then displayed:



4. Press *A* or *Enter* to sort the records in ascending order (A-Z and 0-9), or press *D* to use descending order (9-0 and Z-A). The Sort menu returns.
5. If you want to specify further sort keys, do so in the same way.
6. When you're ready to perform the sort, press *G* to select **G**o. The menu disappears and the records are sorted as specified. To exit the menu without performing the sort, press *Q* (**Q**uit) or *Esc*.

Note: The **D**atabase **S**ort command cannot be directly undone (although you can resort your records). If you're uncertain of the outcome of a **S**ort command, it's a good idea to save your spreadsheet before sorting it (press */FS*). Then, if the sort brings unexpected results, you can retrieve your spreadsheet in the original order.

Records you enter after sorting your database are not automatically inserted in the sort order. You must use the **S**ort command again to reorder the records (press */ADSG*).

The sort order you assign to a spreadsheet remains with it when it is saved. The next time you retrieve the file, the same sort order will be in effect.

To change the current sort order, simply press */ADS*, make the necessary changes, and select **G**o. To erase all of the Sort menu settings, select **R**eset.

If the original order of your database does not follow any specific sort order and you think you might want to return to it later, you can use the **B**lock **F**ill command to assign numbers to each record before changing the order. You can then reinstate the original order at any time by sorting by the assigned numbers. (See "Filling a Block with Sequential Values" on page 81.)

Changing Quattro's Sort Order

Each sort key you specify can be assigned one of two *sort directions*: **A**scending or **D**escending. When the default, **A**scending, is chosen, Quattro sorts data in the following order:

1. blank cells
2. labels beginning with numbers (in numerical order)
3. labels beginning with letters (in alphabetical order)
4. labels beginning with special characters (in ASCII order)
5. values (in numerical order)

When **D**escending is chosen, Quattro sorts records in the opposite order:

1. values (in reverse numerical order)
2. labels beginning with special characters (in reverse ASCII order)
3. labels beginning with letters (in reverse alphabetical order)
4. labels beginning with numbers (in reverse numerical order)
5. blank cells

Capitalization is always ignored. Formulas are sorted by their end values, and dates are sorted by their date serial numbers.

You can alter the order in which Quattro sorts data by using the **S**ort Order command on the Default Startup menu. When you select **S**ort Order from the Advanced Database Sort menu (*/ADSS*), the Sort Order menu is displayed (Figure 9.5).

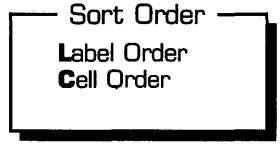


Figure 9.5: The Sort Order Menu

Label Order determines how labels are ordered. The initial default, **D**ictionary, orders labels alphabetically, with labels beginning with special characters at the end. To sort labels in ASCII order (according to the ASCII character code of the first letter), set this command to **A**SCII.

Cell Order determines whether numbers are placed before or after labels. The initial default, Numbers Before Labels, places numbers first. To place labels first, set it to Labels Before Numbers.

If you want to use the new sort order from now on, **U**pdate from the Default menu (*/DU*).

Searching through a Database

One of the more powerful features of a database manager is the ability to swiftly separate out requested information. For example, with just a few keystrokes, you can locate all Pennsylvania customers in your database or all students with a grade point average of 3.0 or above.

With the **A**dvanced **D**atabase **Q**uery command, you can specify certain criteria that you want to look for. The criteria used for the examples above might be *State=PA* and *+GPA>=3.0*.

Once you've set up your criteria, you can then tell Quattro to find all records meeting the criteria, to copy all records or just unique records to a different part of the spreadsheet, or to delete the records.

When you select **Q**uery from the Database menu (*/ADQ*), the Query menu is displayed (Figure 9.6).

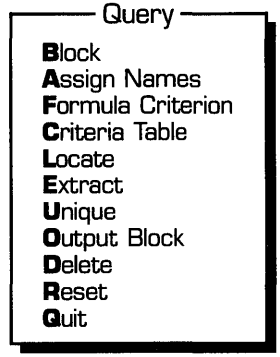


Figure 9.6: The Query Menu

Block lets you specify the block of data you want to search through.

Assign Names automatically assigns names to each cell in the second row of your database, using the field names in the first row. This makes referencing fields in your search criteria much easier.

Formula Criterion lets you enter search conditions directly from the menu.

Criteria Table lets you specify the block containing search conditions. This is a table you set up beforehand to indicate which fields to search and what to search for.

Locate highlights all records that meet your criteria.

Extract copies records that match the conditions to another part of the spreadsheet.

Unique works just like Extract except it eliminates duplicate records from the extracted copy.

Output Block lets you specify a block to which you can copy the records that meet the criterion.

Delete erases all records that match the conditions.

Reset erases all values previously entered in the menu commands.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Query menu to the Database menu.

To execute the last-used **Q**uery command, press the QUERY key (*Alt-F7*), or hold down the *Ctrl* key and press *Q*.

Entering the Search Information

Before you can search through a database, you must do the following:

1. Tell Quattro which block of data to search through.
2. If you want to reference field names in your search formulas, use the **A**ssign Names command to assign names to the first entry in each field.
3. Specify the data to search for and the fields to search, either by setting up a criteria table or by entering a formula criterion.
4. If you used a criteria table, indicate the block containing it.
5. If you want to copy the matched records, set up an output block to copy them to and indicate this block on the menu.

The following subsections describe each of these steps in detail.

Indicating the Block to Search

The first step in setting up a search is to tell Quattro which block of your spreadsheet to search through.

Select **B**lock from the Query menu (*/ADQB*). Quattro prompts you for a cell block. Specify your entire database, including the field names. If you want to search only part of your database, you can specify that part, but the block must include the field names you want to search through. Be sure to include, also, any fields you want copied to the output block (see "Setting Up an Output Block" on page 306).

Naming the First Field Entries

After you've specified the block to search, you can use the **A**ssign Names command on the Query menu to assign block names to the first entry of each field. This is not a required step, but will make entering search criteria much easier. You'll then be able to reference fields by name within search formulas, for example,

```
AMOUNT>300
```

If you don't name the first field entries, you'll need to reference fields by the address of the *first entry in the field* (*not* the cell containing the field name), for example,

```
C4>300
```

To automatically name each cell in the second row of your database, select **A**ssign Names from the Query menu (*/ADQN*). Quattro names each cell in the second row according to the field name above it.

Caution: If any of your field names are more than one word or longer than 15 characters, problems may arise. You should adjust any such field names before initiating the **A**ssign Names command.

Figure 9.7 shows a sample database and the block names that were created for it with the **A**ssign Names command. (The **B**lock **A**dvanced **M**ake Table command was used to create the table.)

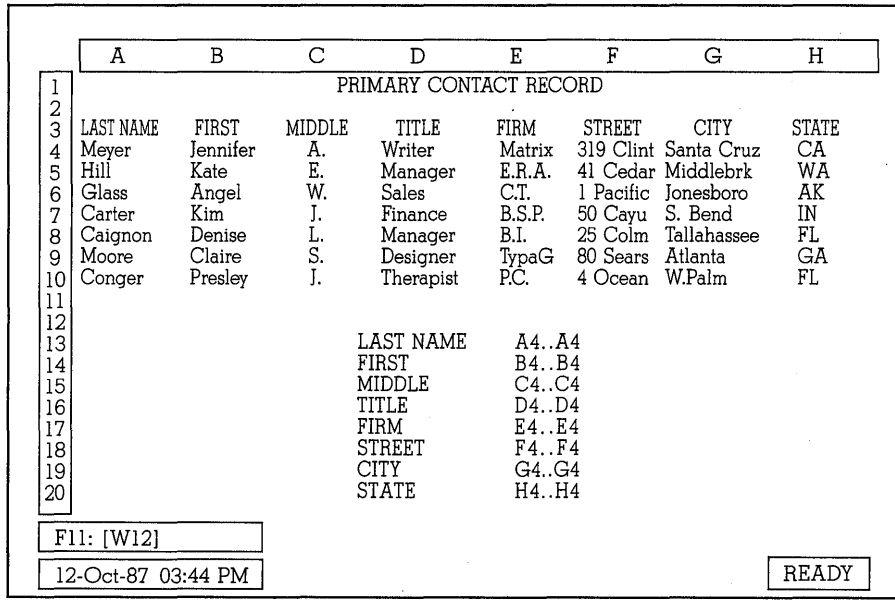


Figure 9.7: How Quattro Names First Field Entries

For information on how to use the block names created with the **Assign Names** command, see the following section.

Specifying the Search Criteria

The most important step in performing a database search is to specify the data you want to search for. You do this by setting up *search criteria*. A search criterion indicates both the data you want to find and the field you want to find it in. Each record found with a matching entry in that field is called a *match*.

There are two ways to specify search criteria. You can create a criteria table as part of the spreadsheet and specify that block as the *criteria block*. Or you can enter the criteria as one logical formula, such as

```
B2 > 100 #AND# E2 = "Boston"),
```

using the **Formula Criterion** command.

In both cases, you indicate the field to search through by referencing the cell containing the first field entry (underneath the field name). If you use a

criteria table, you'll also be able to use wildcards to search for near matches (such as all names that begin with *D*).

Entering Formula Criteria

To perform a simple search, you can use the Formula Criterion command to enter a *search formula*. The search formula tells Quattro what information to search for and which field(s) to search.

A search formula must include a cell reference, an operator, and a value, with no spaces in between. The cell reference indicates which field to search through; it is the address of the first entry in the field you want to search, for example,

```
C2>500
```

The search formula presents a true/false statement concerning field entries. When you perform the search, Quattro starts with the first field entry in the C column (C2). It makes note of whether or not the statement is true, then moves to the next cell in the field (C3). It updates the formula internally to read C3>500 and evaluates cell C3. It evaluates each subsequent field entry similarly—updating the formula and checking to see if the statement is true (see Figure 9.8).

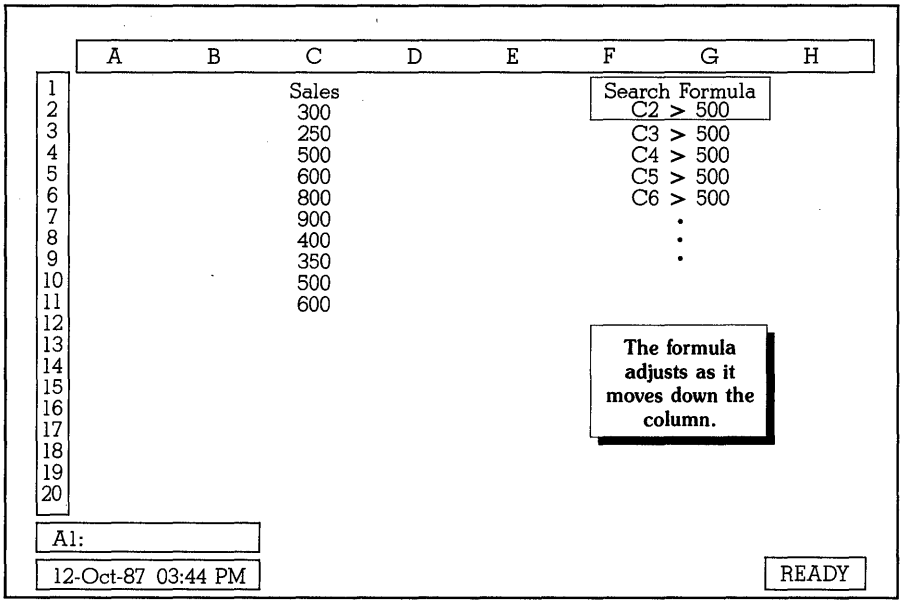


Figure 9.8: How Quattro Searches Through a Database

If you've named the field entries in the second row of your database with the **A**ssign Names command (see page 299), you can reference the actual field names in your formulas, for example,

```
SALE>500
```

To enter a formula criterion:

1. Press */ADQ* to select **Q**uery from the Database menu.
2. Press *F* to select **F**ormula Criterion from the Query menu.
3. Type in a criterion formula. You can use `#AND#` or `#OR#` to connect several different conditions.
4. Press *Enter*.

Search formulas can use any of the following operators to indicate a relationship:

=, <, <=, >, >=, <>.

To tie together two search formulas under one field, use `#AND#`, `#NOT#`, or `#OR#`. For example,

```
AMOUNT>300 #AND# AMOUNT<600
```

tells Quattro to look for all entries in the Amount field that are between 300 and 600.

```
AMOUNT>300 #AND# AMOUNT<600 (#NOT# REP="BOB")
```

tells Quattro to look for all records except Bob's that have a value greater than 300 in the AMOUNT field.

When searching for labels, you must enclose the text you want to search for in quotes, for example,

```
CUSTOMER="John"
```

Note: If your search formula references a cell outside the input block, use an absolute reference (such as $C$3). This ensures that the correct cell is referenced. For cells within the input block, use relative references (such as C3); otherwise, Quattro won't be able to update the reference as it searches down the column. For more information on relative and absolute references, see page 53.

Setting Up a Criteria Table

If you intend to perform many searches on your database or if you want to use several criteria in your search, setting up a *criteria table* as part of your spreadsheet is the best way to specify your search conditions.

Caution: You cannot use both a formula criterion and a criterion table. If you specify a cell block with the **C**riteria Table command, any formula you entered with **F**ormula Criterion is deleted; if you enter a formula criterion, the setting for the **C**riteria Table command is deleted.

A criteria table lists the data you want to search for under the names of the fields you want to search through. If more than one criterion is listed in a single row, Quattro searches for records that match *all* of the conditions. When criteria are listed in separate rows, Quattro searches for records that match *either* of the conditions.

Figure 9.9 shows two different criteria tables. The first searches for all records with both Lunches in the Expense field *and* a value greater than 500 in the Amount field. The second table searches for any record with either Lunches in the Expense field *or* a value of greater than 500 in the Amount field.

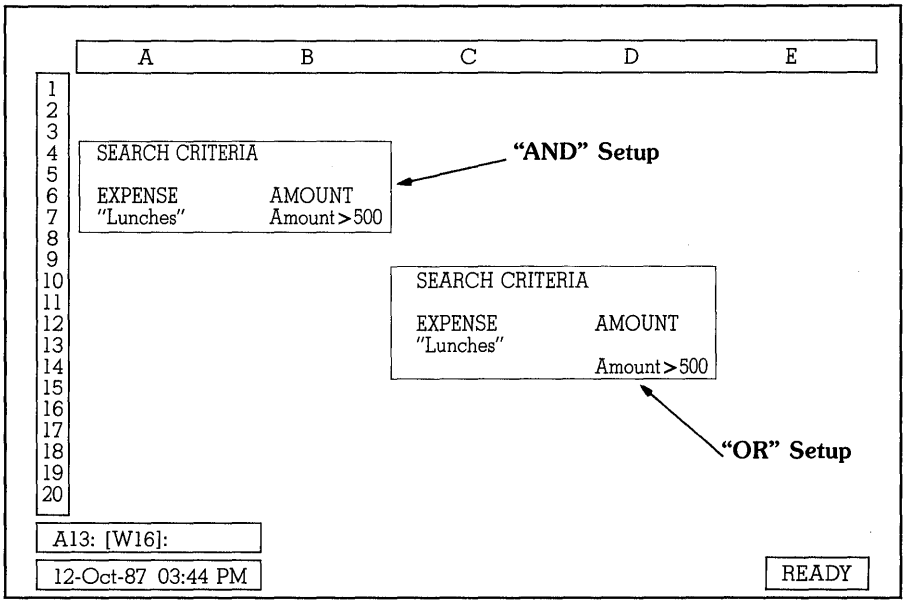


Figure 9.9: Two Criteria Tables

Note: The table in Figure 9.9 shows the formulas entered for the search. Because Quattro usually displays end values instead of the formulas you enter, you will not initially see your formulas. To display the formulas themselves, instead of their end values, change the display format for that block to **T**ext (*/BDT*).

To set up a criteria table:

1. Choose an area of the spreadsheet to use for the criteria table. It should be close enough to the database block to be easy to find.
2. In the first row of the table, enter the names of the fields you want to search through. To make future searches easier, you may want to copy all field names from the database. The criteria table can hold up to 45 field names. Each field name should match exactly that used in the database.
3. Underneath the appropriate field name, enter the data you want to search for. To search for an exact match, enter the value exactly as it appears in the database. To enter a condition, use a formula (see below).
4. If you want more than one criterion met by each record, enter them all in the same row, under the appropriate field names. To search for

records that meet *any* of the given criteria, use a separate row for each criterion.

Note: Unless you've changed the display format for your table to **S**how Formulas, Quattro displays a 0 or 1 in the table when you enter a search formula (0 if the first cell searched returns a false value, 1 if the first cell returns a true value). These numbers have no impact on the search and can be replaced by the actual formulas if you prefer (by specifying the **S**how Formulas format for the block).

In your criteria table, if you're searching for an exact match, you can enter the exact value directly underneath the field name. For example,

```
SALE
500
```

will look for all records that contain 500 in the SALE field.

To search for records that meet a *condition* (rather than an exact match), you must enter a search formula beneath the field name. This search formula is the same as any entered with the **F**ormula Criterion command. It must include a reference, an operator, and a value. If you've named your first field entries with the **A**ssign Names command (see page 299), you can reference the field you want to search by name; otherwise, you must reference the address of the first entry in the field (preceded by a plus sign). For example,

```
SALE
+C3>500
```

tells Quattro to look for all records that contain a value greater than 500 in the SALE field.

All the rules concerning formula criteria specified in the previous section also apply to criteria tables. You can combine conditions with #AND#, #OR#, or #NOT#, and text strings must be surrounded by quotes.

A criteria table offers the added advantage of being able to use wildcards when searching for labels. Quattro allows three types of wildcards:

- **?** (question mark) is a single-character wildcard. It takes the place of any single character. For example, "t?p" would find tip, top, and tap, but not tape or stop. And "t??p" would find trap and trip, but not tap or strap.
- * (asterisk) is a multiple-character wildcard. It takes the place of any number of characters to the end of the label. For example, "ten*" would find tender, tension, and tent, but not attention.
- ~ (tilde) searches for all labels in a field *except* those that match the search condition. For example, CITY=~"Boston" searches for all records that

don't contain Boston in the City field. And NAME=~"T*" searches for all Name entries that don't begin with T.

Figure 9.10 shows several criteria tables and several criterion formulas that request the same search.

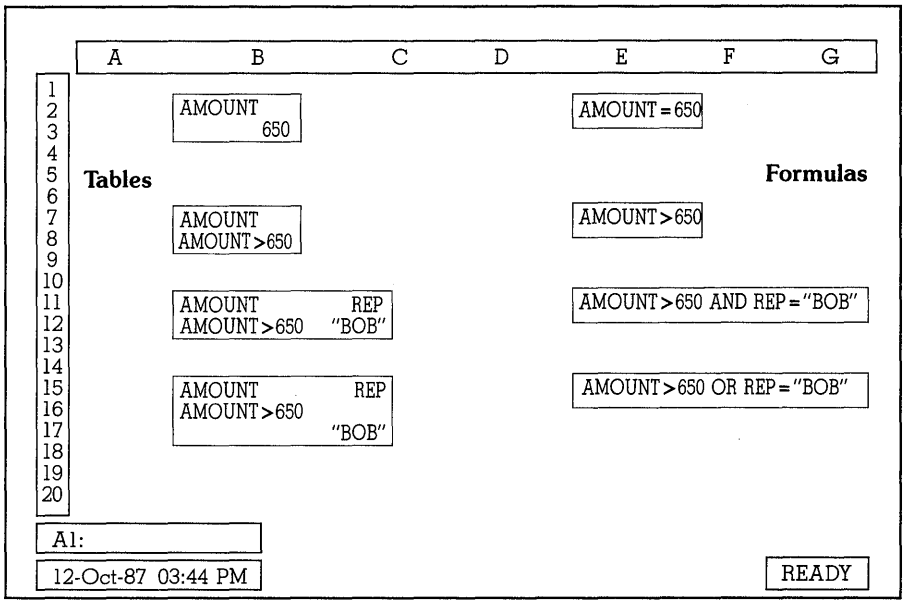


Figure 9.10: Criteria Tables Versus Criterion Formulas

After you've set up a criteria table, you must specify its coordinates with the Criteria Table command on the Query menu.

Setting Up an Output Block

The Query Extract command copies all matching records your search uncovers to a designated area of your spreadsheet. The Query Unique command copies all matching records *except duplicates*. If you intend to use either of these commands, you must first prepare the area to copy the records to (the *output block*).

To set up an output block:

1. Choose a blank area of the spreadsheet that will not overlap your spreadsheet data or criteria table.
2. In the first row of the block, enter the name of each field (exactly as shown in the database) that you want included in the output. You can include up to 45 field names, in any order. Fields that you don't include won't be copied.

Figure 9.11 shows an output block set up for a sample database. Notice that only some of the fields are included and the order is not the same.

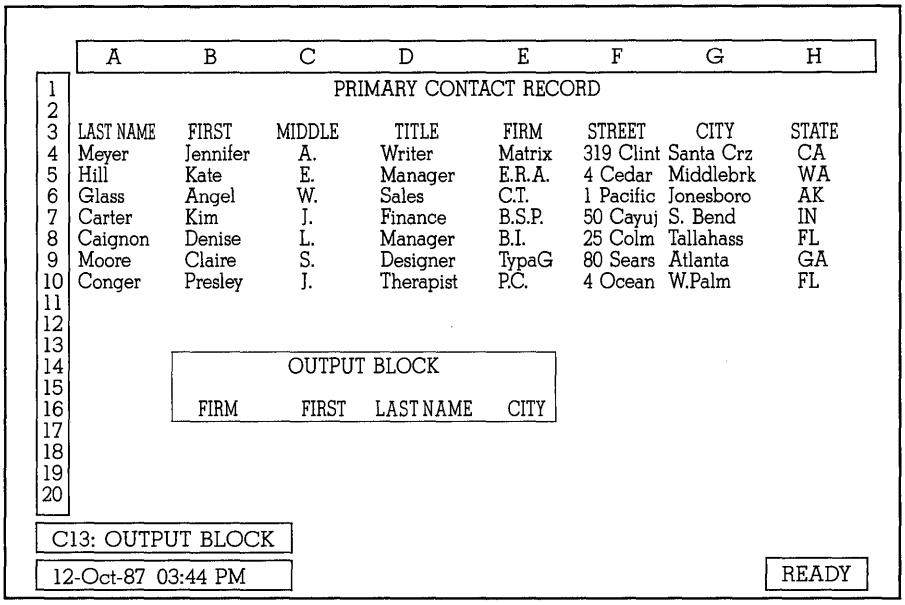


Figure 9.11: A Sample Output Block

Once you've set up your output block, you need to specify the cell block on the Query menu (press */ADQO*). If there's any existing data underneath the block that might be overwritten by copied records, specify the exact block you expect the output to fill. If the block is too small, Quattro displays an error message. If there's no danger of overwriting data, simply specify the top row of the block. The copied records will then fill whatever space is necessary.

Performing the Search

With your criteria table and/or output block set up, you can begin the search operation:

1. Press */ADQ* to display the Query menu.
2. Select **B**lock. Quattro prompts you for a cell block.
3. Specify the cell block you want to search through. Include all the field names and records you want to search. The Query menu returns.
4. If you've set up a criteria block within your spreadsheet, press *C* to select **C**riteria Table from the Query menu. Again, Quattro asks for a cell block.
5. Enter the coordinates of your criteria table. The Query menu returns.
6. If you've set up an output block for copying the matching records to, select **O**utput Block and enter the cell range of that block. If there's nothing underneath the block that might be overwritten, you can specify the top row only. If data *is* underneath the block, specify the exact range of the block. If the matching records don't fit in the block, Quattro will copy as many as it can and display an error message warning you that there are more.
7. If you're using a formula criterion (instead of a criteria table) to search for records and you haven't already entered it, do so now. Select **F**ormula Criterion, enter the search formula, and press *Enter*.
8. You're now ready to perform the search. You have four search options:

   - **Locate** highlights the matching records on the spreadsheet.
   - **Extract** copies the matching records to the output block.
   - **Unique** copies non-duplicate matching records to the output block.
   - **Delete** erases the matching records.

   Each of these options is discussed in the following subsections.
9. When the operation is complete, select **Q**uit to return to the spreadsheet in the READY state.

With the spreadsheet in the READY state, you can repeat the previous **Q**uery operation by pressing the LAST key (*F7*) and selecting **Q**uery from the displayed menu, or by pressing *Alt-F7* or *Ctrl-Q*.

Locating Specific Records

To search through the database for all records that meet the conditions you specified, select **Locate** from the Query menu. Quattro highlights the first record in the input block that meets the conditions (see Figure 9.12). If there are no qualifying records, Quattro beeps and returns you to the menu.

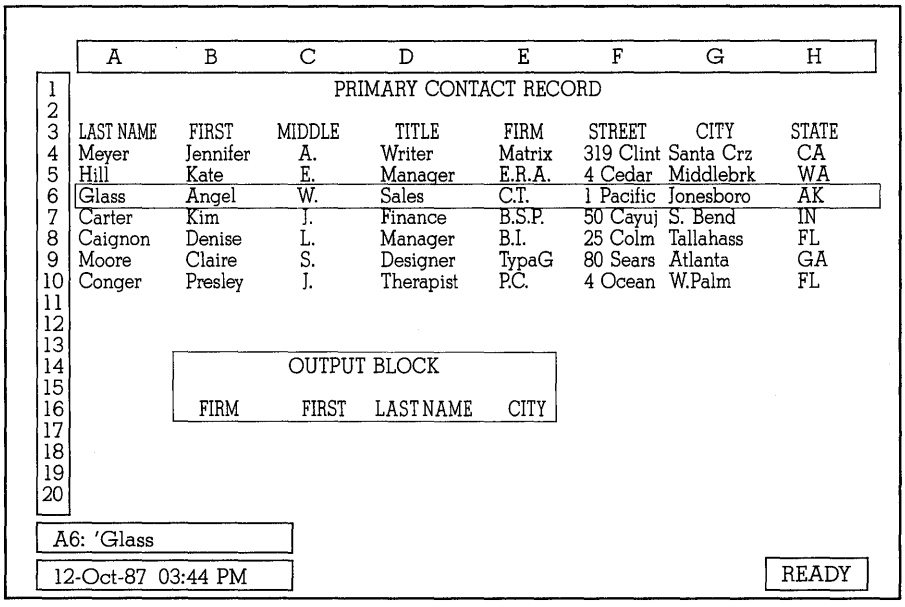


Figure 9.12: Locating a Record in a Database

To highlight other records that meet the criteria, press *Up arrow* or *Down arrow*. *Home* takes you to the first record in the database (matching or not); *End* takes you to the last.

