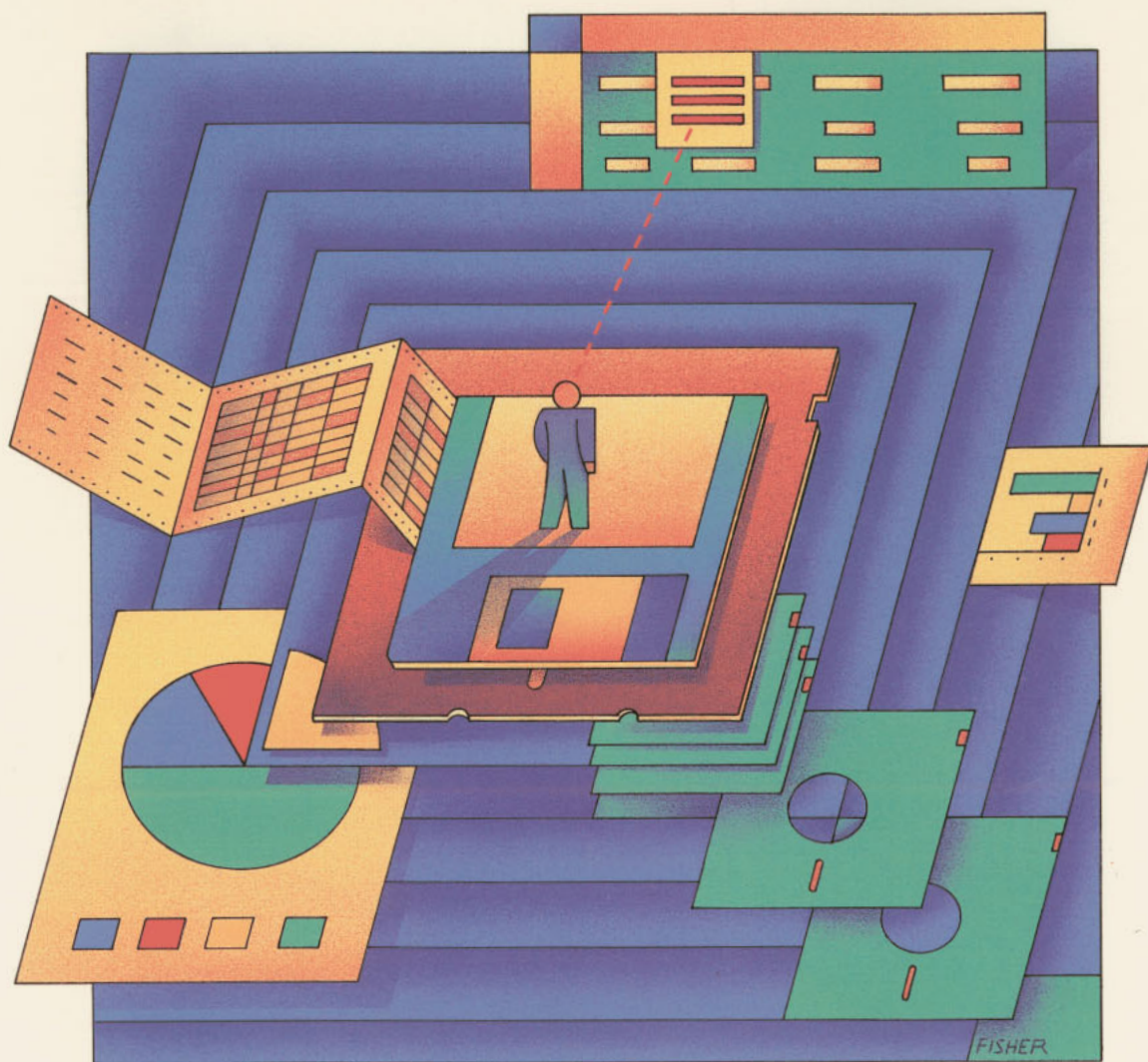


Lotus Spreadsheet

for DeskMate



Lotus Spreadsheet for DeskMate

Lotus®

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Introduction

This manual details how to use the Lotus Spreadsheet for DeskMate (Lotus-DM), a spreadsheet program designed for the Tandy® DeskMate® and other DOS environments. Part One, *Getting Started*, describes the procedures for installing Lotus-DM. Part Two, *User's Guide*, teaches some basic Lotus-DM skills for worksheet, graph, and database tasks. Part Three, *Reference*, is a comprehensive guide to Lotus-DM commands and @functions. A *Quick Reference* card is also included.