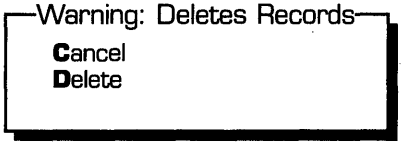
To make changes to a highlighted record, press *Left arrow* or *Right arrow* until the column letter containing the field you want to change is highlighted, then press *F2* to enter Edit mode. The field entry appears on the input line and you can make any changes to it. When you press *Enter*, the changes are entered and the next matching record is highlighted.

To end the **Locate** operation and return to the Query menu, press *Enter* or *Esc*. To then return to the spreadsheet in READY mode, select **Quit**.

Deleting Specific Records

To erase the records that match the given criteria:

1. Select **D**elete from the Query menu. Quattro asks for confirmation and displays the following menu:



2. Press *D* to carry out the deletion, or *C* to cancel the operation and return to the Query menu.

All qualifying records are erased from the database. Records underneath the deleted records move up to fill in the empty rows.

Caution: Once you've deleted records with the **Q**uery Delete command, you cannot bring them back. Always use the **L**ocate command first to be sure the given criteria have located exactly the records you want to delete. And, to be extra cautious, save the spreadsheet before performing the deletion. Then, if you make a mistake, you can retrieve the file without the deletions.

Extracting Records

To copy all records that match the given criteria to the designated output block, select the **E**xtract command from the Query menu. Quattro searches through the database for all records that meet the criteria. It then copies the matching records into the output block specified on the Query menu. It includes only those fields whose names are written on the first row of the output block.

If you specified only the first row of the output block in the Query menu, the copied records take up as much space as needed, overwriting existing data if necessary.

If you specified a multiple-row output block in the Query menu and the matching records do not fit in the block, Quattro copies what it can, and displays a warning that there are more matching records than those copied. Press *Esc* and begin the procedure again, this time specifying a larger output block, or, if it is safe to do so, specifying only the first row of the block.

Before you can extract records from a database, you must first set up an output block in your spreadsheet (see page 306), and the block must be specified in the Query menu (see page 308).

Extracting Unique Records

The **Q**uery **U**nique command copies only unique records that meet the criteria to the specified output block. It works exactly like the **E**xtract command except that it eliminates duplicate records from the output block.

The duplicate records that are eliminated from the output block are identical in all fields, not just those specified in the criteria table. For example, Figure 9.13 shows an output block containing several similar records copied with the **U**nique command. Even though the entries in the field searched through (the Amount field) are the same, other fields in the record are not identical.

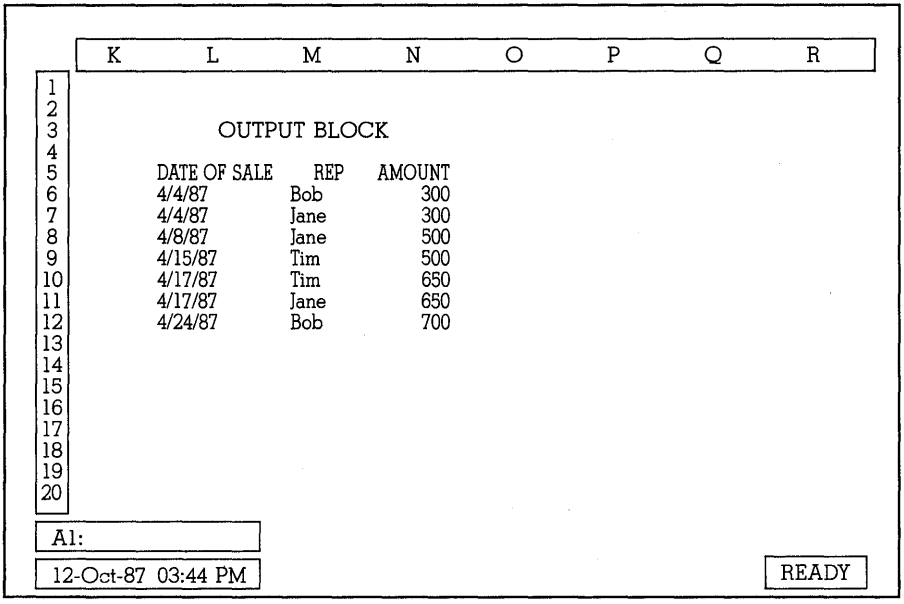


Figure 9.13: Records Extracted with the Unique Command

Search Recap

The Quattro search procedure can be summarized as follows:

1. Select **B**lock from the Query menu (*/ADQB*) and specify the block of data you want to search.
2. If you want to reference field names instead of addresses in your search formulas, select **A**ssign Names (press *A*). Quattro names each cell in the second row of your database according to the label above it.
3. Specify your search criteria, either by setting up a criteria table in the spreadsheet or by selecting **F**ormula Criterion and entering a search formula. If you're using a criteria table, specify the block's coordinates with the **C**riteria Table command.
4. If you want to copy matched records to another part of the spreadsheet, set up an output block, listing the fields you want included. Then select **O**utput Block from the Query menu (*/ADQO*) and specify the coordinates of the block.
5. Finally, select the search operation you want to perform from the Query menu: **L**ocate, **E**xtract, **U**nique, or **D**elete.
6. When the operation is finished, select **Q**uit to return to the spreadsheet in the Ready mode.

To repeat the same **Q**uery operation (the one last used) from the spreadsheet, press the QUERY key (*Alt-F7*) or *Ctrl-Q*.

Figure 9.14 shows a spreadsheet set up for a database search and indicates which items on the Query menu identify which parts on the screen.

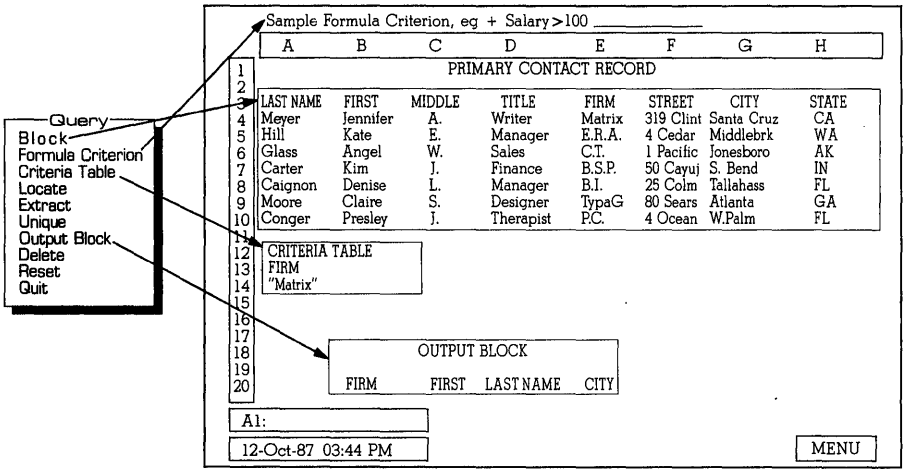


Figure 9.14: Preparing for a Database Search

Setting Up a Form for Data Entry

The **Form Input** command lets you set up all or part of your spreadsheet like a data-entry form. It limits movement of the cell selector only to those cells in a block that are not protected. All other cells remain visible but inaccessible.

While Quattro is in **Form Input** mode, you are only able to move the cursor to unprotected cells in the specified block and input or change data. You cannot use the menus.

To set up the spreadsheet for data entry, first protect all cells you want to prevent access to. You can protect blocks with the **Protect** command on the Block Advanced menu (see page 93), or protect the entire spreadsheet with the default **Protection** command on the Default menu, then "unprotect" the cells you want to allow access to.

To activate **Form Input** mode, select **Form Input** from the Database menu (*/ADF*). Quattro prompts you for a cell block. Specify the block you want to use for data entry. (All cells outside of this block will be inaccessible.)

When you press *Enter,* the menu disappears, and the cell selector can be moved to only those cells in the block that are not protected.

To exit Form Input mode and return access to all cells, press *Esc.*

The Form Input command is used mostly in macro applications, to limit unauthorized access to the Quattro spreadsheet.

C H A P T E R

10

Working With Statistics and Analyzing Data

Quattro offers a special group of commands that perform intricate mathematics on your spreadsheet data. With these commands, you can gain a much deeper perspective on your data. For example, you could build a table that automatically predicts future production rates based on an existing database, or see how many employees have salaries that fall within given ranges.

This chapter describes:

- how to create a sensitivity table that shows what would happen if certain factors in your database changed
- how to create a frequency distribution table that shows how often values within specified ranges appear in your data
- how to multiply or invert matrices
- how to create a regression analysis table that shows how a set of variables may be affected by other variables in your data

These special commands are on the Advanced menu (Figure 10.1), which is accessed through the main menu (*/A*).

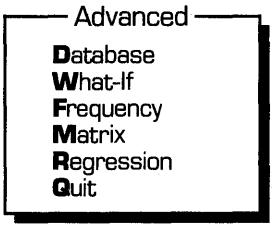


Figure 10.1: The Advanced Menu

Database accesses a menu of commands that you can use with spreadsheets that are set up as databases. These commands are described in Chapter 9, "Working With Your Database," on page 289.

What-If lets you perform a sensitivity analysis to see how data is affected by changing one or more values.

Frequency breaks down a block of values into ranges, and creates a table that shows how many values fall within each range.

Matrix lets you multiply two matrices to create a third, or invert an existing matrix to create a second.

Regression shows how one set of values is influenced by other sets of values.

Quit returns you to the spreadsheet.

Press *Esc* to back out of th Advanced menu to the main menu.

This chapter discusses each of the Advanced commands (except Database) in detail.

Performing a Sensitivity Analysis

The What-If command lets you see how varying a value affects the rest of your data. With it, you can substitute one or two values with a range of values and see how the new values affect other cells. It asks, in essence, "What if this value were different?" Quattro creates a table, separate from your spreadsheet data, showing both the substitutions and the effects they have on other cells.

These tables, called sensitivity or *what-if* tables, display a whole range of possibilities given different circumstances. For example, "What if my company's business expenditures were to increase 10%? 15%? 20%? And what if, at the same time, production increased 10-25%?"

When you select **W**hat-If from the Advanced menu, the What-If menu is displayed (Figure 10.2).

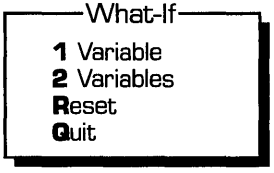


Figure 10.2: The What-If Menu

1 Variable lets you create a one-way sensitivity table showing the effects of altering one variable.

2 Variables lets you create a two-way sensitivity table that alters the values of two variables and shows how they affect each other.

Reset clears the information entered with either of the **W**hat-If commands.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the What-If menu to the Advanced menu.

To recreate the last-specified What-If table, press the TABLE key (*F7*).

Creating a One-Way Sensitivity Table

The **1** Variable command builds a table of formula results based on varying a value referenced by one or more formulas. You can create a basic one-way table that uses only the data you supply. You can also build a table that refers to data already entered in the spreadsheet.

A Basic One-Way Table

A basic one-way sensitivity table simply substitutes values for a variable in one or more formulas. You set up a column of figures to use as substitutions, set up one or more formulas that reference a blank cell, then use the **1** Variable command to calculate the formula(s) repeatedly, inserting a new substitution value in the blank cell each time. The table is completely independent from any other data you might have in the same spreadsheet.

The best way to show this is through an example. Suppose you want to set up a table that shows commissions earned for a range of sales amounts.

Your employees receive three different commission rates: 12%, 15%, and 18%.

The first thing you need to do is create a column of figures that reflect the sales range you want to show. Choose any empty area of your spreadsheet. (Don't use cell A1, however, because the top left cell of the table must be blank.) If the figures increase at regular intervals, you can use the **B**lock **F**ill command to enter the numbers (see page 81). In this case, we'll enter a range of 100-1000 with intervals of 50 (see Figure 10.3).

The next step is to enter the formulas you want to use to calculate the commissions. We'll use three different formulas, one for each commission rate. The formulas are entered above and to the right of the substitution values, in this case in cells B1, C1, and D1 (see Figure 10.3). (The format for these cells has been changed to **S**how Formulas in order to display the actual formulas.)

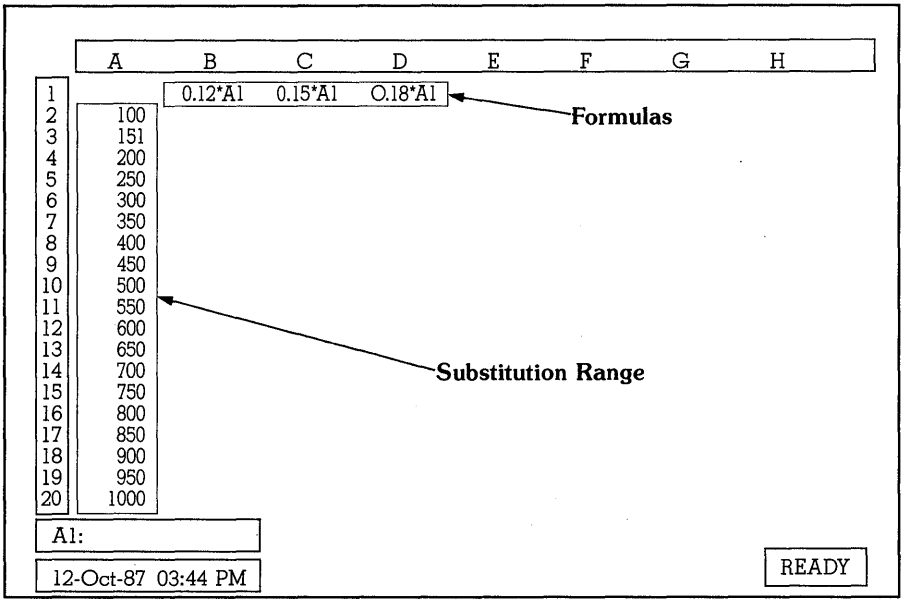


Figure 10.3: Preparing Data for a What-If Table

Each of these formulas references a blank cell (A1). This is the input cell; each of the substitution values will be input in this cell, one by one, to create the table. The input cell can be any cell outside of the table.

Now we're ready to use the **W**hat-If command:

1. Select What-If from the Advanced menu, then select **1** Variable (*/AW1*). Quattro prompts you for the block of cells to use as a data table.
2. Specify the entire block, including formulas and substitution values, in this case, A1..D20. Quattro then prompts for an input cell.
3. Enter A1, the blank cell referenced by the formulas. The table is instantly created (see Figure 10.4). You can see exactly what commissions would be given for each value in the range.

	A	B	C	D	E	F	G	H
1		0.12*A1	0.15*A1	0.18*A1				
2	100	12	15	18				
3	151	18	22.5	27				
4	200	24	30	36				
5	250	30	37.5	45				
6	300	36	45	54				
7	350	42	52.5	63				
8	400	48	60	72				
9	450	54	67.5	81				
10	500	60	75	90				
11	550	66	82.5	99				
12	600	72	90	108				
13	650	78	97.5	117				
14	700	84	104	126				
15	750	90	112.5	135				
16	800	96	120	144				
17	850	102	127.5	153				
18	900	108	135	162				
19	950	114	142.5	171				
20	1000	120	150	180				

A1:

12-Oct-87 03:44 PM

READY

Figure 10.4: The Finished Commission Table

To fill in the values of the table, Quattro moves down each column of the table. For each cell, Quattro inputs that row's substitution value in the input cell, recalculates the formula at the top of that column, and places the results in the cell.

If you change any of the formulas in the first row, or any of the substitution values in the first column, you must use the **1** Variable command again to see the results. The CALC key, (*F9*), does not recalculate the formulas. If this was the last What-If table you created, just press the TABLE key (*F7*) to update the results.

Using a One-Way Table with a Database

A sensitivity table can be a helpful supplement to existing database information. You can create a data table that uses information in a database without ever affecting the database itself.

The most common way a sensitivity table is used with a database is to create "What-If" situations. Suppose you want to determine what your net income might be in 1992. Your boss has promised you a yearly 10% raise, and the current inflation rate is 6.5%. You've created a database projecting yearly gross income (based on a yearly 10% increase), expenses (based on a 6.5% yearly increase), and net income (subtracting expenses from gross income). (See Figure 10.5.)

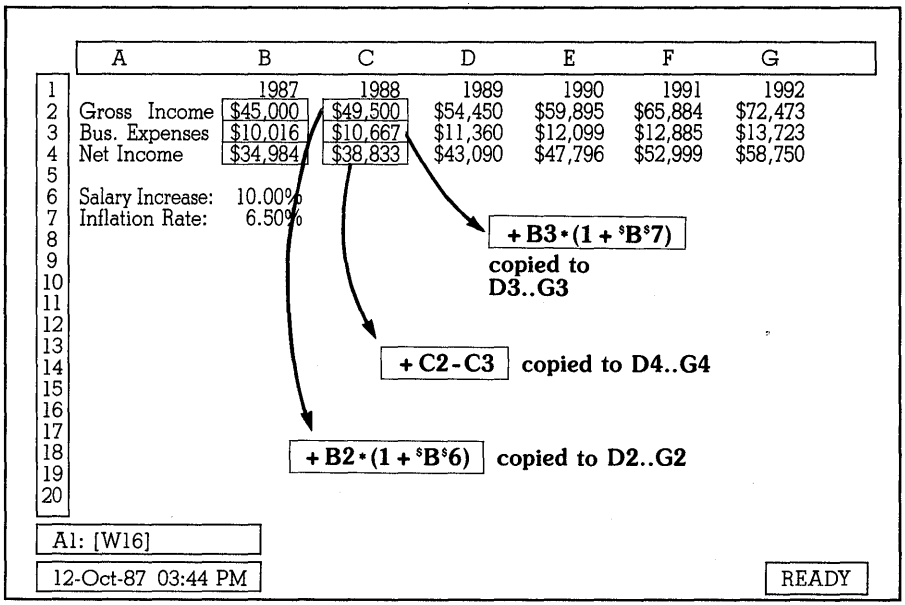


Figure 10.5: A Database Projecting Yearly Income

You'd like to see what happens to your projected income should the inflation rate rise or drop. You could experiment with entering different values in the Inflation cell (B7) and recording how it changes the values in the Net Income field. But creating a sensitivity table would be much more efficient. Not only would it be quicker; it would also show all the possibilities at once.

To create a table showing how different inflation rates would affect your net income, do the following:

1. Underneath the database, enter a range of inflation rates you want to experiment with. Use the **Block Fill** command for quick entry (see page 81).
2. Above and to the right of the list, enter *+G4*, the address of the cell that shows net income in 1992.
3. If you'd like to also see the effects of inflation on expenses, enter *+G3* in the cell to the right.
4. Select **What-If** from the Advanced menu, then select **1** Variable (*/AW1*). Quattro prompts you for the block to use as the data table.
5. Specify the data table either by pointing or entering a cell range or block name. Quattro prompts you for the input cell.
6. Enter *B7* as the input cell. This is the cell you want to put the range of substitution values into. Quattro automatically creates the table, showing different expense and net income values for 1992, given the various inflation rates.

Figure 10.6 shows such a table. It lists different 1992 projections for inflation rates from 5% to 10%.

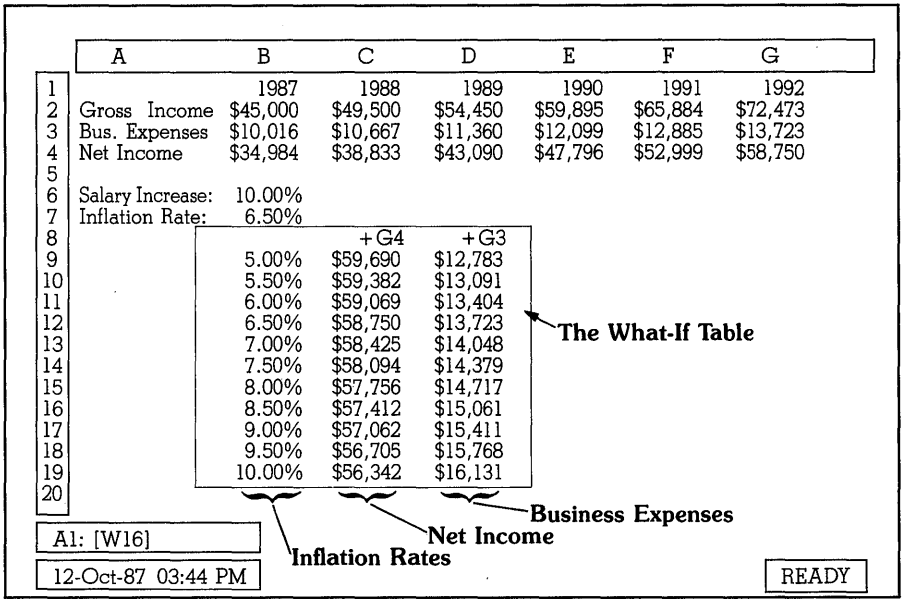
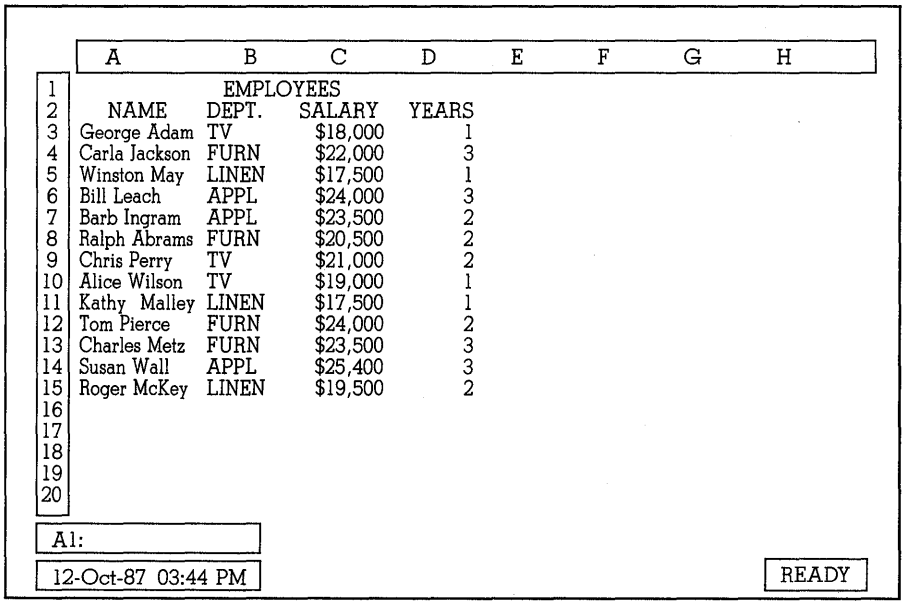


Figure 10.6: A Table Showing Net Income at Different Inflation Rates

Using Database Functions in a One-Way Table

When you set up a sensitivity table using information in an existing database, you can use database @functions to calculate values in the table. Consider the database shown in Figure 10.7. It shows a list of employees, their departments, salaries, and years with the company.



	A	B	C	D	E	F	G	H
1		EMPLOYEES						
2	NAME	DEPT.	SALARY	YEARS				
3	George Adam	TV	$18,000	1				
4	Carla Jackson	FURN	$22,000	3				
5	Winston May	LINEN	$17,500	1				
6	Bill Leach	APPL	$24,000	3				
7	Barb Ingram	APPL	$23,500	2				
8	Ralph Abrams	FURN	$20,500	2				
9	Chris Perry	TV	$21,000	2				
10	Alice Wilson	TV	$19,000	1				
11	Kathy Malley	LINEN	$17,500	1				
12	Tom Pierce	FURN	$24,000	2				
13	Charles Metz	FURN	$23,500	3				
14	Susan Wall	APPL	$25,400	3				
15	Roger McKey	LINEN	$19,500	2				
16								
17								
18								
19								
20								

Figure 10.7: An Employee Database

Suppose you wanted to see the number of employees and average salary within each department. You would need to set up the spreadsheet as shown in Figure 10.8.