Use this manual in conjunction with the Lotus-DM Help system, which provides on-line step-by-step instructions for working with Lotus-DM. You can view a help screen for a specific command, dialog box, or other feature at any point in a Lotus-DM session by pressing F1.

Reading Path

Read *Getting Started* first to install Lotus-DM on your computer system. If you are a Lotus-DM runtime user, read Appendix A first.

If you are a DeskMate user who is not familiar with spreadsheets, read the chapters in the *User's Guide* next to learn about Lotus-DM features and develop basic skills. When you complete the *User's Guide*, refer to *Reference* for information on Lotus-DM basics, commands, and @functions.

If you are a DeskMate user who is familiar with spreadsheets, read Chapter 8 in *Reference* next to learn about Lotus-DM. If, however, you find you need to learn more about a particular task, read the appropriate *User's Guide* chapter. Refer to *Reference* for comprehensive information on commands and @functions.

If you are a Lotus 1-2-3 user, read Chapter 3 in the *User's Guide* and Appendix C in *Reference* next to learn about the differences between 1-2-3 and Lotus-DM. To learn about Lotus-DM, read Chapter 8 in *Reference*; to learn more about a particular task, read the appropriate *User's Guide* chapter. Refer to *Reference* for comprehensive information on commands and @functions.

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If you are using the runtime version of Lotus-DM, and are familiar with spreadsheets, read Chapter 8 in *Reference* to learn about Lotus-DM. If you are not familiar with spreadsheets, read the chapters in the *User's Guide* to learn about Lotus-DM features and develop basic skills. Refer to *Reference* for comprehensive information on commands and @functions.

Conventions

The following conventions are used throughout the manual:

- Function keys and special keys are in small capitals. Function keys are identified by the Lotus-DM key name, followed by the appropriate key sequence in parentheses.
Example: HELP (F1)
- Key names separated by a - (hyphen) indicate that you must press and hold down the first key, press the second key, and then release both keys.
Example: CTRL-→
- In the pull-down menus, Lotus-DM displays command accelerator key sequences separated by a + (plus sign), a DeskMate convention, to indicate that you must press and hold down the first key, press the second key, and then release both keys. This manual uses the hyphen convention as stated above.
- Key names separated by a space indicate that you must press the first key and release it, and then press the second key and release it.
Example: END HOME
- Information that the manual directs you to type appears in a different typeface.
Example: M&M Industries
- Words in **bold** are defined in text where they appear. You will also find many of these terms in the Glossary at the end of this manual.
- The illustrations of dialog boxes and worksheets in the manual are based on DeskMate 3.03. Your screen display may be different depending on your version of DeskMate.

Part One

Getting Started

Part Outline

Chapter 1 Before You Begin

Chapter 2 Installation

Chapter 3 Starting and Ending Lotus-DM

Chapter 1

Before You Begin

This chapter describes the contents of your Lotus Spreadsheet for DeskMate (Lotus-DM) package. It also provides an overview of the Lotus-DM documentation and product support.

Lotus-DM is a spreadsheet program that runs on the Tandy® DeskMate® operating environment under DOS. Lotus-DM provides a similar set of features and @functions as those found in Lotus® 1-2-3® Release 2.01.

There are, however, differences between how both products look and operate. Refer to "Lotus-DM for the 1-2-3 User" in Chapter 3 for more information.

Checking Your Package

Your Lotus-DM package contains disks, documentation, and registration and warranty information. Take time now to check the contents of your package against the following list. If your package is not complete, contact your Lotus representative.

NOTE If you received this software as part of a hardware purchase, only one set of disks (5.25" or 3.5") may be included in the package.

Disks

Your Lotus-DM package should contain both 5.25" and 3.5" disks.