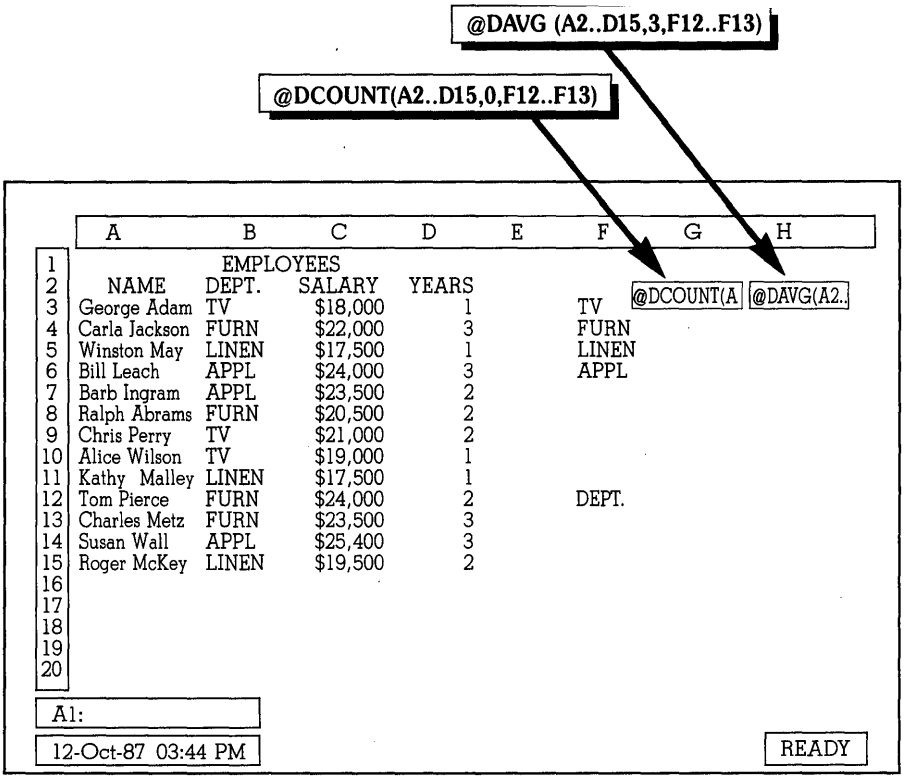


Figure 10.8: Preparing the Spreadsheet for a Table

To prepare the spreadsheet as shown:

1. To the right of the employee database, in cells F3..F6, enter a list of the different departments as the first column of the data table (instead of the usual range of values).
2. Outside the data table, set up a mini-criteria table. Enter the field name "Dept." in cell F12. The blank cell in F13 will serve as the input cell. Both cells will be referenced by the formulas in the data table.
3. In cell G2, enter the following formula:

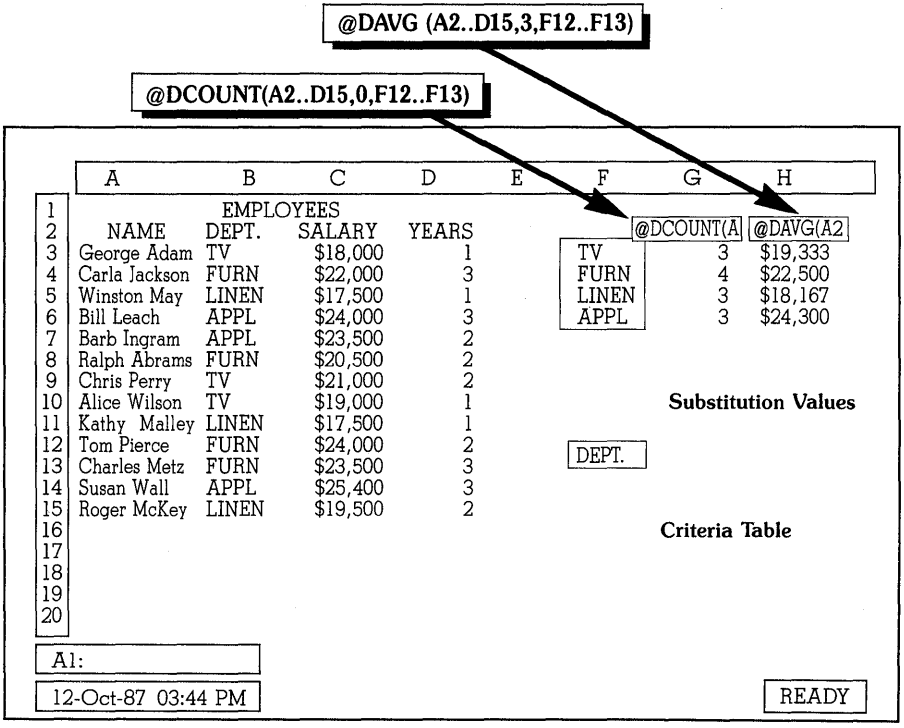
   ```
   @DCOUNT(A2..D15,0,F12..F13)
   ```

   The first parameter (A2..D15) refers to the entire database. The second parameter (0) specifies an offset of 0, telling Quattro to refer to the first column of data. The third parameter (F12..F13) refers to the criteria table you set up in step 2. This formula tells Quattro to count the number of employees listed in the Name column in relation to the department shown in the criteria table.
4. In cell H2, enter the following formula:

   ```
   @DAVG(A2..D15,3,F12..F13)
   ```

This tells Quattro to average the values in the fourth column of the database (SALARY) in relation to the department shown in the criteria table.

5. Select **W**hat-If from the Advanced menu, then select **1** Variable (*/AW1*). Quattro prompts you for the block to use as the data table.
6. Specify cells F2..H6 as the data table. Quattro prompts you for the input cell.
7. Specify F13 as the input cell. When you press *<RETURN>*, Quattro immediately creates the data table shown in Figure 10.9.



	A	B	C	D	E	F	G	H
1		EMPLOYEES						
2	NAME	DEPT.	SALARY	YEARS			@DCOUNT(A	@DAVG(A2
3	George Adam	TV	$18,000	1		TV	3	$19,333
4	Carla Jackson	FURN	$22,000	3		FURN	4	$22,500
5	Winston May	LINEN	$17,500	1		LINEN	3	$18,167
6	Bill Leach	APPL	$24,000	3		APPL	3	$24,300
7	Barb Ingram	APPL	$23,500	2				
8	Ralph Abrams	FURN	$20,500	2				
9	Chris Perry	TV	$21,000	2				
10	Alice Wilson	TV	$19,000	1				
11	Kathy Malley	LINEN	$17,500	1				
12	Tom Pierce	FURN	$24,000	2				
13	Charles Metz	FURN	$23,500	3				
14	Susan Wall	APPL	$25,400	3				
15	Roger McKey	LINEN	$19,500	2				
16								
17								
18								
19								
20								

Figure 10.9: A Table Showing Number of Employees and Average Salary per Department

For more information on database @functions, see Chapter 11, "Using @Functions."

Building a Two-Way Sensitivity Table

A two-way sensitivity table shows values computed by varying *two* variables in a formula. Unlike a one-way table, you cannot use more than one formula in a two-way table. You can create a two-way table in conjunction with a database or completely separate from the other information in the spreadsheet.

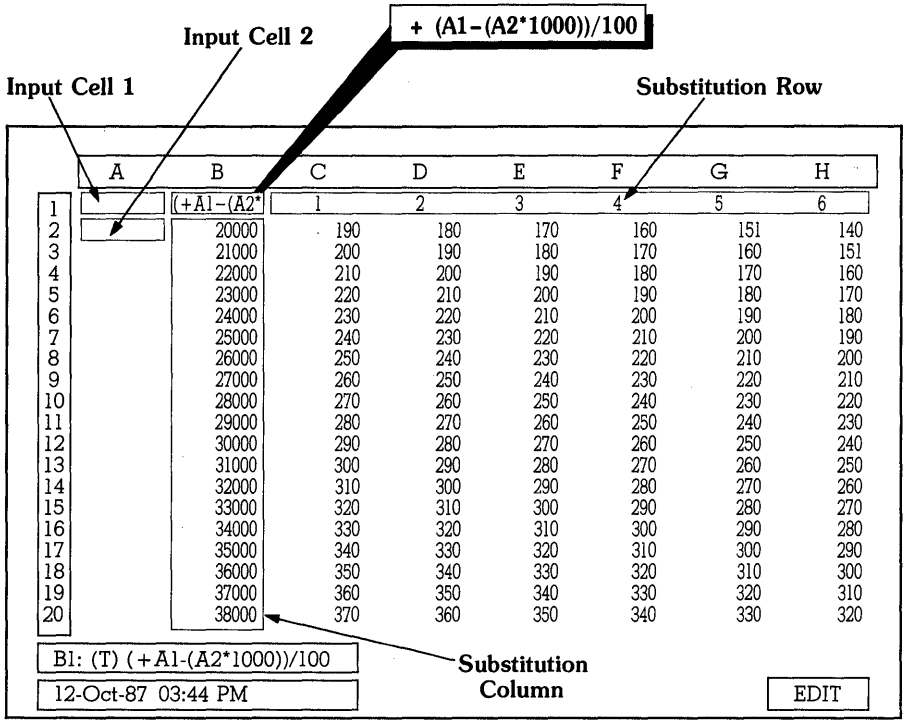
A Basic Two-Way Table

A basic two-way table uses only the data you supply it to calculate values. It is completely separate from any other information in the spreadsheet.

Suppose you own a health club and you want to try an innovative new fee schedule. You're going to implement a sliding scale. You've come up with a formula to figure out individual yearly fees:

```
Family Income - (No. of Dependents * 1000) / 100
```

Now you want to build a lookup table to make it easy to pinpoint fees. Figure 10.10 shows such a table, created with the **2** Variables command. It shows a fee range of $140-$370.



	A	B	C	D	E	F	G	H
1		(+A1-(A2*	1	2	3	4	5	6
2		20000	190	180	170	160	151	140
3		21000	200	190	180	170	160	151
4		22000	210	200	190	180	170	160
5		23000	220	210	200	190	180	170
6		24000	230	220	210	200	190	180
7		25000	240	230	220	210	200	190
8		26000	250	240	230	220	210	200
9		27000	260	250	240	230	220	210
10		28000	270	260	250	240	230	220
11		29000	280	270	260	250	240	230
12		30000	290	280	270	260	250	240
13		31000	300	290	280	270	260	250
14		32000	310	300	290	280	270	260
15		33000	320	310	300	290	280	270
16		34000	330	320	310	300	290	280
17		35000	340	330	320	310	300	290
18		36000	350	340	330	320	310	300
19		37000	360	350	340	330	320	310
20		38000	370	360	350	340	330	320

Figure 10.10: A Sliding Scale Lookup Table

To create a table like this one:

1. Create a column of figures showing the salary range you want to include. Use the **B**lock **F**ill command to enter the values automatically. Above and to the right of this column, create a row showing the number of dependents.
2. In the top left cell of the table, enter the formula to calculate fees. In the sample, A1 is the input cell for the salary amount and A2 is the input cell for the number of dependents. The formula is entered as

   ```
   (A1-(A2*1000))/100
   ```

3. Select **W**hat-If from the Advanced menu, then select **2** Variables (*/AW2*). Quattro prompts you for the block to use as the data table.
4. Specify the entire block, including both substitution ranges. Quattro prompts you for the input cell for the column of values.

5. Enter A1, or whatever cell you referenced in the formula as the salary value. The cell must be outside of the data table. Quattro prompts you for the input cell for the row of values.
6. Enter A2, or whatever cell you referenced in the formula as the number of dependents value. When you press *Enter*, the WAIT status indicator is displayed while Quattro creates the table.

You can build similar tables showing all kinds of information—for example, a mileage chart listing miles per gallon for different amounts of gas used and numbers of miles driven, or profit amounts for a range of prices and costs.

Using a Two-Way Table with a Database

A two-way table can help draw out and analyze information in an existing database. When you create a two-way table in conjunction with a database, you can make use of any of the database statistical @functions offered with Quattro. (See Chapter 11, "Using @Functions," for descriptions of these functions.)

Reconsider the example discussed on page 322. A one-way table was created to show the number of employees and average salary for each of the departments. Using that same database, let's suppose you now want to check to see how long people have been employed in each department.

Figure 10.11 shows such a table. A criteria table (F12..G13) has been set up with two fields: Dept and Years. The empty cells below these field headings are used as input cells. The first column of the frequency table (E2..H6) lists each department. The first row shows a range of years employed. The formula in cell E2,

```
@DCOUNT(A2..D15,0,F12..G13),
```

tells Quattro to count the number of employees listed for each department and employment length shown in the criteria table.

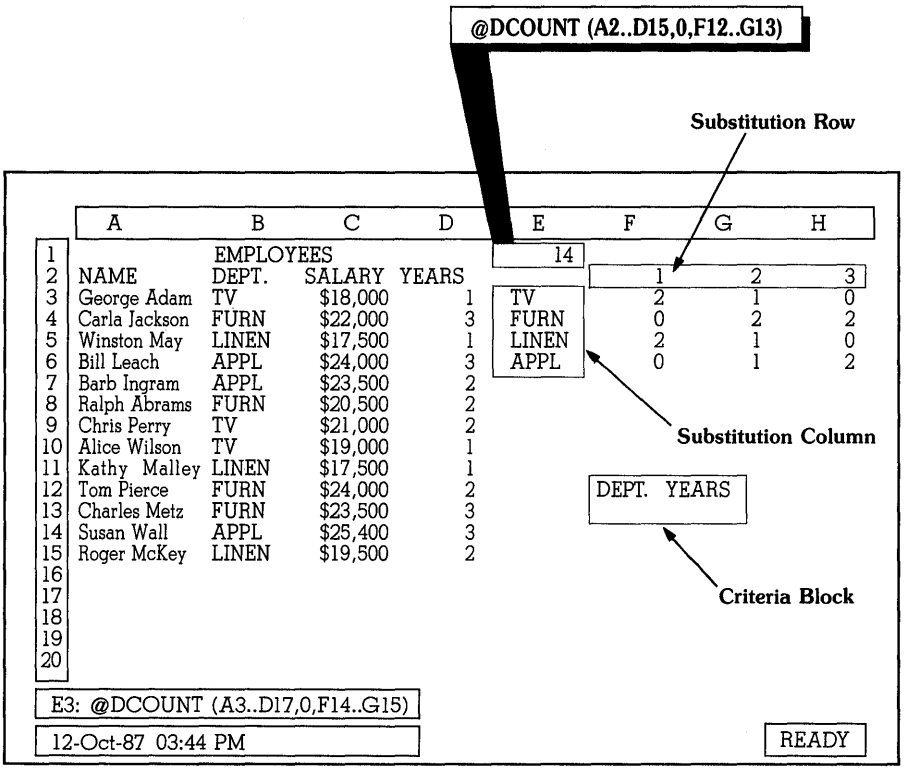


Figure 10.11: A Table Showing Employment Lengths in Each Department

Creating a Frequency Distribution Table

The **Frequency** command (*/AF*) calculates the number of values that fall within given value ranges and displays the results in a *frequency distribution table.*

To create a frequency distribution table, you need two things:

- **a block of values** on which to perform the frequency distribution.
- **a bin block** listing the value ranges you want to check the block of values for. The results of the distribution analysis will appear to the right of this block.

Figure 10.12 includes a database that shows students' test scores, and a frequency distribution table that shows how many scores fell within each bin range.

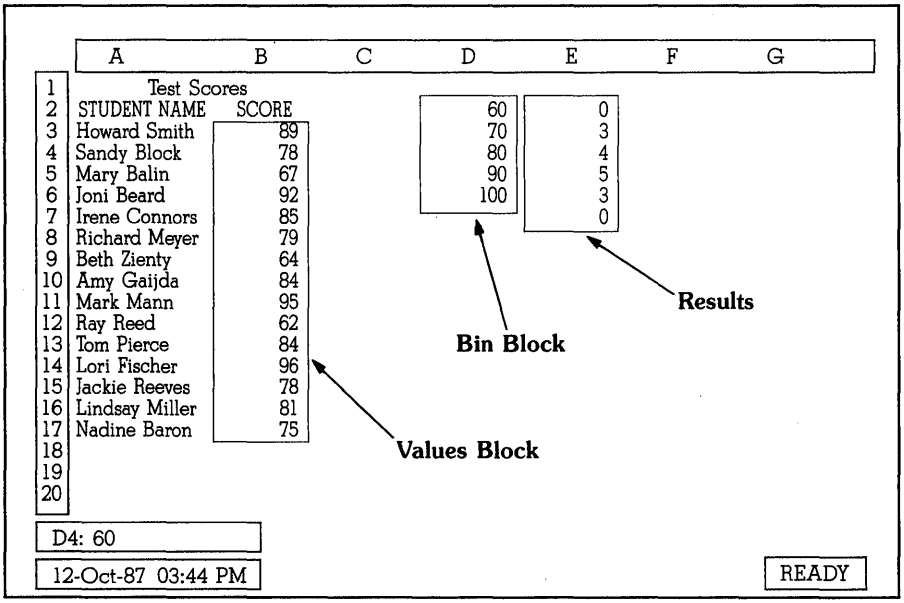


Figure 10.12: A Table Showing Test Score Distribution

To create a frequency distribution table:

1. Set up a bin showing the range intervals you want analyzed. The block must be a single column with a column of blank cells to the right (where the results will be written). You can use the **B**lock **F**ill command to create the bin. The numbers must appear in ascending order.
2. Select **F**requency from the Advanced menu (*/AF*). Quattro prompts you for the coordinates of the values block.
3. Specify the block of values you want to analyze, either by pointing or entering a cell range or block name. The values block can be any valid block; labels and blank cells will be assigned a value of zero. Quattro prompts you for a bin block.
4. Specify the bin block you set up showing the range intervals for which you want to display results. When you press *Enter*, the results are displayed to the right of the bin block, overwriting any data previously stored there.

Each value in the bin block represents all values from it down to the previous value. (The first value represents any value less than or equal to itself.) Notice that the result block is one cell longer than the bin block. Its

last cell contains the number of values found that were greater than the final number in the bin.

Frequency results are not automatically updated. If you change the data in either the values block or the bin, you will have to re-execute the Frequency command to receive correct results.

Values in a frequency distribution table can be easily and effectively displayed in an XY graph. Simply specify the bin block as the x-axis values and the results as the 1st Series of values. Figure 10.13 shows an XY graph showing the test score distribution results found earlier.

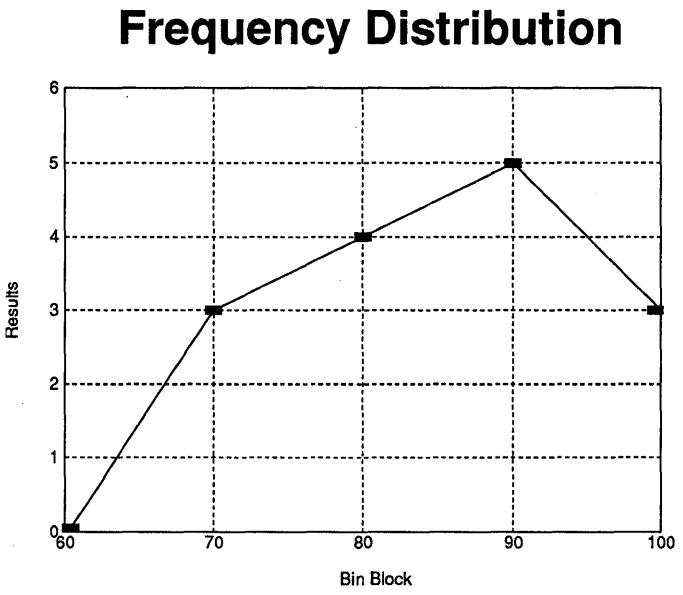


Figure 10.13: An XY Graph Showing Frequency Distribution

Using Matrix Arithmetic

A matrix is a rectangular array of numbers. It is used to systematize linear formulas and equations. (For detailed information about matrices, you can refer to any textbook on linear algebra.)

When you select Matrix from the Advanced menu (*/AM*), the Matrix menu is displayed (Figure 10.14).

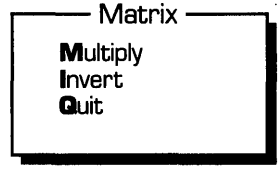


Figure 10.14: The Matrix Menu

Multiply multiplies the values in two matrices and displays the results in a third.

Invert creates a matrix showing the inversion numbers of an existing matrix.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Advanced menu.

Matrix Multiplication

The **M**atrix **M**ultiply command (*/AMM*) lets you multiply the values in two matrices to obtain a third. As an example, the pair of linear equations

$$2x + 3 * y = 31$$
$$x + 2 * y = 19$$

can be expressed in terms of matrix multiplication by saying that the matrix

$$\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

multiplied by the matrix

$$\begin{bmatrix} x \\ y \end{bmatrix}$$

results in the matrix

$$\begin{bmatrix} 31 \\ 19 \end{bmatrix}$$

This command requires two multiplication blocks (matrices) and an output block (to write the results into). The first multiplication block must have the same number of columns as the second multiplication block has rows. In other words, if the first block has five columns, the second matrix must have five rows.

The output block can be any valid cell block; you only need to specify the top left cell. If the block contains any data, it will be overwritten by the results. The resulting size of the output block is determined by the sizes of the two multiplication blocks.

To multiply two matrices:

1. Select **M**ultiply from the Matrix menu (*/AMM*). Quattro prompts you for the first matrix block.
2. Specify the first of the matrices you want to multiply. Quattro prompts you for the second matrix block.
3. Specify the second matrix. Quattro prompts you for a destination block.
4. Enter the top left cell of the area where you want the resulting matrix entered. **M**atrix multiplies the two matrices and displays the results in a new matrix.

Figure 10.15 shows three matrices. The third is the result of multiplying the first two.

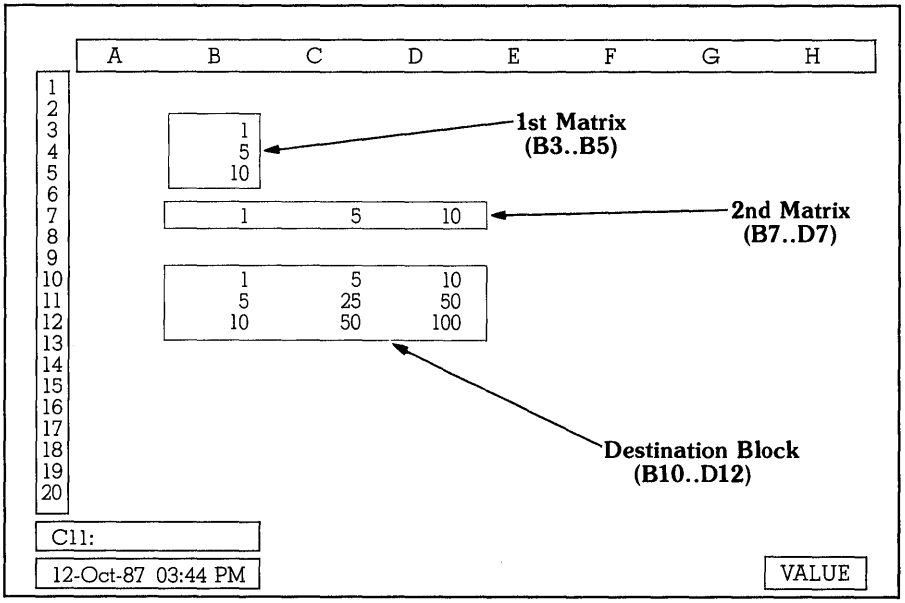


Figure 10.15: A Multiplied Matrix

Matrix Inversion

The **Matrix Invert** command (*/AMI*) lets you find the inverse of a matrix. It can be used only with "square" matrices (those with the same number of rows as columns) and cannot invert matrices larger than 90 columns and 90 rows.

Matrix Invert is used to solve linear systems of equations. For example, if it is applied to the linear equations mentioned in the previous section on multiplying matrices, it can be used to invert

$$\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

to get

$$\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$$

which can then be multiplied by

$$\begin{bmatrix} 31 \\ 19 \end{bmatrix}$$

to get

$$\begin{bmatrix} 5 \\ 7 \end{bmatrix}$$

Thus, the solution to the pair of linear equations is $x=5$, $y=7$.

To invert a matrix:

1. Select **M**atrix from the Advanced menu, then **I**nvert (*/AMI*). Quattro prompts you for a source block.
2. Specify the matrix block you want to invert. Quattro prompts you for a destination block.
3. Specify the upper left cell of the block you want to write the inverted matrix to. If you specify the same block as the invert block, the existing matrix will be overwritten.

Quattro inverts the matrix and writes the results into the output block. Any existing data in the output block is overwritten.

Figure 10.16 shows two matrices. The second is the inverted version of the first.

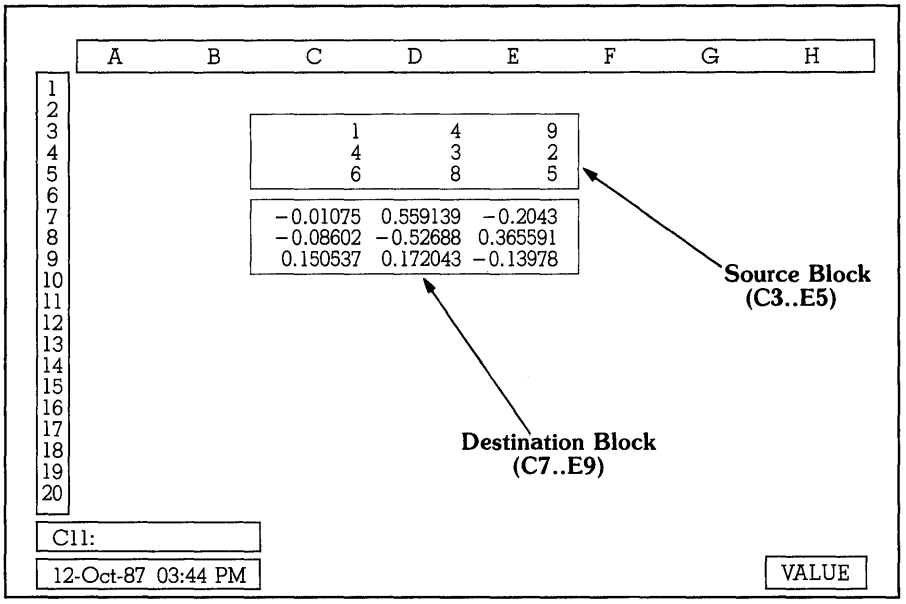


Figure 10.16: An Inverted Matrix

To return an inverted matrix to its original condition, use the **M**atrix **I**nvert command again.

NOTE: There are some square matrices that cannot be inverted, for example:

$$\begin{bmatrix} 1 & 2 & 3 \\ 8 & 9 & 10 \\ 1 & 2 & 3 \end{bmatrix}$$

In this case, an appropriate error message is displayed.

Performing Regression Analysis

The **R**egression command (*/AR*) creates a regression analysis table showing how a set of variables may be affected by other sets of variables. This is especially helpful in determining the relationship between variables, for

example, how does number of hours worked affect production? Or how does advertising expenditure affect total sales?

When you select the **R**egression command, the Regression menu is displayed (Figure 10.17).

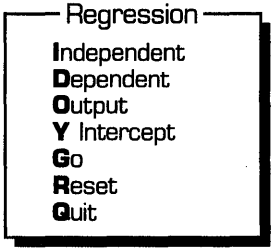


Figure 10.17: The Regression Menu

Independent lets you specify the column(s) of independent data (x), or the data you think might be affecting the dependent data. You can specify more than one column, but they must be adjacent and include the same number of rows.

Dependent lets you specify the column of dependent data (y); in other words, the data you think may be affected by other variables.

Output lets you specify the area you want the regression results written to.

Y Intercept lets you force the y-intercept value to zero. The **Y** Intercept default requires Quattro to calculate the y-intercept value.

Go begins the regression operation.

Reset returns the values entered in the Regression menu to the defaults.

Quit returns you to the spreadsheet.

Press *Esc* to back out of the Advanced menu.

To create a regression analysis table:

1. Make sure the columns you want to compare are the same length. If you're going to compare more than two columns, the dependent variables must be in adjacent columns.
2. Select **R**egression from the Advanced menu (*/AR*). The Regression menu is displayed.
3. Select **D**ependent and specify the column that contains the dependent data. Select **I**ndependent and specify the block containing the independent data. (This may be more than one column.)

4. Select **Output** and specify the upper left cell of the block in which you want the regression information written. This block will be 9 rows deep and 2 columns wider than the number of columns in the dependent block. Make sure to leave enough blank space, or data will be overwritten.
5. If you want to force the *y*-intercept value to zero, select **Y** Intercept, then **Z**ero.
6. Select **Go**. Quattro builds a regression analysis table based on data in the independent and dependent blocks and displays it in the output block.

Regression tables are not updated automatically. If you alter the values in the **I**ndependent and **D**ependent blocks, you will have to initiate the **R**egression command again to see the new results.

Figure 10.18 shows a sample database and regression table. The database tracks the amount of money spent per week on advertising and the total sales per week. The regression analysis shows the relationship between the two. Total sales are given as the dependent variable; advertising money is the independent variable.

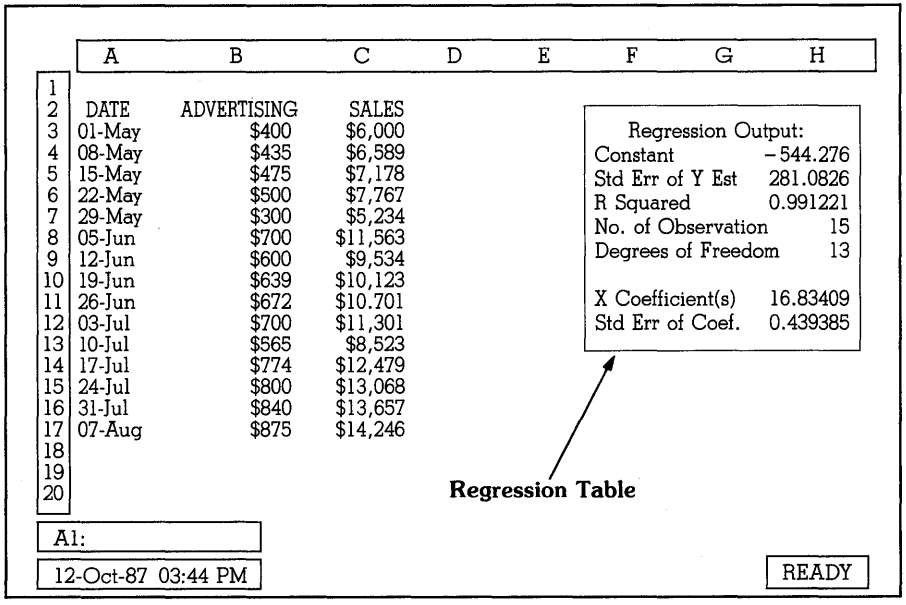


Figure 10.18: A Regression Analysis Table

The regression table includes seven different figures. It finds a model in which the dependent variable (y) is approximated by a linear combination of the independent variables (x), either with or without a constant term. Thus, it finds values of A1, ..., Ak, C such that the values of

A1 * x1 + ... + Ak * xk + C

are as close to the values of y as possible in a least squares sense.

Constant is the y-axis intercept of the regression. It is zero if you specified Zero as the Y Intercept. Otherwise, it is the value of C above.

Std Err of Y Est is the estimated standard error of the y values, and represents the deviation of the observed y values from the values of

A1 * x1 + ... + Ak * xk + C

It is computed by taking the sum of the squares of the differences, dividing by the number of degrees of freedom (defined below), and taking the square root.

R Squared is a statistic measuring the validity of the model. It ranges from 0 to 1, with 1 being optimal. It is useful for comparing different models that have the same number of independent variables. It is defined by letting B be the average of the y observations and dividing the sum of squares of

A1 * x1 + ... + Ak * xk + C – B

by the sum of squares of y – B. The idea is that of the amount that y deviates from being constant, R Squared measures the proportion that can be attributed to the linear model.

No. of Observations is the total number of dependent (y) values, or equivalently, the number of values for any of the independent (x) variables.

Degrees of Freedom is the number of observations minus the number of independent values being computed by the regression. If the constant has been specified to be zero, the number of independent values being computed by the regression is equal to the number of independent (x) variables, as one coefficient is computed for each variable. Otherwise, it is the number of independent (x) variables plus one, as the constant must also be computed.

X Coefficient(s) are the coefficients A1, ..., Ak of the independent (x) variables in the model above.

Std Err of Coef. gives an error estimate of the coefficients, assuming that the model is valid and that deviations of the observations from the model can be attributed to errors that are Gaussian distributed. Each x coefficient

should be interpreted as that value "plus or minus" the corresponding standard error.

There is one value of X Coefficient(s) and one value of Std Err of Coef. corresponding to each Independent (x) variable.

You can use these statistics to calculate projected sales. Using the same example, you could project future sales on the basis of advertising money with the following formula:

Constant + X Coefficient(s) * Advertising Money

First, set up a column of projected advertising figures, as shown in Column B of Figure 10.19. You can use whatever numbers you want. Then create a column of projected sales figures based on the figures in the Advertising column. Set up the SALES heading, then enter the following formula in cell B26:

$H$4 + $H$10 * B23

Copy the formula into cells B27 through B40. Figure 10.19 shows the results.

	A	B	C	D	E	F	G	H
21		Projected						
22	ADVERTISING	SALES						
23	$800	$12,923						
24	$850	$13,765						
25	$900	$14,606						
26	$950	$15,448						
27	$1,000	$16,290						
28	$1,050	$17,132						
29	$1,100	$17,973						
30	$1,150	$18,815						
33	$1,200	$19,657						
32	$1,250	$20,498						
33	$1,300	$21,340						
34	$1,350	$22,182						
35	$1,400	$23,023						
36	$1,450	$23,865						
37	$1,500	$24,707						
38								
39								
40								

A21:

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Figure 10.19: Projected Sales Predicted with a Regression Table

By adding further independent variables to the analysis, you can increase its accuracy. Figure 10.20 shows the same database with two added columns: Reps/Day and Hours Open.

	A	B	C	D	E	F	G
1							
2	DATE	ADVERTISING	REPS/DAY	HOURS OPEN	SALES		
3	01-May	$400	6	65	$6,000		
4	08-May	$435	6	65	$6,589		
5	15-May	$475	7	65	$7,178		
6	22-May	$500	8	65	$7,767		
7	29-May	$300	7	60	$5,234		
8	05-Jun	$700	9	76	$11,563		
9	12-Jun	$600	8	70	$9,534		
10	19-Jun	$638	8	70	$10,123		
11	26-Jun	$672	8	70	$10,701		
12	03-Jul	$700	9	76	$10,301		
13	10-Jul	$565	7	70	$8,523		
14	17-Jul	$774	9	70	$12,479		
15	24-Jul	$800	10	76	$13,068		
16	31-Jul	$840	10	76	$13,657		
17	07-Aug	$875	11	76	$14,246		
18							
19							
20							

A1:

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Figure 10.20: Two Columns Added to the Sales Database

By creating a regression table that includes these two new factors, you can see how all three variables affect the total sales. To do so, include the two new columns in the Independent block (B3..D17) and specify the Sales column (E3..E17) as the Dependent block. Figure 10.21 shows the resulting table. Coefficient results are given for each independent variable.

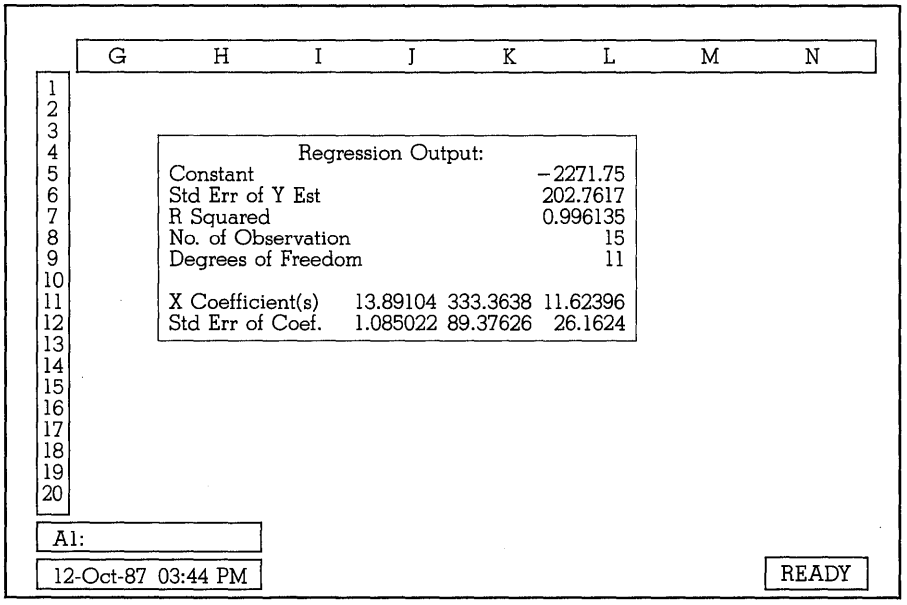


Figure 10.21: A Regression Table with Three Independent Variables

Using the data in this regression table, you could expand your Projected Sales table to include projected reps\day and hours open. First, add these two columns with projected figures to the Projected Sales table. Then, in the first cell under SALES, enter the following formula:

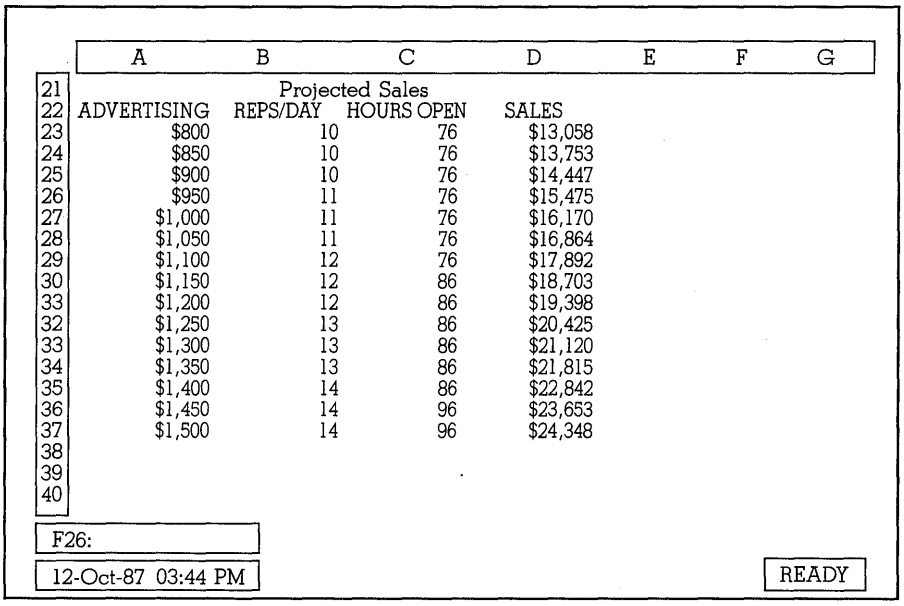
```
$L$5 + A23*$J$11 + B23*$K$11 + C23*$L$11
```

This formula is based on the format below:

Constant + (1st Indep. Value * 1st X Coeff.) +
(2nd Indep. Value * 2nd X Coeff.) +
(3rd Indep. Value * 3rd X Coeff.)

All references to the regression table must be absolute; others must be relative.

Copy this formula to other cells in the column (E27..E40). The results are calculated automatically (see Figure 10.22).



	A	B	C	D	E	F	G
21		Projected Sales					
22	ADVERTISING	REPS/DAY	HOURS OPEN	SALES			
23	$800	10	76	$13,058			
24	$850	10	76	$13,753			
25	$900	10	76	$14,447			
26	$950	11	76	$15,475			
27	$1,000	11	76	$16,170			
28	$1,050	11	76	$16,864			
29	$1,100	12	76	$17,892			
30	$1,150	12	86	$18,703			
33	$1,200	12	86	$19,398			
32	$1,250	13	86	$20,425			
33	$1,300	13	86	$21,120			
34	$1,350	13	86	$21,815			
35	$1,400	14	86	$22,842			
36	$1,450	14	96	$23,653			
37	$1,500	14	96	$24,348			
38							
39							
40							

Figure 10.22: Projected Sales Based on Three Independent Variables

You can now see what your weekly sales totals might be if you increase your advertising, sales representatives, and store hours. You can experiment with these results by adjusting the values in the first three columns.

A regression table is also a good way to set up an XY graph showing projected values. In Figure 10.23, projected advertising figures were assigned to the *x*-axis, and projected sales figures calculated with the regression table were assigned to the first series.

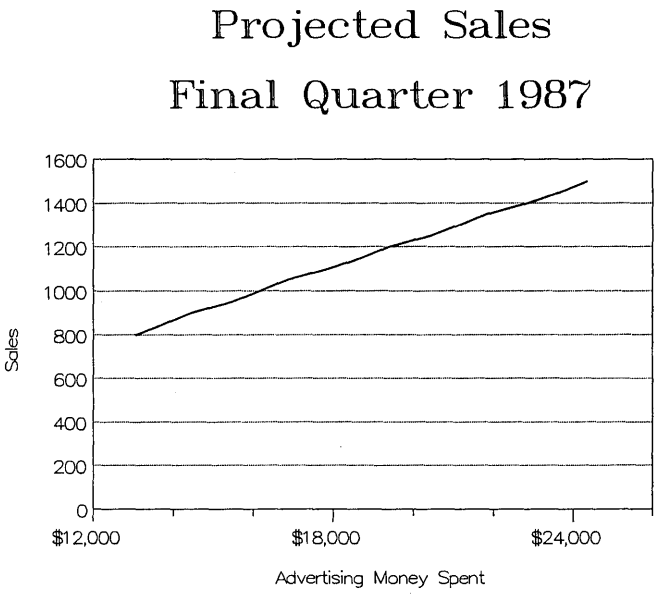


Figure 10.23: An XY Graph Created with a Regression Table

C H A P T E R

11

Using @Functions

Quattro provides many built-in functions—called *@functions* because they're always preceded by an "at" sign—that perform advanced calculations and return a value. Functions are special commands that you enter in spreadsheet cells, either alone or within formulas. They perform advanced calculations and provide the resulting value.

This chapter describes:

- the different types of functions and what they're used for
- the syntax used to create @function statements
- the arguments used within @functions
- creating @function statements

It also includes at the end a table listing and briefly describing each Quattro @function by category. For detailed information on each @function, see Chapter 2 of the *Quattro Reference Guide.*

Types of Functions

Quattro @functions can be divided into six categories:

- **Mathematical** functions are used in more complex mathematical formulas, for example, to determine the trigonometic sine or square root.

- **Aggregation and Counting** functions are used to perform mathematical operations on a group of values, for example, to find the average value in a block of cells.
- **Text** functions are used to manipulate character strings, or labels, for example, to insert characters in the middle of a string.
- **Miscellaneous** functions are used to perform a variety of calculations, for example, to return the value in a specified position in a lookup table.
- **Logical** functions are used mostly in conditional statements, where the results are based on the validity of a logical expression, such as +A3>0.
- **Financial** functions are used primarily in investment calculations, for example, to determine annuity and mortgage payments.
- **Date & Time** functions are used in calculating dates and time. For example, @NOW returns the current date or time (depending on the display format).
- **Database Aggregation** functions are used to perform mathematical calculations on records in a database, for example, to find the maximum value within a field.

Although each category of functions is used for a different purpose, they all share the same basic format and construction.

Function Syntax

As with spreadsheet formulas, it's important to enter functions in the proper format, or *syntax*. All Quattro functions have the same basic syntax:

@function(argument1, argument2, ...)

Function syntax must meet the following rules:

- There is always a leading @.
- The function name can be entered in either upper or lower case; but the spelling must be accurate.
- The required arguments following the function name must be enclosed in parentheses. (Functions that don't require arguments don't need parentheses.)
- When there are multiple arguments, they must be separated by commas. (You can change the argument separator to a semicolon or period instead of a comma with the **P**unctuation command on the Default International menu; see page 133.

- If the function syntax specifies a certain order for arguments, they must be entered in that order.
- There must be no spaces between @ and the function name. There may be spaces between arguments, parentheses, and the function name, but Quattro will delete them.
- You can "nest" functions inside other functions, for example, @INT(@SUM(A2..A10)). Each function must use a separate set of parentheses, however.

Arguments in Functions

Argument is a generic term for the information required by the function. Most functions need at least one *argument*. The type of information required depends on the specific function. There are three general types of arguments:

- numeric values
- block values
- string values

Most arguments require one of these types of values. Some accept a combination or a choice of types. For example, @SUM will accept a block in combination with numeric values.

The values required by each function are described in the function reference section at the end of this chapter.

Numeric Values

When a function requires a numeric value as an argument, it can be entered in a variety of ways:

- as an *actual value*, such as @INT(254.933)
- as the *coordinates of a cell* that contains a numeric value, such as @INT(A5) (no leading plus sign is required)
- as a *block name* of a single-cell block containing a numeric value, such as @INT(TOTAL)
- as a *formula* resulting in a numeric value, such as @INT(B4*10)
- as *another @function* resulting in a numeric value, such as @ABS(@INT(C4))

- as a *combination* of any of the above, such as @ABS(@INT(C4)-35+A2)

Block Values

When a function requires a block as an argument, it can be entered in the following ways:

- as *cell block coordinates*, such as A1..B3
- as the *address of a single cell*, such as A1
- as a *block name*, such as JANUARY
- when a list is allowed, you can use a *combination* of block values, such as @SUM(JANUARY,C15..D25,F10)

String Values

A string value can be entered as an argument in any of the following ways:

- as an *actual string* surrounded by double quotes, such as @PROPER("ACME Industries")
- as a *cell address* of a cell containing a label, such as @PROPER(D13)
- as a *block name* of a single-cell block containing a label, such as @PROPER(COMPANY NAME)
- as a *formula* resulting in a string, for example, @PROPER(+MONTH&" Sales")
- as another *function* resulting in a string, for example, @LENGTH(@PROPER("ACME INDUSTRIES"))

To enter a null, or blank, string value, use two double quotes with nothing in between: "".

Constructing Function Statements

A *function statement* is the complete function command, including arguments and punctuation. You enter a function statement in a spreadsheet cell just as you would any other value: highlight the cell with the cell selector and type the entry. When you press *Enter*, the result of the function is entered in the cell. If the result is a numeric value, it becomes a value entry. If the result is a string, it becomes a label entry.

If you enter any part of the function statement incorrectly, Quattro will beep, enter Edit mode, display a message saying, "Syntax Error," and move the cursor to the part of the function statement causing the problem.

You can use more than one @function in a single statement, for example,

```
@ROUND(@AVG(C14..F24),2).
```

This is called *nesting* functions. You can nest as many functions as you like in a statement (up to 240 characters). The more complex the statement, however, the more difficult it will be to debug should there be problems. It's best to break down complex function statements into several smaller statements, which you can reference with a final statement. The smaller pieces will not only make it easier to pinpoint an error, but they will also be available for use with other formulas, thereby increasing memory efficiency.

There are two Quattro features that can assist you in constructing function statements:

- the FUNCTIONS key (*Alt-F3*)
- pointing

The FUNCTIONS Key

When you press the FUNCTIONS key (*Alt-F3*), Quattro displays a a list of all possible @functions. To display the syntax required for each @function, press the EXPAND key (plus on the numeric keypad). You can also use the NAMES key (*F3*) in building @function statements. This key displays a list of all named blocks and (if expanded) their coordinates. Selecting one of the names enters it on the input line.

To insert an @function in the input line, simply highlight it on the list and press *Enter*.

Pointing

Just as you can point out cells to use in formulas or with Quattro commands, you can also use pointing to indicate cells to use as function arguments.

With the edit cursor to the right of an open parenthesis, comma, or operator, press any of the direction keys (*Left arrow, Right arrow, Up arrow, Down*

arrow, and so on). The function statement remains on the input line and you can move the cell selector freely about the spreadsheet.

To enter a single cell as an argument, move the selector to the cell and press either the comma key (,) or close parenthesis [ )]. The cell's address is entered in the function statement. To enter a completed statement in the spreadsheet, press *Enter*.

To enter a cell block as an argument, move the cell selector to any of the corner cells of the block. Press the period key (.) to anchor the selector in that cell. Then move the selector to the opposite corner of the block. The block is highlighted as you extend it. Press the comma key (,) or a close parenthesis [ )] to enter the block as an argument.

For more details on pointing, see page 57.

Functions by Category

Table 11.1 lists and briefly describes each of the @functions available within each category. For detailed descriptions of each @function, see Chapter 2 of the *Quattro Reference Guide*.

Table 11.1: Functions Listed by Category

Function	Returns
Mathematical Functions	
@ABS(*X*)	The absolute value of X
@ACOS(*X*)	The arc cosine of X
@ASIN(*X*)	The arc sine of X
@ATAN(*X*)	The arc tangent of X (2 quadrant)
@ATAN2(*X*,*Y*)	The arc tangent of X/Y (4 quadrant)
@COS(*X*)	The cosine of X
@DEGREES(*X*)	The number of degrees in X radians
@EXP(*X*)	e raised to the X power
@INT(*X*)	The integer portion of X
@LN(*X*)	The Log base e of X
@LOG(*X*)	The Log base 10 of X
@MOD(*X*,*Y*)	The remainder of X/Y
@PI	The value pi (3.14159..)
@RADIANS(*X*)	The number of radians in X degrees
@RAND	A random number between 0 and 1

Table 11.1: Functions Listed by Category, Continued

Function	Returns
@ROUND(*X,N*)	X rounded to the number of digits specified (up to 15)
@SIN(*X*)	The sine of X
@SQRT(*X*)	The square root of X
@TAN(*X*)	The tangent of X
Aggregation and Counting Functions	
@AVG(*List*)	The average of (List)
@COUNT(*List*)	A value equal to the number of non-blank cells in (List)
@MAX(*List*)	The maximum value in (List)
@MIN(*List*)	The minimum value in (List)
@STD(*List*)	The standard deviation of all non-blank values in (List)
@SUM(*List*)	The sum of values in (List)
@VAR(*List*)	The variance of all non-blank values in (List)
String Functions	
@CHAR(*X*)	The ASCII character for code number X
@CLEAN(*String*)	Returns non-printable ASCII codes from a string
@CODE(*String*)	The ASCII code for the first character in String
@EXACT(*String1,String2*)	1 if String1 and String2 are identical; otherwise 0
@FIND(*SubString,String, StartNumber*)	The character position of the first SubString found in String
@HEXTONUM(*X*)	The numerical value of X
@LEFT(*String,N*)	The first N characters in String
@LENGTH(*String*)	The number of characters in String
@LOWER(*String*)	The lowercase value of String
@MID(*String, StartNumber,N*)	N characters of String, beginning with the StartNumber character position
@N(*Block*)	The numeric value of the upper left cell in Block (0 if it's a label)
@NUMTOHEX(*X*)	The hexidecimal value of X
@PROPER(*String*)	The text in String with the first letter in each word capitalized
@REPEAT(*String,N*)	String, repeated N times

Table 11.1: Functions Listed by Category, Continued

Function	Returns
@REPLACE(*String, StartNum,N,NewString*)	Removes N characters from String, beginning with StartNum, then inserts NewString in its place
@RIGHT(*String,N*)	The last N characters in String
@S(*Block*)	The string value of the upper left cell in Block (0 if it's a value entry)
@STRING(*X,N*)	Numeric value of X as a string, with N decimal places
@TRIM(*String*)	String without leading, trailing, or consecutive spaces
@UPPER(*String*)	String in upper case
@VALUE(*String*)	Numeric value of String
Miscellaneous Functions	
@@(*Cell Address*)	The contents of the cell specified by Cell Address
@CELL(*Attribute,Block*)	The requested attribute of Block
@CELLINDEX(*Attribute, Block,Column,Row*)	The requested attribute of the cell in the offset position of Block
@CELLPOINTER(*Attribute*)	The requested attribute of the current cell
@CHOOSE(*Number,List*)	The value in List in the position of Number
@COLS(*Block*)	The number of columns in Block
@CURVALUE(*GeneralAction, SpecificAction*)	The current value of the given menu command
@ERR	The value ERR (error)
@HLOOKUP(*X,Block,Row*)	The contents of the cell Row number of rows beneath X in Block
@INDEX(*Block,Column,Row*)	The contents of the cell located at the specified column and row in Block
@MEMAVAIL	The amount of memory currently available
@MEMEMSAVAIL	The amount of external memory currently available
@NA	The value of NA (not available)
@ROWS(*Block*)	The number of rows in Block
@VLOOKUP(*X,Block,Column*)	The contents of the cell Column number of columns to the right of X in Block

Table 11.1: Functions Listed by Category, Continued

Function	Returns
Logical Functions	
@FALSE	The logical value 0
@FILEEXISTS(*FileName*)	1 if the given file name exists, otherwise 0
@IF(*Cond,X,Y*)	X if Cond is true, Y if Cond is false
@ISERR(*X*)	1 if X is ERR, otherwise 0
@ISNA(*X*)	1 if X is NA, otherwise 0
@ISNUMBER(*X*)	1 if X is a number, otherwise 0
@ISSTRING(*X*)	1 if X is a string, otherwise 0
@TRUE	The logical value 1
Financial Functions	
@CTERM(*Int,Fv,Pv*)	The number of compounding periods
@DDB(*Cost,Salvage,Life, Period*)	Double-declining depreciation allowance
@FV(*Pmt,Int,Term*)	The future value of an annuity
@IRR(*Guess,Block*)	The internal rate of return
@NPV(*Int,Block*)	The present value of future cash flow
@PMT(*Prin,Int,Term*)	The payment amount for a loan
@PV(*Pmt,Int,Term*)	The present value of an annuity
@RATE(*Fv,Pv,Term*)	The periodic interest rate
@SLN(*Cost,Salvage,Life*)	Straight-line depreciation allowance
@SYD(*Cost,Salvage,Life, Period*)	Sum-of-the-years'-digits' depreciation allowance of an asset
@TERM(*Pmt,Int,Fv*)	The number of payment periods of an investment
Date & Time Functions	
@DATE(*Yr,Mo,Day*)	A date serial number
@DATEVALUE(*DateString*)	A date serial number
@DAY(*DateNumber*)	The day of the month (1-31)
@HOUR(*TimeNumber*)	The hour of the day (1-23)
@MINUTE(*TimeNumber*)	The minute of the hour (1-59)
@MONTH(*DateNumber*)	A month number (1-12)
@NOW	The current date/time serial number
@SECOND(*TimeNumber*)	A second number (1-59)
@TIME(*Hr,Min,Sec*)	A time serial number
@TIMEVALUE(*TimeString*)	A time serial number
@TODAY	The current date
@YEAR(*DateNumber*)	A year number (0-199)

Table 11.1: Functions Listed by Category, Continued

Function	Returns
Database Aggregation Functions	
@DAVG(*Block,Column, Criteria*)	Average values in Column of Block that meet Criteria
@DCOUNT(*Block,Column, Criteria*)	Number of values in Column of Block that meet Criteria
@DMAX(*Block,Column, Criteria*)	Maximum value in Column of Block that meet Criteria
@DMIN(*Block,Column, Criteria*)	Minimum value in Column of Block that meet Criteria
@DSTD(*Block,Column, Criteria*)	Standard deviation of values in Column of Block that meet Criteria
@DSUM(*Block,Column, Criteria*)	Sum of values in Column of Block that meet Criteria
@DVAR(*Block,Column, Criteria*)	Variance of values in Column of Block that meet Criteria

C H A P T E R

12

Using Macros

Quattro's macro facility is a valuable accessory to the program. It is simple enough to be of use to the least experienced of users, yet its extensive vocabulary of commands offers advanced users all the tools they need to create complex macros.

A *macro* is a recorded sequence of keystrokes and/or commands that can be invoked with a single command. In Quattro, you can use macros to customize the program to suit your requirements. You can create simple macros to automate routine tasks, such as advancing the cell selector down a column as you enter values. You can also create more complex macros to build your own application—for example, a complete expense tracking system.

This chapter describes how to

- record macros using Quattro's Record mode.
- execute macros using the *Alt* key, the MACRO key, or the Macro menu
- edit existing macros
- debug macros using Quattro's extensive Debug facility
- delete macros
- enter macros in the spreadsheet without recording them
- use macro commands within macros

For detailed descriptions of each of the macro commands, see Chapter 3 of the *Quattro Reference Guide*.

What Is a Macro?

A macro is a sequence of keystrokes and/or commands that can be executed automatically. When you replay a macro, Quattro performs the actions recorded in the macro. Macros are stored with the spreadsheet in which they are created, so you can have a different set of macros for each spreadsheet you use.

Quattro macros can utilize any key on the keyboard and any command on the menus. In addition, they can include *macro commands*: special commands that perform functions that menu commands can't, such as prompting the user for input before continuing the macro. Macro commands also bring into play several programming functions, such as looping, branching, and subroutines.

Because you create your own macros, their level of complexity (and effectiveness) is up to you. If you're new to macros, you might want to begin by simply assigning the menu commands you use most often to macros, thereby reducing your keystrokes. You can also use macros to enter frequently-used labels.

As you become more familiar with macros, you can automate complex command sequences, such as printing a standard report. If you're a more sophisticated user, you can build actual spreadsheet applications, which can then be used by others with little or no knowledge of Quattro.

The Basics

The most efficient way to create a macro is with Quattro's *Record mode*. To enter Record mode, press *Alt-F8*. Quattro prompts you for a name to give the macro and the block to store it in. It then begins recording each step you take until you exit Record mode by pressing *Alt-F8* again. Quattro stores the actions you recorded in the specified block of the spreadsheet and gives it the specified name.

You can also create macros in the more traditional way—by entering keystrokes as a label in a cell, then naming the cell. Yet you will discover that Quattro's record facility is not only faster and easier, but also safer. The possibility for error is nearly eliminated.

Once you've created a macro, you can execute it by pressing the MACRO key *(F8)* and selecting the macro's name from a displayed list, or by selecting **E**xecute from the Macro menu and pointing to or typing the

address of the first cell in the macro's block. The actions stored in the macro are performed immediately.

Quattro also supports *instant macros*, macros you can execute directly with the *Alt* key. To make a macro an instant macro, just give it an alphabetic name [any letter from a to z, preceded by a backslash (\)]. To execute the macro, hold down the *Alt* key and press the associated letter.

In Quattro, you can execute macros you created in Lotus 1-2-3 and you can execute macros you recorded in Quattro with Lotus 1-2-3.

You can also use commands on the Macro menu to delete and name macros. To display this menu (Figure 12.1), select **M**acro from the main menu (*/M*). Also included on this menu are commands used to load and run Quattro add-ins. These commands and their functions are described in the following chapter, "Using Add-Ins," on page 385).

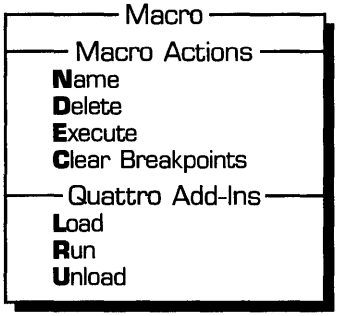


Figure 12.1: The Macro Menu

Name assigns a name to a cell block containing a macro. That name can then be used to invoke the macro.

Delete removes an existing macro name from the list of block names.

Execute invokes a specified macro.

Clear Breakpoints removes any breakpoints set in macros earlier.

Load, Run, and Unload deal with Quattro add-ins and are covered in Chapter 13.

Locating Your Macros

Quattro stores macros in cells in the current spreadsheet. Although they can be located anywhere in the spreadsheet, proper positioning is

important. It would be easiest to place them in the bottom right corner of the spreadsheet, but this wastes memory space. Therefore, they should be near your spreadsheet data, but not in a place that would interfere with data operations.

Figure 12.2 shows a spreadsheet with data and four sets of macros.

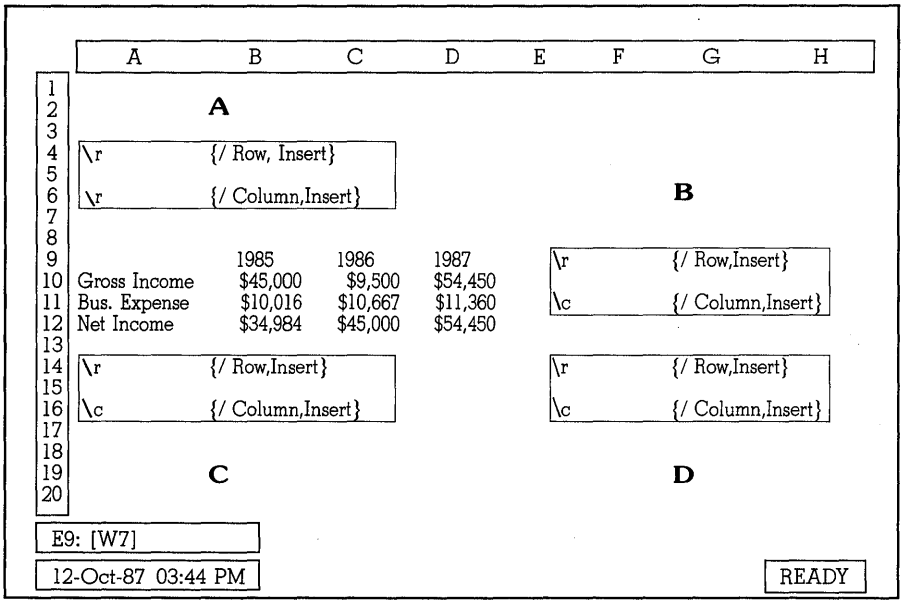


Figure 12.2: Macros Stored in a Spreadsheet

Although each of these locations has its pros and cons, the B position (to the right of the data) is not recommended. If you deleted, inserted, or sorted rows with macros in this position, your macros would be ruined. Macros in positions A and C (above and below spreadsheet data) could be damaged if you deleted columns, although this is a far less frequent action. Position D (below and to the right of the spreadsheet) is probably the best location, since it is not affected when you delete rows or columns of your data.

You should also leave space on either side of the macros. You can use one column for labels that identify the macros (and cells used for temporary storage) by name. In the other column, you can add comments that explain steps in the macros. If you place the names in their own column, it will be much easier to locate macros. The macro descriptions will help in reading and debugging macros. Figure 12.3 shows a set of macros with this layout.

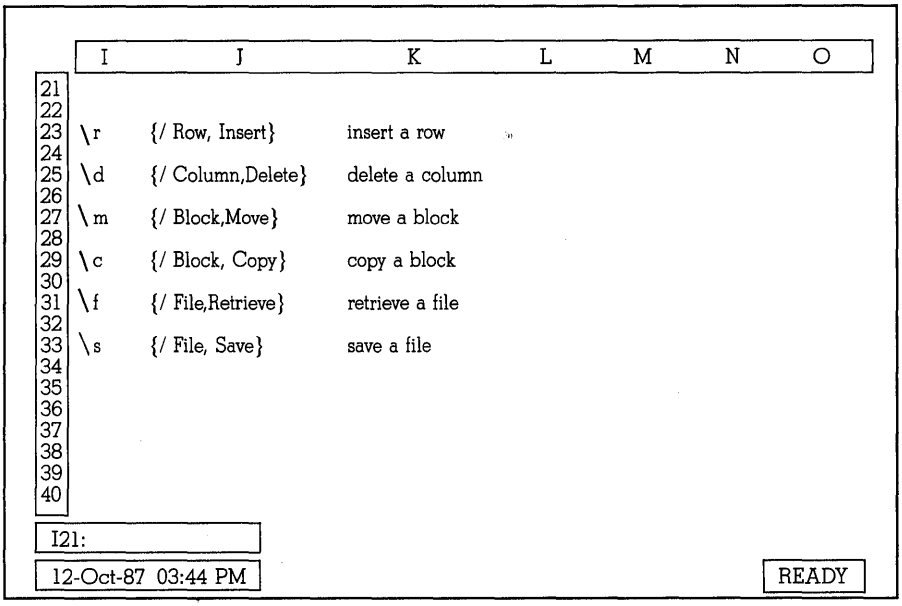


Figure 12.3: A Set of Macros with Descriptions

When Quattro executes a macro, it begins with the first cell in the macro block. It continues down through the column, interpreting everything it encounters as part of the same macro, until it meets up with a blank cell, a cell with a value, the {QUIT} macro command, or an invalid macro entry. At that point, it stops reading cells and returns control to the keyboard. For this reason, it's imperative that you leave a blank cell (or include the {QUIT} command) after each macro in your spreadsheet.

Recording a Macro

Quattro has greatly simplified the procedure for creating spreadsheet macros. Instead of requiring you to type the keystrokes needed to perform an action as a label in a cell, it lets you *record* actions *as you perform them.*

For example, in many spreadsheet programs, to create a macro that changes a cell's display format, you would have to step through the appropriate menu commands and prompts and write down each keystroke you make to perform the action. Then you would enter those keystrokes as a label.

In Quattro, you can enter macro Record mode, which records actions as you perform them. Record mode also allows you to use Quattro macros with different menu trees, because it's the *commands* that are recorded, not the keystrokes that initiated them.

Note: When recording a macro, be sure to select menu commands by pressing the first letter rather than using the arrow keys and *Enter*. This will create more readable macro arguments. For example, if you use the arrow keys to select the **B**lock **L**abel **A**lign **C**enter command, the macro appears as `{/ Block,Align}{down}{down}~`. If you use first-letter keys, you get `{/ Block,Align}c~`. Also, when including a specific cell block with a command, be sure to type in the cell range rather than pointing it out.

To record a macro:

1. First, plan ahead for what you want the macro to do. Take notes if necessary.
2. Hold down the *Alt* key and press *F8*. Quattro prompts you for a macro name.
3. Enter a name for the macro. To make it an instant macro, give it an alphabetic name (a slash followed by any single letter). (See "Naming a Macro" below for more details.) Quattro prompts you for the block to store the macro in.
4. Press *Enter* to store the macro in the current cell (and possibly cells below it), or specify a different starting location. Quattro enters Record mode, and the RECORD indicator flashes on the status line.
5. Carry out whatever actions you want recorded in the macro. You can use any key on the keyboard. Quattro displays menus, prompts, and messages and moves the cell selector as usual. The only difference is that each key you enter is recorded in the macro. You can enter as many command sequences as you like in one cell. If necessary, Quattro continues the macro into the cell(s) below. (But if it encounters a non-block cell, recording stops.)
6. When you've completed the sequence you want stored in the macro, press *Alt-F8* again. Quattro exits Record mode and returns to the spreadsheet.

The procedure you record can be as long as you like. When the current cell is filled, Quattro continues writing the macro in the cell(s) below. If the capture block (where the macro is stored) is a single cell, Quattro fills as many cells below as necessary, then aborts the recording and displays an error message. To limit macro storage to a specific area of your spreadsheet, specify a block of at least two rows. Then only these cells will be filled.

Note: If you prefer to record actual keystrokes instead of menu-equivalent commands, you can set the **M**acro Recording default (*/DSCM*) to **K**eystroke (see page 152). Quattro will then record the actual keys you press. This is not recommended, however, since you won't be able to use macros recorded this way with altered menus or other menu trees.

Note: You cannot run Transcript while recording a macro.

Naming a Macro

The name you give a macro has special significance. Since you will use this name to invoke the macro, it should help identify the actions taken by the macro. For example, a macro that changes the display format of the current cell to percent could be called "PERCENT".

Macro names are the same as block names and are listed together when you press *F3*. For this reason, you must not give a macro the same name as a named block. When naming macros, follow the same guidelines as those for block names (see page 94).

Instant Macros

If the macro you're creating is one you will use often, you can give it a special name that will make it easier to execute: any letter of the alphabet (a-z) preceded by a backslash (\). You will then be able to initiate the macro directly from the keyboard simply by pressing *Alt* and that letter (in either upper or lowercase). Such macros are called *instant macros* and they differ from standard macros only in the way they are invoked. To invoke a standard macro, you must press the MACRO key (*F8*) or select Execute from the Macro menu (*/ME*) and indicate the macro to execute.

Because there can be only 26 instant macros, it's a good idea to reserve these for the macros you'll use most often. It also helps to name macros according to their functions. For example, if you have a macro that erases the current cell, you might name it *E*. If you have a macro that blanks out the data input area, you might want to call it BLANK_INPUT.

Auto-Execute Macros

If you assign a macro the auto-execute name specified in the Default Startup menu (initially \0), it will be executed automatically every time

you retrieve the spreadsheet. This is usually used to invoke a special application used with all spreadsheets.

There can be only one auto-execute macro per spreadsheet. You can specify a different macro to be executed automatically, however, by indicating its name with the **M**acro command on the Default Startup menu (see page 146).

If you no longer want a macro to be executed automatically, change its name or delete it with the Macro Delete command (see page 364), or change the Startup Macro name on the Startup menu.

Executing a Macro

There are two ways to execute a standard (non-instant) macro:

- Press the MACRO key (*F8*). Quattro displays a list of named blocks (both for macros and other blocks) and asks which macro block you want to execute. Select a macro name from the list or type it in.
- Select Execute from the Macro menu (*/ME*). Quattro prompts you for the macro to execute. Use the arrow keys to point to the first cell in the macro's block or type in the macro's name or address.

The MACRO indicator is displayed on the screen, and the macro is executed immediately.

Instant macros (named *\a* through \z) can be invoked directly from the keyboard by pressing *Alt* and the letter in the macro's name.

You can also execute a macro as you load Quattro by specifying its name after Q and a file name on the DOS command line. For example,

```
Q EXPENSE \F
```

loads Quattro, retrieves the spreadsheet named EXPENSE, and executes the macro named \F.

If you try to execute a macro that has not yet been named or that contains an error, Quattro beeps and displays an error message. To correct a macro that contains an error, you can use the debugging facility (see page 368).

To stop a macro in mid-execution, press *Ctrl-Break*. Then, press *Esc* to return to Ready mode.

Note: If the *Ctrl-Break* key has been disabled with the {BREAKOFF} macro command, you will not be able to interrupt the macro with *Ctrl-Break*.

Reading Macro Instructions

As you record a macro, Quattro writes macro instructions into cells, beginning with the location you specify. Yet when you look at the cell entry, you can see that Quattro has not recorded your actions keystroke by keystroke. Instead, it has translated keystrokes that invoked menu selections into special commands, called *menu-equivalent* commands.

Note: If you've set the **M**acro Recording command to **K**eystrokes (*/DSMK*), Quattro records actual keystrokes rather than translating into menu-equivalent commands.

Menu-equivalent commands have two purposes:

- They make reading the macro much easier. For example, a macro to change the display format of the current cell to currency with zero precision would be displayed as
- {/ BLOCK,FORMAT}c0~b100~
- rather than
- /BDC0~b100~
- They make it possible to use the macros with different menu trees. Because it's the commands themselves that are recorded, not the actual keystrokes, if you change the menus with the Quattro Menu Builder, the macros will not be affected.

The menu-equivalent commands are designed to best describe the action taken, rather than simply list the keystrokes used to invoke them. They each consist of two words surrounded by curly braces and preceded by a slash and space, for example,

{\ File, Retrieve}

or

{\ Print, CreatePageBreak}

The first word relays the general action taken by the command. The second word (in combination with the first) pinpoints the action of the command.

Menu-equivalent commands are described in detail in Chapter 4 of the *Quattro Reference Guide*.

Editing a Macro

If a macro contains an error, or if you want to alter it, you can change it by editing it. If it's a lengthy macro and you're not sure where the problem is, you can debug it to find the error (see "Debugging a Macro" on page 368).

To edit a macro, move the selector to the cell you want to change, and press the EDIT key (*F2*). Quattro enters Edit mode, which is the same mode used to edit any other kind of spreadsheet entry. Make the changes you want, then press *Enter*. Be sure to leave a blank cell at the end of the macro.

When you record a macro, Quattro translates special keys you press, such as arrow keys and *Enter* into special *key-equivalent* commands, and translates menu commands you select as *menu-equivalent* commands. This increases both readability and flexibility (see "Reading Macro Instructions" on page 363).

When you edit a macro, you need to use the same equivalent commands when you make changes. For example, if you want to move the selector one cell to the right, you need to enter {RIGHT}. If you want to use the **T**itles **H**orizontal command, you need to enter {/ Titles,Horizontal}. Table 12.1 on page 367 lists each of the key-equivalent commands required when writing or editing macros. "Menu-Equivalent Commands" in Chapter 4 of the *Quattro Reference Guide* lists each of the menu-equivalent commands required to enter commands from the menus.

Note: You can use the MACRO COMMANDS key (*Shift-F3*) to enter menu-equivalent commands automatically (see page 368).

See "Entering Macros as Labels" on page 365 for information on how to write macro instructions.

Deleting a Macro

When you no longer use a macro, you can conserve spreadsheet space and shorten the macro name list by deleting it.

The **M**acro **D**elete command (*/MD*) removes the name given to a macro, so it will no longer be displayed in the macro name list. This is the same as the **B**lock **A**dvanced **D**elete command (*/BAD*). When you select either of these commands, Quattro displays a list of existing block and/or macro names. Select one from the list or type in the name.

This command deletes the block name only. To delete the actual macro cells, select Erase from the Block menu */BE*, and specify the block containing the macro.

Advanced Macro Techniques

With the information given up to here, you should be able to record, execute, edit, and delete simple macros. The rest of this chapter deals with macro techniques appropriate for more advanced users. It tells you how to:

- enter macros directly into the spreadsheet as labels
- debug macros
- use macro commands
- use the MACRO COMMANDS key (*Shift-F3*) to enter macro commands and menu-equivalent commands.

Entering Macros as Labels

If you're an advanced macro user, you may prefer to write macros directly into cells as labels, instead of using Record mode. Because this method requires a great amount of precision (one incorrect keystroke could invalidate your macro), it is not recommended for novice users.

Warning: If you create macro labels that list keystrokes used to invoke menus, they may not work with alternate menu trees, should you change your menus with the Quattro Menu Builder.

To enter a macro as a label:

1. Plan your macro well. If the macro involves menu commands, step through the commands first and write down each keystroke involved. If it involves special macro commands, make sure you know exactly what you're going to enter as the command arguments. For complex command macros, you may want to sketch out a flow chart first.
2. Move the cell selector to the first cell in the block in which you want to store the macro.
3. Press the apostrophe key (') to begin the label. This ensures that whatever follows will be regarded as a label. (Value entries cannot be executed as macros.)
4. Enter the keystrokes required to execute the command(s) you want. You can use any of the keys on the keyboard, although certain keys must be

indicated with special key-equivalent commands (see Table 12.1). If you use more than one cell, be sure they proceed directly downward with no blank cells between them. Each of the cells must contain commands entered as a label. If you want to be able to use the macros you enter as labels with other menu trees, use menu-equivalent commands instead of keystroke commands (see "Entering Menu-Equivalent Commands" on page 368).

5. When you're finished with the macro or want to move to the next cell to enter more of the macro, press *Enter*. Be sure to leave a blank cell at the end of the macro, or end it with {QUIT} or {RETURN}.
6. When the macro is complete, you can assign a name to the macro block. Select **Name** from the Macro menu (*/MN*), enter the name, and then specify the first cell of the block containing the macro.

If your macro invokes more than one command, it's a good idea to use separate cells for each command. That way, if there is a problem, it's easier to pinpoint.

Figure 12.4 shows a macro written into three cells. Descriptions of each step are included in cells to the right. The name of the macro is shown to the left. Macros set up this way are much easier to read and debug.

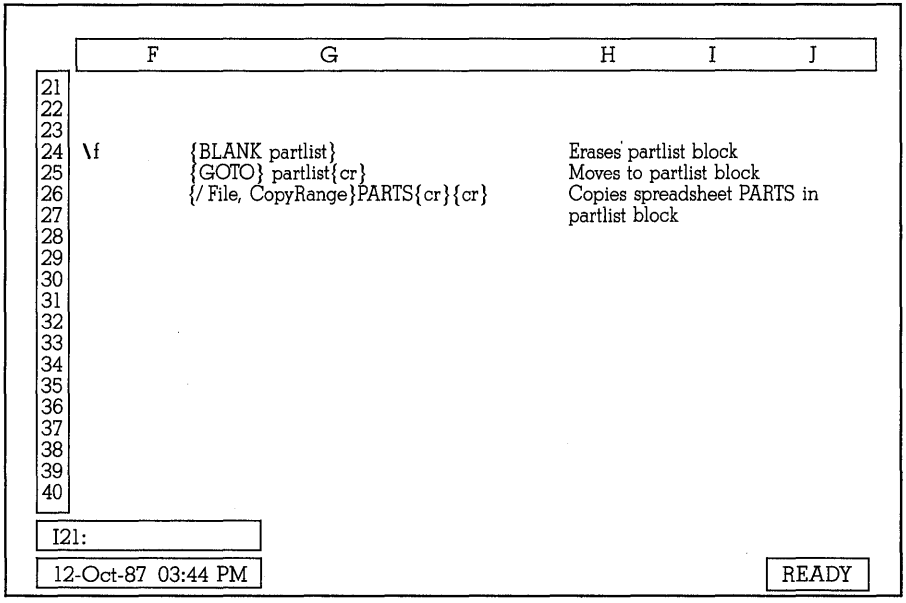


Figure 12.4: A Macro Written into Three Cells

To enter the keys shown in Table 12.1 in a macro, you must use the special key-equivalent commands shown. You can enter the commands in either upper or lowercase.

Table 12.1: Commands for Entering Special Keys in Macros)

Special Key	Key-Equivalent Command
Enter	~ (tilde) or {CR}
Backspace	{BS} or {BACKSPACE}
Esc	{ESC} or {ESCAPE}
Del	{DEL} or {DELETE}
Ins	{INS} or {INSERT}
Home	{HOME}
End	{END}
PgUp	{PGUP}
PgDn	{PGDN}
Ctrl-Right arrow or *Tab*	{BIGRIGHT}
Ctrl-Left arrow or *Shift-Tab*	{BIGLEFT}
Up arrow	{UP} or {U}
Down arrow	{DOWN} or {D}
Right arrow	{RIGHT} or {R}
Left arrow	{LEFT} or {L}
Ctrl-Backspace	{CLEAR}
Ctrl-D	{DATE}
F2 (EDIT)	{EDIT}
F3 (NAMES)	{NAMES}
Alt-F3 (FUNCTIONS)	{FUNCTIONS}
Shift-F3 (MACROS)	{MACROS}
F4 (ABSOLUTE)	{ABS}
F5(GOTO)	{GOTO}
F6 (WINDOW)	{WINDOW}
F7 (QUERY)	(QUERY}
Alt-F7 (TABLE)	{TABLE}
Shift-F7 (ADD-IN)	{ADDIN}
F9 (CALC)	{CALC}
F10 (GRAPH)	{GRAPH}

You can repeat most of the keys listed in Table 12.1 by specifying a repeat number with the code. For example, to move the cell selector down 5 cells from its current position, use the command: {DOWN 5} or {DOWN A4} if cell A4 contains the value 5.

For descriptions of each of the keys listed here, see Appendix A of the *Quattro Reference Guide.*

Entering Menu-Equivalent Commands

The easiest and most accurate way to enter menu-equivalent commands is with the MACRO COMMAND key (*Shift-F3*). When you press this key, a menu of macro command categories is displayed (Figure 12.5).

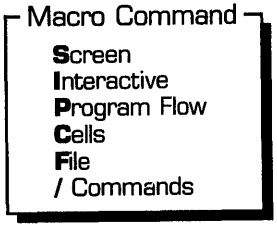


Figure 12.5: The Macro Commands Key Menu

The first five items on the menu deal with special macro commands that are described later in this chapter. The last item, / Commands, lets you enter menu-equivalent commands. When you select it, Quattro displays a menu of General Action categories, giving the general area of the command. Use the arrow keys to highlight the area you want (scrolling the list, if necessary), and press *Enter*. A menu of Specific Actions for that category is then displayed. Select the specific action you want to take. The menu-equivalent command created by the General and Specific Actions is automatically written into the spreadsheet's input line.

To find the menu-equivalent command corresponding to the menu command you want to use, see Table 4.2 in the *Quattro Reference Guide*.

Debugging a Macro

Quattro contains a powerful facility for debugging macros. *Debugging* is the process of isolating the specific command(s) or logical error(s) that are causing a problem in a macro.

With the Quattro debugger, you can:

- execute macros in slow motion (step by step), pausing as long as you want between steps
- set breakpoints that "freeze" a macro when it reaches a given cell or satisfies a given condition
- execute a macro at full speed until it reaches a breakpoint, then either continue in slow motion or at full speed until the next breakpoint

■ view, or *trace*, changes to a specific cell as a macro executes

Isolating a problem in a long macro is not simple at regular speed. For this reason, Quattro has included a special macro mode called *Single-Step*. In Single-Step mode, Quattro executes a macro step by step, pausing for a signal from the keyboard before going on to the next step. This way, you can figure out exactly what is happening in each phase of the macro.

To execute a macro in Single-Step mode, press the DEBUG key, *Shift-F8*, then invoke the macro you want to debug. A *Debug Window* appears in the bottom half of the screen (see Figure 12.6). The first cell of the macro appears in the middle of the Debug Window, and the DEBUG indicator is shown at the bottom of the screen.

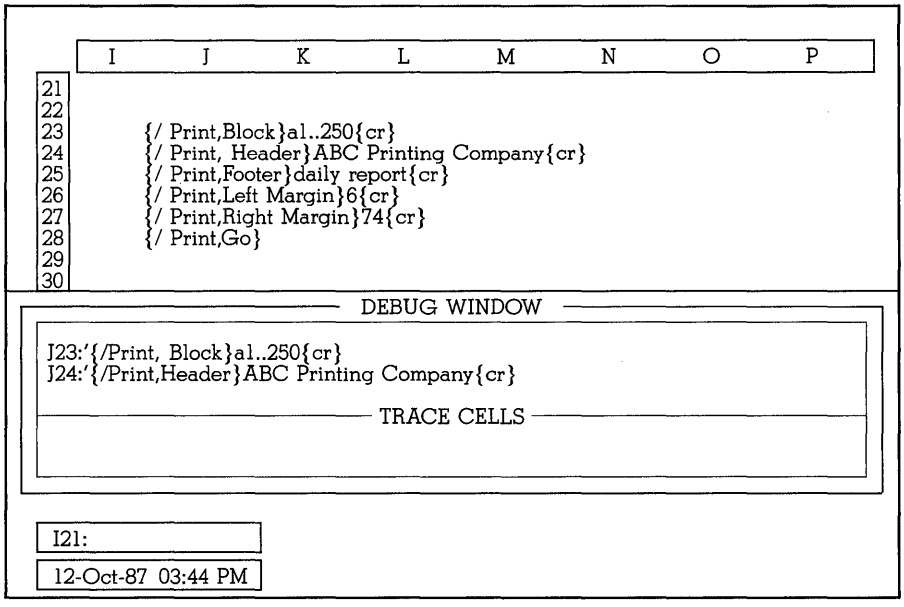


Figure 12.6: The Macro Debug Window

The Debug Window is divided into two sections:

- **The Top (Macro) Section** contains three rows. The middle row displays the macro cell currently executing. The top row displays the previous macro cell, and the third row displays the next macro cell.
- **The Bottom (Trace) Section** displays the contents of "trace cells" and is used to view the effects of a macro on specific cells.

To execute the first step of the macro (the first keystroke or command), press the space bar. Press the space bar repeatedly to execute each step of the macro until you pinpoint the error. To execute the rest of the actions in the macro at full speed, press *Enter*.

To display the special Macro Debug menu (Figure 12.7), press the slash key (/) from within the Debug Window.

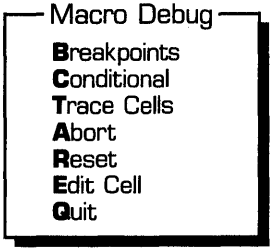


Figure 12.7: The Macro Debug Menu

Breakpoints lets you specify up to four cells or blocks at which macro execution should be suspended.

Conditional lets you specify up to four cells that contain logical expressions, such as *+A3=10*. As soon as the expression returns a true value, the current macro is suspended.

Trace Cells lets you specify up to four cells whose contents you want monitored while a macro is being debugged.

Abort stops execution of the macro and removes the Debug Window from the screen.

Reset removes any breakpoints you've set with the Breakpoints, Conditional, and Trace Cells commands.

Edit a Cell lets you make changes to the macro you're debugging without leaving Debug mode.

Quit exits Debug mode and continues to execute the macro until completion.

Suspending Macro Execution

If you know that most of a macro is correct, you can use *breakpoints* to execute a macro at full speed up to a certain point, then begin Single-Step mode. There are two kinds of breakpoints you can set: *standard breakpoints* and *conditional breakpoints*. Standard breakspoints suspend execution when

the breakpoint cell is reached. Conditional breakpoints suspend execution when the condition stored in the conditional breakpoint cell is reached.

You can set up to four standard breakpoints and four conditional breakpoints per spreadsheet.

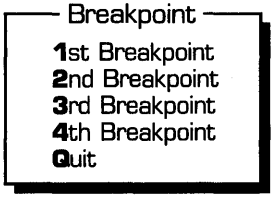
Setting Standard Breakpoints

When you debug a macro containing a standard breakpoint, Quattro executes the macro at full speed until it reaches one of the breakpoints, then suspends execution. To resume a suspended macro, press the space bar to continue in Single-Step mode, or press *Enter* to continue at full speed until the next breakpoint or until the end of the macro.

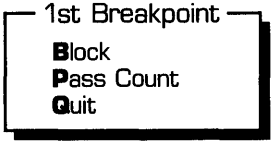
Breakpoints provide a means to quickly run through the parts of a macro that work correctly, but pause at the cells that contain problematic macro instructions.

You can set up to four breakpoints per spreadsheet. To set a breakpoint:

1. Press the slash key (/) from within the Debug Window.
2. Press *B* to select **B**reakpoint. Quattro displays a menu of breakpoints:



3. Select the breakpoint you want to set. A menu for that breakpoint is displayed:



4. Select **B**lock and specify the cell or block of cells at which you want the macro to stop. If you specify a block of cells, Quattro will execute the entire block in Single-Step mode before continuing at full speed.
5. There are situations in which a problem appears only after many repetitions of the same macro statements in a looping macro. If this is the case, you can set a pass count to indicate how many times to pass

through the breakpoint before stopping. Select Pass Count and specify the number of passes (up to 240). The default, 0, tells Quattro to stop every time it passes through the breakpoint.

6. Select **Q**uit to return to the Debug Window.

When you execute the macro, Quattro performs each step at full speed until the specified cell is reached. It then suspends execution until you press the space bar or *Enter*.

The example macro in Figure 12.8 includes a loop that continuously increments a single cell block called "counter".

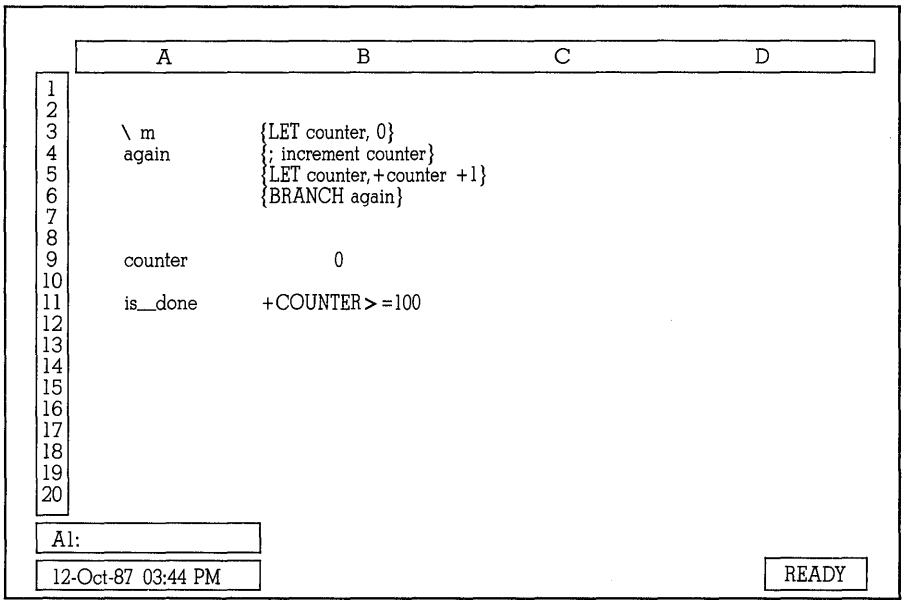


Figure 12.8: An Example Looping Macro

If you specify B5 as the first breakpoint, and leave the Pass Count at 0, the macro will stop at the {LET} macro command each time it goes through the loop. When you press *Enter*, Quattro executes the macro and increments the counter cell by one. In the top part of the Debug Window, the selector will highlight the {LET} macro command, indicating that this macro command was just executed.

If you specified a pass count of 5 for the first breakpoint in this example, every time you press *Enter*, five loops will occur. You will see the counter increment from 0 to 5, to 10, and so on.

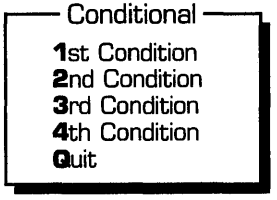
To clear all set breakpoints (including conditional breakpoints and trace cells) select **R**eset from the Debug menu. You can also clear breakpoints by selecting **C**lear Breakpoints from the Macro menu (*/MC*).

Setting Conditional Breakpoints

While standard breakpoints stop a macro when it reaches a given cell, conditional breakpoints stop the macro when a condition becomes true. In the example in Figure 12.8, cell B11 contains a logical formula. (The cell containing the formula has been formatted such that the formula, rather than the value calculated, is displayed.) B11 is false (has a value of 0) until 100 or more loops have occurred, which causes the value to become true (a value of 1). If this cell is specified as a conditional cell, the macro will suspend execution when the counter reaches 100.

You can set up to four conditional breakpoints per spreadsheet. To set a conditional breakpoint:

1. Select **C**onditional from the Debug menu. Quattro displays a menu of conditional breakpoints:



2. Select the conditional breakpoint you want to set. Quattro prompts you for a cell.
3. Specify the cell containing the condition.
4. To set further conditional breakpoints, repeat the steps above.
5. Select Quit to return to the Debug Window.

Conditional breakpoints can be extremely valuable. Suppose your macro is writing information into the range I100..M250 , which should contain only blank cells. Place the formula @COUNT(I100..M250)<>0 into a cell, and specify this cell as a conditional breakpoint. The @COUNT function will give a value greater than zero as soon as a label or value is written to any cell in this block, causing the formula to become true, and immediately pausing the macro.

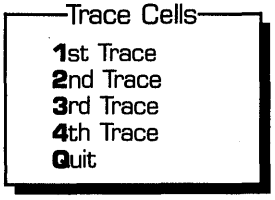
Setting Trace Cells

Macros often affect the contents of one or more specific cells. By monitoring the contents of these cells during debugging, you can see more clearly what the macro is doing.

Quattro lets you specify up to four *trace cells*, whose contents are shown during debugging in the Trace section of the Debug Window. The window is updated instantly as the contents of the trace cells change.

To set trace cells:

1. Press / while the Debug Window is displayed. The Debug menu appears.
2. Press *T* to select Trace Cells from the menu. The Trace menu is displayed:



3. Select the trace cell you want to set. Quattro prompts you for a cell address.
4. Specify the cell you want to trace.
5. To specify further trace cells, repeat the steps above.
6. Select Quit to return to the Debug Window.

In the example shown in Figure 12.8, if you specified the counter cell (B9) as a trace cell, you could watch the counter incremented during each loop.

Resetting Breakpoints and Trace Cells

To remove all breakpoints (standard and conditional) and trace cells set for the spreadsheet, select Reset from the Debug menu (press */R* while in the Debug Window).

You can also reset breakpoints and trace cells from within the spreadsheet (instead of the Debug Window). Just select Clear Breakpoints from the Macro menu (*/MC*).

Editing a Cell in Debug Mode

Once you've pinpointed the problem with a macro, you can use the Edit a Cell command to make corrections to the macro.

When you select Edit a Cell from the Debug menu (*/E*), Quattro prompts you for the address of the cell you want to edit. Type in the address (you can't point in Debug mode). Quattro then displays the contents of the cell on the input line. You can make changes to the cell just as you would in regular Edit mode. When you press *Enter*, Quattro enters the changes and returns you to the Debug Window.

For details on editing macros, see "Editing a Macro" on page 364.

Exiting Debug Mode

When a macro is finished executing in Debug mode, the Debug Window disappears. To exit Debug mode, press the DEBUG key (*Shift-F8*) again.

To abort a macro being debugged before it's finished, press / and select **A**bort from the Debug menu. The Debug Window disappears. You can debug another macro, or press *Shift-F8* to exit Debug mode.

Using Macro Commands

Quattro's macro facility includes an extensive set of special commands for use within macros. These commands perform unique functions that can't always be done from the keyboard, such as sounding your computer's beep, or pausing the macro and prompting for user input. The command set also includes conditional and branching commands, making it a true "programming" language. (Chapter 3 of the *Quattro Reference Guide* describes each of the macro commands.)

Macro commands can be used in combination with keyboard commands to create advanced macros. For example, the macro shown in Figure 12.9 uses the {GETNUMBER} command to prompt the user for a date and stores each response in a named block. It then uses menu commands to set the column width to 10 and change the display format to Date 1.

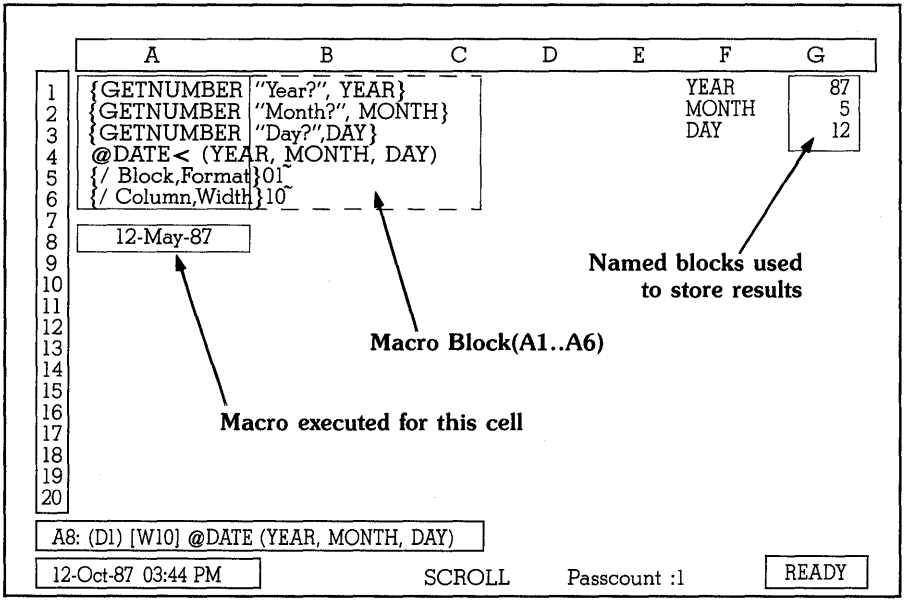


Figure 12.9: A Macro Example

Macro commands are somewhat similar to Quattro's @functions in that they have specific grammatical rules, or *syntax*. The syntax for macros is fairly straightforward:

{COMMANDNAME Argument1,Argument2,Argument3...}

COMMANDNAME is the exact name of the command (as shown in this chapter). The *arguments* are values you enter to give further instructions with the command. Not all macro commands require arguments. When they do, a specific type of information is required. (See "Arguments in Macro Commands" on page 377.)

Examples:

{DISPATCH D35}
{BEEP 3}
{GETNUMBER "How old are you?",AGE}
{CONTENTS E15,F15,15}

The syntax rules for Quattro macros are as follows:

- The command must begin and end with curly braces { }.

- There must be a space between the command name and the argument(s).
- When more than one argument is used, commas must separate the arguments. [You can use a semicolon or period instead of a comma if you specify it as the international punctuation character (see page 133).]
- Arguments must be the correct type. In other words, if a string is required, the argument must be a valid character string. If a number is required, it must be a numeric value. If a cell location is called for, it must be a valid cell address.
- No spaces or other punctuation are permitted within the argument list, except within quoted strings. For example, {GETLABEL "Hello, world",A4} is allowed, but {GETLABEL Hello, world,A4} is not.
- The entire expression must be entered in a single cell.
- The command can be entered in either upper or lowercase.
- You can include more than one macro command in a cell.

Because macros are entered as labels, Quattro won't beep at you if you enter a macro command using the wrong syntax. It will beep if you try to execute an incorrect macro command, however. You can save debugging time by paying careful attention to the format of macro commands as you enter them.

Arguments in Macro Commands

Arguments in macro commands, like those used with @functions, require specific information to be supplied with the command. There are four different types of arguments:

- **Number**—requires any numeric value, entered as
  - an actual number (such as 2 or 0.45)
  - a formula resulting in a number (such as A3 * 15)
  - a reference to a cell containing a numeric value or formula (such as C10)
- **String**—requires a text string, entered either as an actual string or a reference to a cell containing a label. In many cases, you can use a formula that returns a string value.
- **Location**—requires a reference to either a single cell or a cell block. The reference can be a block name, a single cell address (A1), or a cell range (A1..A4).

- **Condition**—requires a logical expression, that is, an expression containing any cell reference, number, string, or string-valued formula that can be evaluated to be either true or false, for example, C4>500.

Unlike @functions, string values you enter in a macro do not always require quotes. However, strings *and block names* must be enclosed in double quotes if they contain a comma, or a semicolon [or period if it's specified as the argument separator with international punctuation setting (see page 133)]. For example,

{GETLABEL "Good morning; what's your name?",A10}

You must also enclose in quotes any formula you want to appear as a label and any string that is identical to a block name.

Caution: Unlike @function statements, cell references in macros *are not updated* when the cell coordinates change. If you move a cell, or insert or delete a row or column, the macro may reference the wrong location. For this reason, you should always reference block or macro *names* whenever possible. Block names are always updated automatically to reference the correct location.

The specific values required by each function are described in the command description section at the end of this chapter. Some commands accept a combination or choice of argument types. For example, {LET} stores either a label or a number in a cell, depending on the argument type. You can specifically indicate a value or label entry by including *argument suffixes* in the command. Using *:string* assures a label entry, and :value assures a value entry (if the entry is a valid number). For example,

{LET C3,3+4:value}

enters a value of 7 in C3, and

{LET C3,3+4:string}

enters 3+4 as a label in C3.

You can also use quotes around a numeric value to enter it as a label.

Entering Macro Commands in Macros

You can enter a macro command in a macro by typing it, but there's an easier and more accurate way—using the MACRO COMMANDS key (*Shift-F3*). This key displays a menu of macro command categories (Figure 12.10). (The last item, / Commands, lists menu-equivalent commands.)

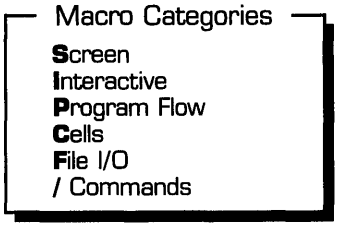


Figure 12.10: The Macro Categories List

Select the category that contains the command you want to use. (For a list of the macros in each category, see Table 12.2 on page 382.) A list of each macro within that category is displayed (see Figure 12.11 for an example.)

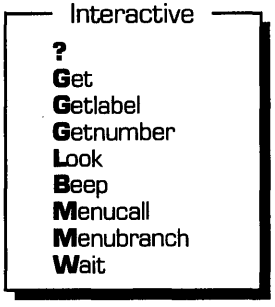


Figure 12.11: The Interactive Macro Command List

To insert one of the listed commands into the input line, select it from the list. This list disappears and the macro command is inserted at the cursor position on the input line. If there are any arguments required with the command, press the *Left arrow* key to back up and insert the arguments.

Using Subroutines

If you use many macros in your spreadsheets, you may find that you include the same command sequence in many of your macros. You can save time and memory space by storing that command sequence in a separate macro, called a *subroutine*. You can then reference the subroutine within any other macro to include the subroutine's command sequence. You do this by typing the name of the subroutine inside curly braces. For example, if the subroutine name is GORIGHT4, then {GORIGHT4} invokes the subroutine.

Figure 12.12 shows a main macro called MAIN referencing a subroutine called SUB. The {RETURN} command at the end of the subroutine returns control to the main macro. It then picks up from where it left off.

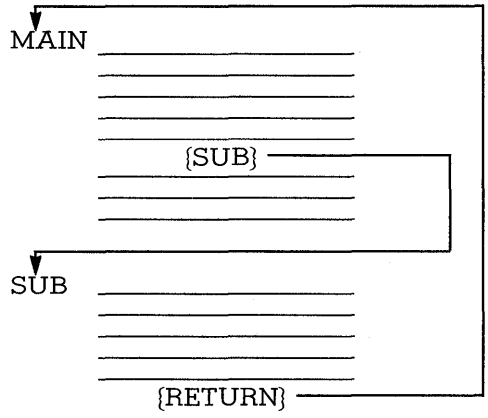


Figure 12.12: Using a Subroutine Macro

Caution: When you name your subroutines, be sure to avoid any names that duplicate macro commands. Otherwise, the macro commands will be rendered invalid. For example, if you named a subroutine READLN, then tried to read a line from a file into cell A6 ({READLN A6}), Quattro would assume that you were calling the READLN subroutine and passing it the contents of cell A6 as an argument.

When you reference a subroutine, you can "pass" the subroutine arguments to use with its commands. These arguments are stored in spreadsheet cells which are referenced by the subroutine. For example,

{SUB C10,36}

sends control to the SUB subroutine and passes two arguments along with it: C10 and 36. In order for the subroutine to know what to do with the arguments, they must be defined within the subroutine, using the {DEFINE} command. This command tells Quattro where to store the arguments and whether they should be interpreted as values or labels.

Figure 12.13 shows a main macro passing two arguments to a subroutine: C10 and 36. These arguments are immediately defined by the subroutine's {DEFINE} command as values to be stored in cells E10 and E11, respectively. The next line of the subroutine then uses these values to calculate a third value, which is stored in E12.

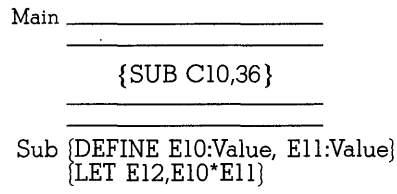


Figure 12.13: Passing Arguments to a Subroutine

To jump from one macro to another and *stay with* the second macro (effectively passing control to another macro) use the {BRANCH} command.

For more information on subroutines and branching with the {SUBROUTINE}, {DEFINE}, and {BRANCH} commands, see Chapter 3 of the *Quattro Reference Guide.*

Macro Commands by Type

Macro commands fall into five categories:

- **Screen** commands affect the screen display.
- **Interactive** commands let you create interactive macros that pause for the user to enter data from the keyboard.
- **Program Flow** commands are programming commands that let you include branching and looping in your macro.
- **Cell** commands affect the data stored in specified cells.
- **File** commands work with data within files other than your current spreadsheet file.

Table 12.2 lists the commands in each category, along with the syntax and a brief description. The next section, "Macro Command Descriptions," describes each command in detail.

Table 12.2: Macro Commands Listed by Category

Command	Description
Screen Commands	
{INDICATE *String*}	Sets the mode indicator to display *String*
{PANELOFF}	Prevents menus & prompts from being displayed
{PANELON}	Restores menus & prompts disabled by {PANELOFF}
{WINDOWSOFF}	Prevents the screen from being updated
{WINDOWSON}	Restores screen updating disabled by {WINDOWSOFF}
Interactive Commands	
{ ? }	Pauses the macro and accepts input from the keyboard until *Enter* is pressed
{BEEP *Number*}	Sounds the computer's bell
{GET *Location*}	Pauses the macro, accepts one keystroke, and stores it in *Location*
{GETLABEL *PromptString*, *Location*}	Pauses the macro, displays *PromptString*, and stores the subsequent keystrokes as a label in *Location*
{GETNUMBER *PromptString, Location*}	Pauses the macro, displays *PromptString*, and stores the subsequents keystrokes as a numeric value in *Location*
{LOOK *Location*}	Places the first keystroke typed in *Location*
{MENUBRANCH *Location*}	Passes macro control to a custom menu at *Location*
{MENUCALL *Location*}	Pauses the macro, and executes a customized menu as a subroutine
{WAIT *TimeNumber*}	Pauses the macro for the amount of time specified in *TimeNumber*

Table 12.2: Macro Commands Listed by Category, Continued

Command	Description
Program Flow Commands	
{BRANCH *Location*}	Passes execution control to another macro at *Location*
{BREAKOFF}	Disables the *Ctrl-Break* key used to abort a macro
{BREAKON}	Restores the *Ctrl-Break* key after it was disabled by {BREAKOFF}
{DEFINE *Location1: Type1,...*}	Defines the type of arguments passed to a subroutine and tells where to store them
{DISPATCH *Location*}	Branches indirectly or directly to an alternate macro branch
{FOR *CounterLoc,Start#, Stop#,Step#,StartLoc*}	Executes a subroutine the specified number of times
{FORBREAK}	Terminates execution of a {FOR} command
{IF *Condition*}	Checks to see if a condition is TRUE or FALSE before continuing execution in the same cell
{ONERROR *BranchLocation, MessageLocation*}	Continues execution at a specified location after an error is detected
{QUIT}	Terminates macro execution and returns keyboard control
{RESTART}	Terminates macro execution at the end of the current subroutine
{RETURN}	Terminates the current subroutine and returns control to main routine
{STEPOFF}	Exits Single-Step mode, executing the macro at normal pace
{STEPON}	Enter Single-Step mode, in which the macro is executed step by step, advancing when you press *F9*
{SubRoutine, ArgumentList}	Jumps to the specified subroutine, and passes any given arguments
Cell Contents Commands	
{BLANK *Location*}	Erases a cell or block of cells
{CONTENTS *Dest,Source, Width#,Format#*}	Copies the contents of one cell to another
{LET *Location, (Number | String)*}	Places a number or string in the given location
{PUT *Location,Column#, Row#, (Number | String)*}	Places a number or string in a given location offset by the specified number of columns and rows

Table 12.2: Macro Commands Listed by Category, Continued

Command	Description
{RECALC *Location, Condition,Iteration#*}	Recalculates rows of the spreadsheet a specified number of times
{RECALCCOL *Location, Condition,Iteration#*}	Recalculates columns of the spreadsheet a specified number of times
File Commands	
{CLOSE}	Closes an open file
{FILESIZE *Location*}	Calculates the number of bytes in the current file, and stores the value in *Location*
{GETPOS *Location*}	Places the position of the file pointer in *Location*
{OPEN *Filename, AccessMode*}	Opens a file for reading, writing, or modifying
{READ #*Bytes, Location*}	Reads the specified number of bytes and stores them in *Location*
{READLN *Location*}	Reads a line of characters and stores it in *Location*
{SETPOS *FilePosition*}	Sets the file pointer to the value of *FilePosition*
{WRITE *String*}	Writes a string of characters to the current file
{WRITELN *String*}	Writes a string of characters to the current file and ends it with a carriage return/line-feed
Miscellaneous Commands	
{ ; }	Lets you enter explanatory remarks in a macro
{ }	Lets you enter a blank line in a macro without stopping macro execution

C H A P T E R

13

Using Add-Ins

An *add-in* is a supplemental mini-program that you can run with Quattro. Quattro includes two such add-ins: the Menu Builder and Transcript.

- **The Menu Builder** lets you alter the Quattro menu tree—from renaming menu commands to completely reworking the user interface.
- **Transcript** records your exact keystrokes and stores them in a file. You can use Transcript to undo a mistake, restore your work after a power failure, or audit changes you make to a file. You can also create macros from this history.

You can also run any separately sold, Quattro-compatible add-in. If you're an experienced programmer, you can even write and run your own add-in.

This chapter describes both of the add-ins that come with Quattro and how to run, load, and unload add-ins in general.

Loading and Running Add-Ins

Add-Ins are loaded and run from the Macro menu (Figure 13.1), which you access by selecting **M**acro from the main menu (*/M*).

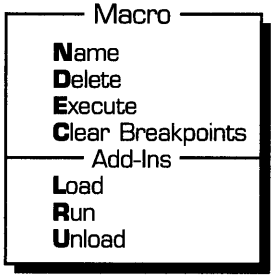


Figure 13.1: The Macro Menu

Loading Add-Ins

Before you can run an add-in, you must load it into system memory. You can have as many as eight add-ins loaded at one time.

To load a program add-in:

1. Press */M* to select **M**acro from the main menu.
2. Press *L* to select **L**oad. Quattro prompts you for the name of the add-in to load and displays a list of add-ins in your default resource directory.
3. Select an add-in. If you want to load an add-in in a different directory, type in the name and directory and press *Enter*.

The add-in is loaded into system memory. Repeat the procedure for each add-in you want to load (up to eight).

You can automatically load add-ins you use frequently with the **D**efault Add-Ins command:

1. Press */DSD* to select **D**efault Add-Ins from the Default Startup menu. Quattro prompts you for the name of the add-in you want loaded at startup and displays a list of existing add-ins.
2. Select an add-in from the list, or type in the name and directory path of an add-in and press *Enter*.
3. If you want to load other add-ins automatically, specify them in the same way. You can specify up to eight.
4. Press *Esc* to return to the Default menu and select **U**pdate. This stores the add-ins as permanent defaults.

Each time you load Quattro, any default add-ins will be loaded automatically with the program. You will then be able to run them without using the Load command first.

Running an Add-In

Once an add-in is loaded into system memory, you can run it at any time from within Quattro.

To run a loaded add-in:

1. Select **R**un from the Macro menu (*/MR*). Quattro displays a list of all loaded add-ins.
2. Select an add-in from the list.

Quattro runs the add-in immediately. When you exit the add-in, the Quattro spreadsheet will return. To rerun the last-run add-in, just press the ADD-IN key (*Shift-F7*).

The Menu Builder

The Menu Builder add-in (MENUBLDR.QAI) lets you alter the Quattro menus. You can use it to give commands more familiar names, duplicate or move commands you want quicker access to, and even change a command's function. You can change the existing menus, or create your own menu tree, which you can then use as an optional menu tree.

When you first load the Menu Builder, the Menu Builder menu is displayed over the spreadsheet (Figure 13.2).

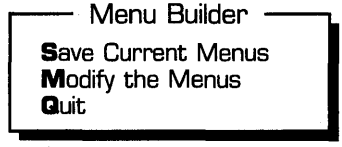


Figure 13.2: The Menu Builder Menu

Save Menus saves the changed menu tree in a file.

Modify the Menus displays the Modify Screen, with which you can make changes to the menus.

Quit exits the add-in and returns you to the spreadsheet.

Modifying the Menus

Once you've loaded and run the Menu Builder add-in, you can begin making changes to the Quattro menu tree. Begin by selecting **M**odify the Menus from the Menu Builder menu. This displays the Modify Screen (Figure 13.3), which you use to make the changes.

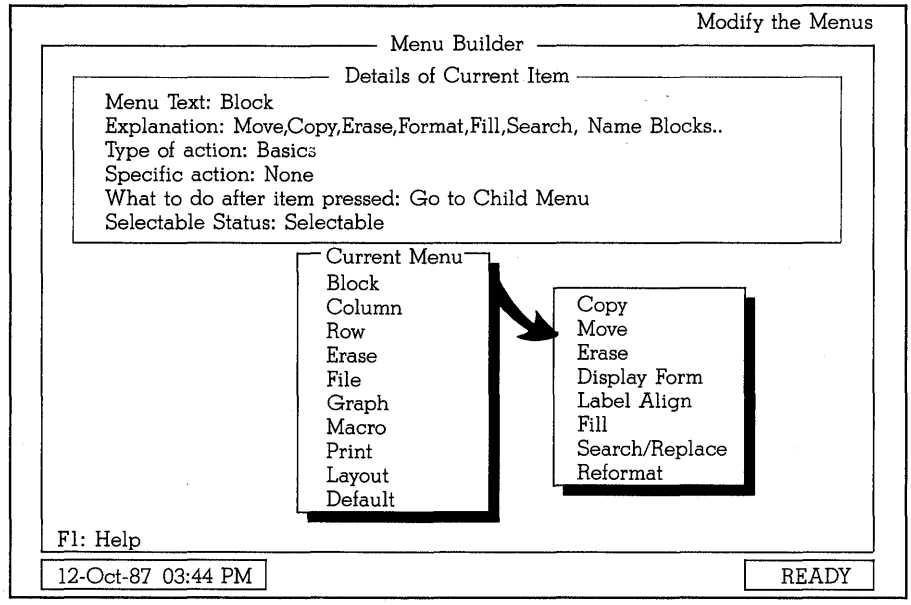


Figure 13.3: The Modify Screen

The Modify Screen is divided into two windows.

- **The top window** contains details about the current menu command. You use this window to change the name and function of an existing command.
- **The bottom window** contains the menus. You use this window to move around the menu tree. The current menu is shown in the middle. The menu used to access the current menu is shown to the left, and the menu displayed with the current command is shown to the right.

Only one window can be active at a time. To move between the windows, press the WINDOWS key (*F6*).

Changing an Existing Command

When the Modify Screen is first displayed, the bottom window is active and contains the main menu, with the Block menu shown to the right. Use the arrow keys to move around the menu tree until the command you want to change is highlighted.

- *Up arrow* moves the command selector upward, highlighting the next command up.
- *Down arrow* moves the command selector downward, highlighting the next command below.
- *Left arrow* displays the previous menu (the parent menu) in the middle of the window.
- *Right arrow* displays the menu accessed by the highlighted menu command (the child menu) in the middle of the window.

When the command you want to adjust is displayed and highlighted, press the WINDOW key (*F6*) to move into the top window. The top window contains the following alterable details about the command:

Text in Menu: contains the actual text of the command, as displayed in the menu. To change this text, highlight it and edit the existing text, or press *Esc* and type in new text.

Explanation: contains a description of the command's function. To change, highlight and edit or enter new text.

General Action: describes the general type of action invoked by the command. To change this, highlight the item and press any key. A choice list of possible actions in the general category is displayed. Select one from the list.

Specific Action: describes the specific type of action taken by the command. To change, highlight the item and press any key. A choice list of specific actions available with the current general action is displayed. Select one from the list.

What To Do After Item Pressed: tells Quattro what to do after the command is selected. There are four possibilities: **G**o to Child Menu, **S**tay on Current Item, **G**o to Parent Menu, and **Q**uit the Menus. To change the action taken, select this item and press any key to display a choice list of the possibilities. Select the desired option.

Selectable Status: determines whether or not the command can be selected from the menu. Some commands are for display only. To change selectable status, select this item and choose an option from the displayed list.

Every function in Quattro is defined by a combination of options in two categories: general action and specific action. General action includes such areas as Column, Block, and Row. Each general action contains a subgroup of more specific actions. For example, under Row are Delete and Insert. These action definitions are also used in macros and are called "menu-equivalent commands." For a list of all menu-equivalent commands, see Chapter 4 of the *Quattro Reference Guide*. You can also view a list of menu-equivalent commands by pressing the MACRO COMMANDS key (*Shift-F3*) and selecting / Commands.

To change the action taken by a command, alter the options given as General Action or Specific Action.

After you've made all changes you want to the command details, press *F6* to return to the bottom window. The changes are incorporated into the displayed menu tree. These changes are not permanent, however, until saved with the Save Menus command. To discard changes, exit the Menu Builder without saving (press *Esc* twice).

Moving Menu Commands

The Menu Builder makes it very easy to move menu commands—either to rearrange the order of commands in a menu or to move a command from one menu to another.

To move a menu command:

1. Use the bottom window to display the menu containing the command you want to move.
2. Use the *Up* and *Down* arrow keys to highlight the command you want to move.
3. Press the minus key (–) on the numeric keypad. The command disappears from the menu.
4. Use the arrow keys to go to the command below which you want the deleted command inserted, either on the same or another menu.
5. Press the plus key (+) on the numeric keypad. The deleted command is inserted below the current command.

With the plus and minus keys, you can change the arrangement of the entire menu tree. You can also use the minus key to delete unwanted commands from the menus.

Caution: If you delete two menu commands in a row, you won't be able to recall the first one with the plus key. You will have to insert the command

using the *Ins* key and respecify all information about the command (see the following section).

Inserting Commands in a Menu

You can add a menu command anywhere in any Quattro menu. Of course, you can't create a command that performs a function not already available in Quattro, but you can duplicate an existing command, giving it a different name, if you like.

To insert a command in a menu:

1. With the bottom window active, use the arrow keys to display the menu you want to add a command to. Make sure it's in the middle of the window.
2. Use the arrow keys to highlight the command below which you want to add the command.
3. Press *Ins*. Quattro displays a prompt asking you for the name of the command.
4. Type a name for the command and press *Enter*. The command is inserted into the menu.
5. To specify information about the new command, press *F6* to jump to the top window and fill in the appropriate information (see page 389 for details).

Creating a New Submenu

You can use the Menu Builder to create whole new submenus, for example, to group the commands you use most often.

To create a new submenu:

1. With the bottom window active, use the arrow keys to highlight the command you want to use to display the new submenu. Make sure the command doesn't already have a submenu.
2. Press *F6* to jump to the top window.
3. Highlight the **W**hat To Do After Item Pressed option and press any key.
4. Select **G**o to Child Menu from the displayed option list.
5. Press *F6* to go back to the bottom window. The highlighted command now shows a new submenu to the right. It contains only one item: **Q**uit.

6. Press *Right arrow* to make the new submenu current.
7. Press *Ins* to add the first command to the menu. Quattro prompts you for the name of the command.
8. Enter a command name. The command is inserted in the new submenu.
9. Press *F6* to move to the top window again, and fill out the required information for the new command.
10. Repeat the last five steps to insert as many commands as you like in the menu.

For details on filling out information on new menu commands, see page 389.

Saving Your Changes

Once you've made changes to the menu tree, you can save it, either replacing the existing menu tree, or creating a different one. There are two types of menu tree files you can create: a main menu tree and an alterate. A main menu tree is loaded with the **M**ain Menus command on the Default Startup Menu Trees menu (*/DSMM*) and is the menu tree you use primarily in Quattro. An alternate menu tree is one you can load along with the main menu tree and switch to occasionally as an option. (You cannot use an alternate menu tree as the main menu tree and vice versa.)

To save the changes you made to the Quattro menus, press *Esc* to exit the Modify Screen, then select **S**ave Menus from the Menu Builder menu. Quattro displays a submenu with two options: **M**ain Menu Tree and **A**lternate Menu Tree. Select the type of menu tree you want to create or replace.

Quattro prompts you for a file name, showing as the default the name of the existing menu tree file. To alter the existing menu tree, press *Enter*. To store the menus in a different menu tree file, enter a different file name.

Your menu tree file is automatically given an .RSC extension (if it's a main menu tree) or an .ALT extension (if it's an alternate).

To exit the Menu Builder without saving any of the changes you made, just press *Esc* to return to the spreadsheet.

Note: If you accidentally write over the existing menu tree, you can restore it by copying QUATTRO.RSC from your backup System Disk to the current disk. If you want to save the changes you made as an alternate menu tree, give QUATTRO.RSC a different name before copying the backup file. (Be sure to include the .RSC extension.)

The Transcript Add-In

Transcript is a useful and discreet recording tool. As soon as it's loaded, it begins recording each step you take and storing it in a file. It takes little extra memory or computer time and, in fact, you'll hardly even notice it's there—until you need it.

Transcript has four main purposes. You can use it to

- undo a mistake you made
- protect against power failure or system crashes
- audit the changes you make to a spreadsheet
- create macros

Note: Using Transcript is not recommended on a floppy-disk system, since it will severely slow down disk access.

Loading Transcript

To load Transcript, select **Load** from the Macro menu (*/ML*), then select TRANS.QAI from the displayed list of add-ins. As soon as Transcript is loaded, it begins recording your actions. The word `Transcript` appears in the bottom right corner of the screen, indicating that Transcript is loaded and recording.

Transcript records every keystroke you make and every command you select. It stores them exactly as recorded macros, using menu-equivalent commands that can be used with any menu tree (see Chapter 4 of the *Quattro Reference Guide* for descriptions of these commands). Unlike macros, however, your actions are stored as you make them in a file in your resource directory, called QUATTRO.LOG. You can restore your work by playing back sections of this file.

If you want to use Transcript as a backup tool (for failure-protection or for undoing mistakes), it's best to have it loaded automatically each time you start Quattro. Then you'll never have to think about it. It will just be there when you need it.

Note: If you've already begun entering data when you load Transcript, you'll get an error message asking you to save your file. Save the file, then load Transcript again.

To load Transcript automatically:

1. Press */DSA* to select **A**dd-Ins from the Default Startup menu. Quattro prompts you for an add-in name and displays a list.
2. Select TRANS.QAI from the list.
3. Press *Esc* to return to the Default menu.
4. Select **U**pdate to save the TRANS.QAI as a startup add-in.

From now on, each time you load Quattro, Transcript will be loaded automatically and will be recording your steps as you work.

Viewing Your Command History

After you've loaded Transcript, you can pause at any time to view the steps you've taken so far. To see the recorded transcript, just run Transcript (press */MR* and select TRANS.QAI). The Command History window appears (Figure 13.4).

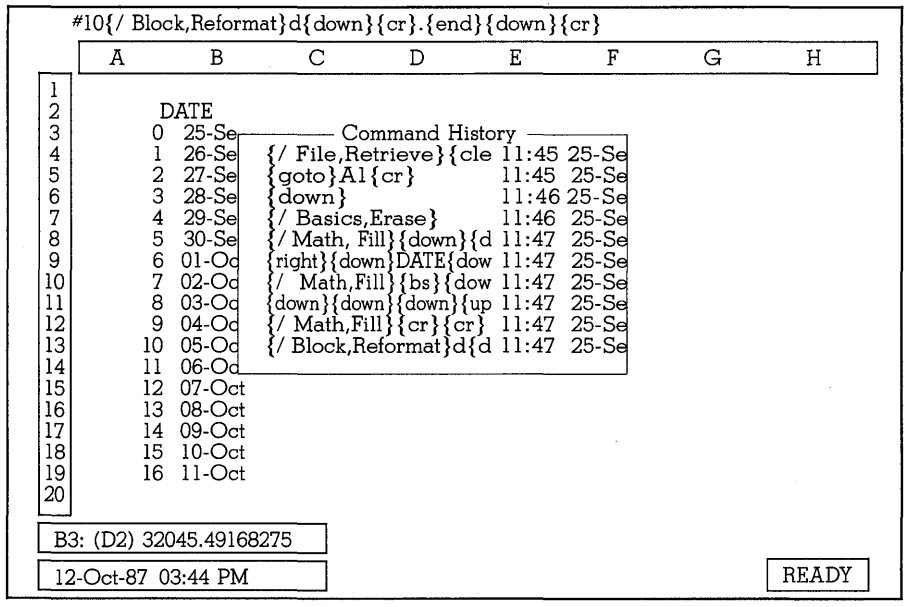


Figure 13.4: The Transcript Command History Window

The Command History window shows every step you've taken in Quattro since the file was begun. The last command you gave is highlighted. All actions since the last checkpoint (**F**ile **S**ave, **F**ile **R**etrieve, or **E**rase

command) are marked with a vertical line to the left. Your steps are shown like macros, using menu-equivalent commands.

The right side of the window shows the date and time each group of steps was begun. To remove the date/time stamp, press the CONTRACT key (minus on the numeric keypad). To restore the stamp, press EXPAND (plus on the numeric keypad).

Each line of the window contains several steps, only some of which can be viewed in the window. To see *all* the steps stored on a line, use the arrow keys to highlight the line. Its full contents are shown on the input line above.

If the transcript contains more lines than can fit in the window, use the direction keys to scroll the window. *Home* takes you to the first command in the history; *End* takes you to the last.

Working with Your Command History

Besides viewing your command history, you can also do the following:

- Undo the last command you issued.
- Restore the actions from the last **S**ave, **R**etrieve, or **E**rase command to the highlighted line in the window.
- Replay a marked-off block of the transcript.
- Copy a marked-off block of the transcript to the spreadsheet for use as a macro.

To work with your transcript file, use the Edit History menu. Press the slash key (/) from within Transcript to display this menu (Figure 13.5).

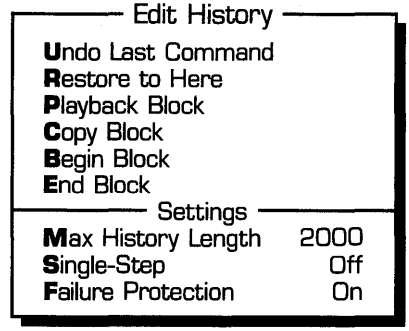


Figure 13.5: The Edit History Menu

Undo Last Command replays the command history from the last checkpoint (the last time you saved or retrieved a file) to the command immediately preceding the last command.

Restore to Here replays the command history from the last checkpoint to the end of the line highlighted in the Command History window.

Playback Block replays the block of actions marked off on the Command History window.

Copy Block lets you copy a block of the transcript into your spreadsheet for use as a macro.

Begin Block lets you mark the beginning of a block of actions you want to replay or copy to the spreadsheet.

End Block lets you mark the end of a transcript block.

Single-Step plays back actions one keystroke at a time.

Failure Protection determines how often your recorded actions are written to disk.

Max. History Length determines how large the transcript file can be before Quattro stores it in a backup file and begins a new file.

Undoing the Last Action

Suppose you issue a command, such as **B**lock Erase, and realize as you do it that you've made a grave mistake. With **U**ndo Last Command, you can restore the spreadsheet to exactly what it was before the mistake.

When you select **U**ndo Last Command, Quattro replays all the commands in the history from the last checkpoint (when you last saved or retrieved a file or erased the spreadsheet) to immediately before the last command you gave (not counting the command to run Transcript). In effect, it "undoes" the last command you gave. You can then return to your spreadsheet and continue as if the mistake never happened. While your actions are played back, the Restore indicator is displayed in the bottom right corner of the screen.

To abort actions being played back, press *Ctrl-Break*. Quattro stops at the end of the current command (unless it's in Single-Step mode—see "Playing Back One Step at a Time" on page 399).

Restoring Actions to a Point

The **R**estore to Here command replays commands in your history from the last checkpoint to the end of the line that's highlighted. (All actions after the last checkpoint are marked with a vertical line to the left.)

Suppose you made a serious mistake in your spreadsheet but didn't realize immediately. You could just use the arrow keys to highlight the line before the mistake and select **R**estore to Here. When you returned to your spreadsheet, you would find it just as it was before you made the mistake.

To restore a spreadsheet after system or power failure, highlight the last line of the command history, then select **R**estore to Here. All your work from the last checkpoint to the point of failure will be restored. While your actions are restored, the Restore indicator is displayed in the bottom right corner of the screen.

To abort restoration, press *Ctrl-Break*. Quattro stops at the end of the current command (unless it's in Single-Step mode—see "Playing Back One Step at a Time" on page 399).

Note: You cannot use Transcript to restore actions that occurred *before* the last checkpoint. You can, however, use the **P**layback Block command to replay sections of your command history before the last checkpoint.

Playing Back a Block of Actions

If you want to repeat a series of actions, or just take a closer look at what you did earlier, use the **P**layback Block command.

First, mark off the block of actions you want to replay. Highlight the first line you want replayed, and select **B**egin Block (*/B*). Then highlight the last line you want replayed and select **E**nd Block (*E*).

When you select **P**layback Block, Quattro re-executes all actions stored in that block, just as if it were a macro. While your actions are played back, the Restore indicator is displayed in the bottom right corner of the screen.

To abort playback, press *Ctrl-Break*. Quattro stops at the end of the current command (unless it's in Single-Step mode—see "Playing Back One Step at a Time" on page 399).

Copying a Block of Actions to the Spreadsheet

Because your actions are recorded exactly as macros are (using a combination of menu-equivalent commands, key-equivalent commands, and exact keystrokes), your transcript is like one very long macro. In fact, you can use the transcript to create macros, copying them directly into your spreadsheet.

To copy a section of the transcript into your spreadsheet, block off the area you want to copy (see above), then select Copy Block. The Transcript window and menu temporarily disappear to reveal the spreadsheet, and Quattro prompts you for the destination of the block. Use the direction keys to position the cell selector in the top left cell of the block you want to copy the transcript to. Press *Enter*. Quattro copies the actions into the spreadsheet block and returns the Transcript window and menu to the screen.

Once you've copied a transcript block to your spreadsheet, you'll have to name it before you can execute it. After you exit Transcript, select Name from the Macro menu (*/MN*) and specify a name for the macro, indicating its location.

Transcript Restrictions

Transcript makes changes to your spreadsheets only; it doesn't affect actual *files*. Therefore, it cannot do the following:

- run or load add-ins (although it can restore effects an add-in might have had on a spreadsheet)
- restore changes to the menu structure made with the Menu Builder
- restore changes made at the DOS level with the OS command
- print the spreadsheet or a graph
- extract values or formulas

This has no effect on Transcript's ability to restore your spreadsheet. It simply allows it to work faster, without getting bogged down with writing to files.

If you have Transcript loaded and you initiate a command that Transcript may not be able to replay, such as the OS command, Quattro displays a message asking you to save your file. To be sure that Transcript can restore your spreadsheet correctly, always save your spreadsheet when you see this message.

Setting Your Maximum History Length

Transcript stores all your actions in a file called QUATTRO.LOG. Each time you load Transcript, Quattro opens up this file and appends it. This makes it possible for you to rescue your work in the case of power or system failure.

When your QUATTRO.LOG file reaches the maximum size (initially 2,000 bytes), Quattro renames it QUATRBAQ.LOG (at the next checkpoint) and begins a new QUATTRO.LOG file. The QUATRBAQ.LOG file is overwritten each time this happens.

You can change the maximum size allotted the QUATTRO.LOG file with the **M**ax History Length command. Just select this command and enter any value from 1 to 25,000.

Playing Back One Step at a Time

The **S**ingle-Step command lets you play back actions in your command history one step (or keystroke) at a time. This is useful when you know you made a mistake, but you're not sure what you did, or if you just want to check over your actions carefully.

Single-Step is initially set to **O**ff. If you set it to **O**n, your actions will be played back step by step when you use the **U**ndo Last Command, **R**estore to Here, or **P**layback Block commands. This works just like Single-Step mode in macro debugging. To initiate the next step, press the spacebar. To continue the actions at full speed, press *Enter*. To exit Single-Step mode, return the setting to **O**ff. While your actions are executing in Single-Step mode, the Single-Step indicator is displayed in the bottom right corner of the screen.

If you press *Ctrl-Break* while replaying actions in Single-Step mode, Quattro stops the playback immediately. If it was in the middle of a command, you may have to press *Esc* several times to return to the spreadsheet.

Protecting Against Failure

Normally, Transcript stores your actions on disk as you make them. This ensures that if there's a power or system failure, all your work will be saved and can be fully restored.

If you find Transcript slowing down your work and you can risk the possible loss of data, you can set the **F**ailure Protection command to **N**o.

Transcript will then store your actions in a memory buffer and write them periodically to disk. If your system crashes or there's a power failure, you may have to repeat some of the final steps involved in your work after restoring it.

Printing Your Transcript

To print a copy of your transcript, mark off the entire transcript as a block and copy the block to your spreadsheet. Then exit Transcript and print that block of the spreadsheet.

Exiting Transcript

To exit the Transcript Edit History menu, press *Esc*. The Command History menu remains on the screen. To exit the Command History window, press *Esc* again, and you're back in the spreadsheet.

After you've returned to the spreadsheet, Transcript continues to record your actions. If you want it to stop recording, unload the program: press */MU* and select TRANS.QAI from the displayed list of loaded add-ins.

A P P E N D I X

A

HELP!

This appendix lists common problems enountered in Quattro and possible solutions. The problems are listed in the order you would ordinarily encounter difficulties while learning or working with Quattro. The final section, "Contacting Borland for Help," tells you the information you need if you have to contact Borland's Technical Support staff for further assistance.

Problems and Solutions

The Basics

Disk won't copy.
Make sure the disk you are copying to has been formatted correctly (see "Formatting Your Work Disks" in Chapter 2 of *Getting Started with Quattro*).

Program won't load.
Make sure you are logged on to the directory or disk drive containing the Quattro program files. If you get the message "Not enough memory to load," your computer doesn't have enough system memory. If you have RAM-resident programs (such as SideKick and Lightning) loaded, unload them and try again. If you have a floppy drive system, make sure the System Disk is in Drive A and the Resource Disk is in Drive B.

If you know you have enough memory, but still get this message, perhaps you've somehow exited to DOS with the Quattro **OS** command. Just type EXIT to return to Quattro.

No help messages.
In order for help messages to be displayed, your computer must be able to access the help file (QUATTRO.HLP) on the Quattro Resource Disk. Make sure the resource directory (*/DDR*) is set to the directory or drive containing this file.

My spreadsheet just disappeared!!
If the DOS prompt is displayed on the screen below a message that says, *Type exit and press Enter to return to Quattro,* you accidentally selected the **OS** command from the File menu. Simply do as the message says: Type EXIT and press *Enter.* You will return to the spreadsheet exactly as you left it.

I'm having trouble pointing to cell blocks.
Remember the following guidelines:

- Press the period key (.) to anchor a cell. Moving the cell selector will then extend the selection from that anchor cell.
- Press *Esc* to unanchor a cell. You can then move the cell selector without extending the selection.
- Press *Backspace* to unanchor a cell and return to the cell that was current before you began pointing.
- Press *Enter* to end pointing and enter the selected block on the input line.

Entering Data

Quattro beeps when I try to enter data.
Quattro rejects data that doesn't meet its expectations. Use the following guidelines when entering data in the spreadsheet:

- If you start a label with a number, precede it with a label-prefix character (' " ^).
- Don't include commas or dollar signs in numbers.
- Press *Ctrl-D* before entering a date.
- If a formula begins with a cell reference, precede it with a plus sign.

Some of my cell entries appear as asterisks.
The cell's value is too wide to fit in the column. Widen the column (*/CW*) or change the numeric format to one that uses less decimal places or mathematical symbols.

Quattro won't calculate my formula
If the formula begins with text, such as a cell address, you must precede it with a plus sign (+).

When I enter phone numbers, Quattro calculates them.
Quattro assumes a phone number is a formula and subtracts the suffix from the prefix, displaying the result. Precede the phone number with a label-prefix character (' " ^) to enter it as a label.

When I copied a formula, the formula changed.
Quattro automatically changes references in a formula to refer to the same position as the original references. If you don't want Quattro to do this, use the ABS key (*F4*) to make the references absolute before copying the formula (see page 53).

One of my formulas just turned to ERR after I moved data around.
You probably moved data into a cell referenced by the formula, or into a corner cell of a block referenced by the formula. You'll have to reenter the formula.

Data disappeared from the middle of the screen when I scrolled right.
The data was spillover data from a cell to the left. When the cell that actually contains the entry is scrolled off the screen, the spillover data disappears.

Editing Data

I can't get the GOTO key (*F5*) to work.
GOTO doesn't work in Edit mode. You must be in Ready mode.

I can't point to a cell block in Edit mode.
To initiate pointing in Edit mode, the cursor must be at the end of the entry, and must be preceded by either an operator (+ – * /) or an open parenthesis [( ].

I can't make changes to a cell entry.
The cell is protected. If you can make changes to other parts of the spreadsheet, the cell is protected by a **B**lock **A**dvanced **P**rotect command. You can remove the protection with the **B**lock **A**dvanced **U**nprotect command (*/BAU*). If you can't make any changes to the spreadsheet, default protection is enabled. To disable it, set the **D**efault **P**rotection command to **D**isable (*/DPD*).

Nothing appears on the input line for the cell I'm trying to edit.
You're probably trying to edit spillover text from a cell to the left. If text doesn't fit in a cell, and if cells to the right are empty, the text runs over into adjacent cells. These cells are used for display only. To edit the entry, go to the cell in which it was entered.

Every time I make a change to the spreadsheet, Quattro pauses to recalculate formulas.
Quattro recalculates only those formulas that are affected by the new data, so recalculation time is minimal. However, if you'd rather not take the time to recalculate, you can turn automatic recalculation off (*/DRD*), then use the RECALC key (*F9*) to recalculate the spreadsheet when you want to.

Using Commands

I can't insert a column or row.
You must have data stored in the last column or row of the spreadsheet. Delete the data or move inward.

I can't open a second window.
Opening a second window splits the screen at the position of the cell selector. You cannot open a horizontal window if the cell selector is in the first or last row of the spreadsheet. You can't open a vertical window if the selector is in the first or last column in the spreadsheet.

My default settings got changed!
When you select update from any menu, it also updates the Default menu settings. Change the settings back and select **U**pdate.

I can't delete a column or row.
There must be a protected cell within the column or row. Find the cell and unprotect it (using the **B**lock **A**dvanced **U**nprotect command) or turn off default protection (*/DPD*).

When I change the default column width, some columns are unaffected.
Those columns have been individually adjusted with the **C**olumn **W**idth command (*/CW*). To include them in default width adjustments, use the **C**olumn **R**eset command (*/CR*) to return them to the default width.

The Block Align command doesn't work.
When you align labels in a block with the **B**lock **A**lign command, only existing labels are affected. Unlike **B**lock **D**isplay Format, you can't pre-format a block for label alignment. Also, only labels are affected by label alignment. Values are always aligned right.

The OS command doesn't work.
Quattro must be able to find the DOS file COMMAND.COM in order to access DOS. If you're using a floppy-drive system, COMMAND.COM must be on your system disk; if it is not, you must replace the Resource Disk in Drive A with your DOS disk before you use the **OS** command (see "Copying COMMAND.COM" in Chapter 2 of *Getting Started with Quattro*).

The Block Fill command doesn't work.
Make sure the stop value is greater than start value (or less than the start value if you're using a negative step value). If you're using **F**ill with date values, you'll need to increase the stop value by several thousand (date serial numbers are five digits long).

The Query command doesn't work.
Make sure you've followed these rules for querying a database:

- When indicating which field to search through, reference the cell containing the first entry in that field, *not* the field name.
- If you're using a criteria table, be sure to include field names in the block to search. If you're using a formula criterion, don't include the field names in the block to search.
- If you're searching for text, surround the text with quotes.
- If you're using a criteria table, include the reference to the first entry cell underneath the field name (unless you're searching for an exact entry). For example, in the criteria table shown below, the reference isn't required in the first condition, because it's an exact entry. The cell address in the second condition refers to the first cell containing an entry (underneath the field name):

NAME	SALARY
"Smith "	C4>25000

I can't get wildcards to work in searching.
Wildcards work only in criteria tables used with the **Q**uery command. You can't use wildcards in a Query formula criterion or with the **B**lock **S**earch/Replace command.

Printing

Spreadsheet won't print.
Make sure the printer is securely connected and turned on. If so, check the following:

- The **D**evice setting on the Text Printer menu (*/DHPTD*) should be set to the port used to connect your printer (see page 123).
- The **P**rint **B**lock setting (*/PB*) should include the data you want to print (see page 191).
- The **D**estination setting on the Print menu (*/PD*) should be set to **P**rinter (see page 195).

Graph won't print.
You must have a graphics printer in order to print graphs. Make sure the printer is securely connected and turned on. If so, check the following:

- The **D**estination command on the Graph Print menu (*/GPD*) should be set to the printer you're using (see page 280).
- All information about the printer you're using should be specified with the **P**rinters command (*/GPP*). Make sure the **D**evice command for that printer (*/GPP1D* or */GPP2D*) is set to the port used to connect that printer. And make sure the make, model, and mode are set correctly for that printer (*/GPP1T* or */GPP2T*). (See page 276).

Printout is double-spaced.
Change the **A**uto LF command on the Text Printer menu (*/DHTA*) to **Y**es.

Printer won't advance after each line.
Change the **A**uto LF command on the Text Printer menu (*/DHTA*) to **N**o.

Headers and footers aren't positioned correctly.
Make sure you align the printer each time you print a new block so that Quattro knows to start printing at the top of the page.

Contacting Borland for Help

If none of the information given here addresses your Quattro problem, you can contact Borland's Technical Support staff for individual assistance. The fastest way to get a reply is to log on to Borland's forum on CompuServe. If you are a CompuServe subscriber, simply type

```
GO BOR
```

from the main CompuServe menu, then select "Enter Business Products Forum" from the Borland main menu. Leave your questions or comments there for the support staff to process.

If you prefer, you can write a letter describing your problem in detail and send it to

Technical Support Department
Borland International
4585 Scotts Valley Drive
Scotts Valley, CA
95066, USA

As a last resort, you can call Technical Support at (408) 438-5300.

Whichever method you use to contact Borland, you need to provide the information listed below. If you're calling Borland, be sure to have this information at hand *before* you make the call.

- **Product name, version number, and serial number.** Quattro's version number and serial number are shown on the label of your Quattro System Disk.
- **Computer make and model number.** If the model number is not imprinted on your computer cabinet, you can find it in its documentation.
- **Graphics card type.** The type of graphics card used in your computer should be noted in the computer's documentation.
- **Operating system and version number.** To get the DOS version number, type VER on the DOS command line. To help determine the exact setup of your operating environment, it is also helpful to have a printout of your AUTOEXEC.BAT and CONFIG.SYS files.
- **Resident programs.** If you had any resident programs loaded when the problem occurred (such as SideKick, SuperKey, Lightning, or a RAM disk), please have a list of them and their version numbers ready.

Whenever you must telephone for technical support, make sure your computer is within reach, booted up, and ready to use. You may need to step through specific procedures in order to pinpoint the problem.

A P P E N D I X

B

A DOS Primer

If you are new to computers or to DOS, you may have trouble understanding certain terms used in this manual. This appendix provides you with a brief overview of the following DOS concepts and functions:

- what DOS is and does
- the proper way to load a program
- directories, subdirectories, and the path command
- using AUTOEXEC.BAT files

This information is by no means a complete explanation of the DOS operating system. If you need more details, please refer to the MS-DOS or PC-DOS user's manual that came with your computer system.

Quattro runs under the MS-DOS or PC-DOS operating system, version 2.0 or later.

What Is DOS?

DOS is shorthand for Disk Operating System. MS-DOS is Microsoft's version of DOS, while PC-DOS is IBM's rendition. DOS is the traffic coordinator, manager, and operator for the transactions that occur between the parts of the computer system and the computer system and you. DOS operates in the background, taking care of the menial computer tasks you wouldn't want to have to think about—for instance, the flow of characters

between your keyboard and the computer, between the computer and your printer, and between your disk(s) and internal memory (RAM).

Other transactions are ones that you initiate by entering commands on the DOS command line; in other words, immediately after the DOS prompt. Your DOS prompt looks like one of the following:

A>
B>
C>

The capital letter refers to the active disk drive (the one DOS and you are using right now). For instance, if the prompt is A>, it means you are working with the files on Drive A (on the left, if you have two), and that commands you give DOS will refer to this drive. When you want to switch to another drive, making it the active drive, all you do is type the letter of the drive, followed by a colon and *Enter*. For instance, to switch to Drive B, just type `B:` *Enter*.

There are a few commands that you will use often with DOS, if you haven't already, such as

DEL or ERASE	to erase a file
DIR	to see a list of files on the logged disk
COPY	to copy files from one disk to another
Q	to load Quattro

DOS doesn't care whether you type in uppercase or lowercase letters, or a combination of both, so you can enter your commands however you like.

We'll assume you know how to use the first three commands listed; if you don't, refer to your DOS manual. Next, we'll explain the proper way to load a program like Quattro, and that involves the last command—Quattro.

How to Load a Program

On your Quattro System Disk, you'll find the main Quattro program, under the file name Q.EXE. This program file is necessary for all functions, so you always need it when you first start the program. A file name with the "last name" or extension .COM or .EXE means a program file that you can load and run (use) by typing only its "first name" on the DOS command line. So, to invoke Quattro, you simply type *Q* and press *Enter*, and Quattro will be loaded into your computer's memory.

There's one thing you need to remember about loading Quattro and other similar programs: *You must be logged onto the disk and directory where the program is located in order to load it;* unless you have set up a DOS path (described shortly), DOS won't know where to find the program.

For instance, if your System Disk with the Q.EXE program is in Drive A but the prompt you see on your screen is B>, DOS won't know what you're talking about if you type *Q* and press *Enter,* and will give you the message "Bad command or file name."

It's as if you were shuffling through the "School Records" file in your file cabinet looking for information about your home finances. You're in the wrong place. So if you happen to get that DOS message, simply switch to Drive A by typing *A:* and pressing *Enter.* Then type *Q* and press *Enter* to load Quattro.

You can set up a "path" to the Quattro files so that DOS can find them, using the DOS *path* command. See the section on the AUTOEXEC.BAT file for more information.

Directories

A *directory* is a convenient way to organize your floppy or hard disk files. Directories allow you to subdivide your disk into sections, much the way you might put groups of manila file folders into separate file boxes. You might want to put all your file folders having to do with finance—for instance, a bank statement file, an income tax file, or the like—into a box labeled "Finances."

On your computer, it would be convenient to make a directory to hold all your Quattro files, another for your SideKick files, another for your letters, and so on. That way, when you type `DIR` on the DOS command line, you don't have to wade through hundreds of file names looking for the file you want. You'll get a listing of only the files on the directory you're currently logged onto.

Although you can make directories on either floppy or hard disks, they are used most often on hard disks. This is because they can hold a greater volume of data, so there is a greater need for organization and compartmentalization.

When you're at the DOS level, rather than in Quattro or another program, you can tell DOS to create directories, move files around between directories, and display which files are in a particular directory.

In the examples that follow, we assume you are using a hard disk system, and that you are logged onto the hard disk so that the prompt you see on your screen is C>. If you want to create directories on your floppy disks, just substitute *A* or *B* for *C* in the example.

To make a directory for your Quattro files, do the following:

1. At the C> prompt, type `MD` (Make Directory) `QUATTRO` and press ***Enter.*** The MD command tells DOS to make a directory called QUATTRO.
2. Type `CD` (Change Directory) `QUATTRO` and press ***Enter.*** The CD command tells DOS to move you into the Quattro directory.
3. Now, put the Quattro disk you want to copy from into one of your floppy drives—let's say *A* for this example—and type `COPY A:*.*` ***Enter.*** (The asterisks are *wildcards* that stand for all files.) The COPY command tells DOS to copy all files on Drive A to the Quattro directory on Drive C. As each file on the disk is copied, you will see it listed on the screen.

That's all there is to it. Treat a directory the same way you would a disk drive: To load Quattro, you must be in the Quattro directory before typing Quattro and pressing ***Enter,*** or DOS won't be able to find the program.

Subdirectories

If you are someone who really likes organization, you can further subdivide your directories into subdirectories. You can create as many directories and subdirectories as you like—just don't forget where you put your files!

A subdirectory is created the same way as a directory. To create a subdirectory from the Quattro directory (for instance, for storing your spreadsheet files), do the following:

1. Be sure you are in the Quattro directory.
2. Type `MD SPREAD` ***Enter.***
3. Type `CD SPREAD`. You are now in the SPREAD subdirectory.
4. Copy your spreadsheet files to the new subdirectory.

Where Am I? The $p $g Prompt

You probably have noticed that when you change directories, you still see the C> prompt; there is no evidence of what directory or subdirectory you are in. This can be confusing, especially if you leave your computer for a while. It's easy to forget where you were when you left.

DOS gives you an easy way to find out. Just type

```
prompt=$p $g
```

and from now on (until you turn your computer off or reboot), the prompt will show you exactly where you are. Try it. If you are still in the SPREAD subdirectory, your DOS prompt should look like

```
C:\Quattro\SPREAD >
```

The AUTOEXEC.BAT File

To avoid typing the prompt command (discussed in the previous section) to see "where you are" every time you turn on your computer, you can set up an AUTOEXEC.BAT file to do it for you each time you turn on your computer.

The AUTOEXEC.BAT file is a useful tool to set your computer to do things automatically. There are many more things it can do, but rather than go into great detail here, we suggest referring to your DOS manual for more information. We will show you how to create an AUTOEXEC.BAT file that will automatically change your prompt so you know where you are in your directory structure, set a *path* to the Quattro directory, and then load Quattro.

The DOS *path* command tells your computer where to look for commands it doesn't recognize. DOS only recognizes programs in the current (logged) directory, unless there is a path to the directory containing pertinent programs or files.

In the following example, we will set a path to the Quattro directory.

If you have an AUTOEXEC.BAT file in your root directory, your computer will do everything in that file when you first turn your computer on. (The root directory is where you see the C> or C:\ prompt, with no directory names following it.)

Here's how to create an AUTOEXEC.BAT file.

1. Type `CD \` to get to the root directory.
2. Type `COPY CON AUTOEXEC.BAT` *Enter*. This tells DOS to copy whatever you type next into a file called AUTOEXEC.BAT.
3. Type
4.
```
PROMPT=$P $G Enter
PATH=C:\QUATTRO
CD QUATTRO
Ctrl-Z Enter
```

The *Ctrl-Z* sequence saves your commands in the AUTOEXEC.BAT file.

To test your new AUTOEXEC.BAT file, reboot your computer by holding down the *Ctrl* and *Alt* keys and then pressing *Del*. You should see C:\QUATTRO>.

Changing Directories

How do you get from one directory to another? It depends on where you want to go. The basic DOS command for changing directories is CD. Use it like this:

- *To move from one directory to another*: For example, to change from the Quattro directory to one called WP, type the following from the Quattro directory:

  `C:\QUATTRO>  CD \WP` *Enter*

- Notice the backslash (\ ) before the directory name. Whenever you are moving from one directory to another unrelated directory, type the name of the directory, preceded by a backslash.
- *To move from a directory to its subdirectory*: For example, to move from the Quattro directory to the SPREAD subdirectory, type the following from the Quattro directory:

  `C:\QUATTRO> CD SPREAD` *Enter*

  In this case, you did not need the backslash, because the SPREAD directory is a direct offshoot of the Quattro directory. In fact, DOS would have misunderstood what you meant if you had used the backslash in this case. If you had included the backslash, DOS would have thought that SPREAD was a directory off the main (root) directory.
- *To move from a subdirectory to its parent directory*: For example, to move from the SPREAD subdirectory to the Quattro directory, type the following from the SPREAD subdirectory:

  `C:\QUATTRO\SPREAD> CD..` *Enter*

DOS will move you back to the Quattro directory. Any time you want to move back to the parent directory, use a space followed by two periods after the CD command.

- *To move to the root directory*: The *root directory* is the original directory. It is the parent (or grandparent) of all directories (and subdirectories). When you are in the root directory, you see this prompt: C:\ >.

  To move to the root directory from any other directory, simply type

  `CD \` ***Enter***

  The backslash without a directory name signals DOS that you want to return to the root directory.

This appendix has presented only a quick look at DOS and some of its functions. Once you're familiar with the information given here, you may want to study your DOS manual and discover the many things you can do with your computer's operating system. There are many other DOS functions not mentioned here that can simplify and enhance your computer use.

A P P E N D I X

C

Glossary

absolute cell reference—a cell reference in a formula that will always reference the same cell, even if the formula is copied to a different part of the spreadsheet. To make a cell reference absolute, insert dollar signs in its address—for example, $A$5.

address—the location of a cell in a spreadsheet, defined by the letter of its column followed by the number of its row. For example, C5 is the address of the cell in column C and row 5.

aspect ratio—the ratio of a screen's width to its height, used to display graphics.

block—any rectangular group of cells, indicated by the addresses of the top left and bottom right cells.

borders—the lettered row at the top of the spreadsheet and the numbered column to the left that are used to identify cell addresses.

cell—a box in the spreadsheet used to enter data. A spreadsheet is made up of thousands of cells, ordered by rows and columns.

cell identifier—the left part of the descriptor line that displays information about the current cell. It includes the cell's address and contents and (if different from the default) column width and display format.

cell selector—the highlighted rectangle that indicates the current cell.

coordinates—the two points of reference that define a cell or block. The address of a cell is the letter of the column followed by the number of the

row containing it. The coordinates of a block are the addresses of the top left and bottom right cells in the block.

database—an organized collection of information. In Quattro, a database is organized as rows, or *records*, of information, divided into separate columns, or *fields*.

date/time serial number—a number assigned to a date and/or time, counting the number of days since January 1, 1900, and/or the number of seconds from midnight. The integer portion is used for the date; the fractional portion is used for time. Also known as the Julian number.

default—a standard setting used when none other is specified. For example, the default column width is nine. You can change a default value temporarily or permanently. And you can depart from the default value for specified areas of the spreadsheet (for example, changing the width of an individual column).

descriptor line—the line on which information about the current cell (and any error messages) are displayed. Initially, this is the second line from the bottom of the screen. You can optionally move it to the top of the screen.

direction keys—keys on the numeric keypad (on the right side of the keyboard) used to move the cursor or cell selector.

directory—a section of a disk created with the DOS MKDIR or MD command. Sometimes directories are further broken down into *subdirectories*.

display format—the format in which a value is displayed.

DOS—the computer operating system required in order to run Quattro.

field—a category of information in a database. In a Quattro database, fields are set up as columns of information.

file—a section of a disk used to store data.

format line—a line used to parse data. Symbols on the line tell Quattro how to break down and interpret the data.

frequency distribution—a table showing how many times numbers within given ranges are found in a block of data.

frozen titles—columns and/or rows that have been fixed on the screen. They remain in place even when the rest of the spreadsheet is scrolled.

function—one of a set of special commands that can be entered in a spreadsheet cell, either alone or within a formula. They perform advanced

calculations and provide the resulting value. Also called @functions, because they all begin with an @.

function keys—the keys labeled *F1* through *F10* at the top or left of the keyboard, used to perform special Quattro functions.

hardware—the physical equipment used to run Quattro: your computer, disk drivers, screen, and printer.

headings—a column and/or row that contains text defining data below or to the right.

input line—the line above the spreadsheet used to display data when you enter or edit it. It's also used for menu descriptions and system prompts.

label—any textual cell entry.

label-prefix character—a character preceding a label entry that indicates how to align the entry. A single quote (') aligns a label entry left, a double quote (") aligns it right, and a caret (^) centers it.

macro—a sequence of keystrokes and/or commands that are recorded and stored in a spreadsheet and that can be executed automatically.

macro commands—a set of special commands that can be used within macros.

matrix—a rectangular array of numbers used to systematize linear formulas and equations.

menu-equivalent commands—special commands that correspond to menu items, used in macros and command history transcripts.

mode indicator—a highlighted word on the bottom line of the spreadsheet that indicates the current state, or *mode*, of the program. For example, when a menu is displayed, the MENU indicator appears.

named block—a block of cells that has been assigned a name. The block can then be referenced by name instead of by coordinates.

operating system—the base software your computer uses to run other programs. For example, Quattro requires DOS as a base in order to run.

operator—a mathematical symbol used in a formula to express a relationship between two values. For example, in the formula *A6 + 10 / B2*, both + and / are operators.

parsing—breaking down a column of long labels (such as those created by importing a text file) into two or more columns of data.

plotter—a computer printing device that uses interchangeable colored ink jets, or *pins*, to print multicolored text and graphs.

pointing—the method of indicating a cell block by moving the cell selector to its coordinates.

protection—a security function that prevents the contents of a cell block or the entire spreadsheet from being changed.

RAM (random-access memory)—a temporary storage area within your computer, used for storing your work until you save it to disk.

recalculation—the act of calculating formulas in a spreadsheet.

record—a set of information in a database. In a Quattro database, records are rows of data.

regression analysis—a table of figures that indicate how one set of variables is affected by other sets of variables.

resolution—the number of pixels used by a screen to display graphics and text. The greater the resolution, the sharper the screen display is.

sensitivity analysis—a table that shows the results of varying one or two essential values. Also called a *what-if table*, because it shows what would happen to other figures if certain values changed.

shortcut—a menu command programmed into a *Ctrl*-key sequence. To create a shortcut, highlight the menu command you want to program and press *Ctrl* and *Enter* at the same time. Then press *Ctrl* and the letter you want to assign the command to. To execute a shortcut, press *Ctrl* and the letter assigned to the shortcut.

spillover—part of a long label displayed in empty cells to the right of the cell in which the label was entered.

status indicator—a highlighted word on the bottom line of the spreadsheet that indicates a special condition, such as the *Caps Lock* key being on.

status line—the bottom line of the spreadsheet screen, showing date, time, spreadsheet mode, and any status conditions.

value—any numeric value in the spreadsheet, entered either as a number, a date, or a formula that calculates a number.

window—the part of the spreadsheet screen used to view data. You can open a second window in Quattro, and use it to view a different part of your spreadsheet.

x-axis—the horizontal line at the bottom of a graph, used to plot values.

y-axis—the vertical line at the left of a graph, used to plot values.

Index

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

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