1-2 Before You Begin

NOTE If one of your Lotus-DM program disks is defective or if you accidentally damage or erase one of the original program disks, contact your local Lotus representative for instructions on returning it for a replacement disk.

5.25" Disks

- **Runtime Disk**

The Runtime Disk contains the runtime version of Lotus-DM, which lets you run Lotus-DM from DOS. Refer to Appendix A in *Reference* for more information on running Lotus-DM from DOS.

- **System Disk**

The System Disk contains the Lotus-DM program files and the Install program, which lets you record your name and your company name on your copy of Lotus-DM.

- **PrintGraph and Translate Disk**

The PrintGraph and Translate Disk contains the PrintGraph program, which lets you print graphs you create within Lotus-DM; font files that are used by the PrintGraph program to print text in graphs; and the Translate utility, which lets you transfer data between Lotus-DM and other products.

- **Help and Sample Files Disk**

The Help and Sample Files Disk contains the Lotus-DM on-line Help system, which lets you get information about a particular topic while you are using Lotus-DM; and sample files to use with Lotus-DM.

3.5" Disks

- **System Disk**

The System Disk contains the Lotus-DM program files; the Install program, which lets you record your name and your company name on your copy of Lotus-DM; and the runtime version of Lotus-DM, which lets you run Lotus-DM from DOS. Refer to Appendix A in *Reference* for more information.

- **PrintGraph, Translate, and Help Disk**

The PrintGraph, Translate, and Help Disk contains the PrintGraph program, which lets you print graphs you create within Lotus-DM; and font files that are used by the PrintGraph program to print text in graphs; the Translate utility, which lets you transfer data between Lotus-DM and other products; the Lotus-DM on-line Help system, which lets you get information about a particular topic while you are using Lotus-DM; and sample files for you to use with Lotus-DM.

Documentation

Your Lotus-DM documentation set includes the *Quick Reference*, a separate card that summarizes Lotus-DM's menu commands and features, and the *Lotus Spreadsheet for DeskMate Manual*, divided into three sections.

- **Part One - Getting Started**

Getting Started tells you how to install Lotus-DM and gives you information on starting and ending a Lotus-DM session.

- **Part Two - User's Guide**

The *User's Guide* describes basic Lotus-DM concepts and features including creating a spreadsheet, graphing spreadsheet data, and creating databases.

- **Part Three - Reference**

Reference contains comprehensive information on Lotus-DM commands. It also includes a Glossary and Appendices.

(NOTE) The dialog box and worksheet screen displays in the manual are based on DeskMate 3.3. Your screen display may be different depending on the version of DeskMate on your system.

Warranty Registration Card

The Warranty Registration Card is included in the box that contains your Lotus-DM disks. To become a registered Lotus-DM licensee, you must fill out the Warranty Registration Card and send it to Lotus. Only registered licensees receive a special price on upgrades to new releases, replacement disks for disks that are damaged after the warranty period (for a nominal handling charge), special discounts and offers on new products, and access to Lotus Product Support.

Product Support

Lotus provides phone assistance to registered licensees of its software. Lotus cannot provide phone support if you are not a registered licensee.

Lotus Product Support specialists are available to answer questions related to Lotus software and how it performs with the equipment Lotus supports or certifies as compatible with its software. Product Support specialists cannot provide information about hardware or software programs not supported by Lotus. They also cannot customize applications for you.

Before You Call Product Support

If you have difficulty using Lotus-DM, try the following before you call Product Support:

- Read the section in *Reference* that contains information about the command or procedure you are trying to perform. If *Reference* contains examples that pertain to your problem, try the examples to see if they help you understand how to apply the concept to your own work.

1-4 Before You Begin

- Press HELP (F1) to display Help screens that provide additional information about commands, procedures, and error messages.
- Consult your technical resource person or the computer retailer where you purchased the product.

Chapter 2

Installation

Before you can use Lotus-DM, you must make sure your hardware meets system requirements, install Lotus-DM on your computer, and make back-up copies of the Lotus-DM disks.

System Requirements

This section describes the hardware, memory, and operating system requirements for using Lotus-DM.

Hardware Requirements

To use Lotus-DM, you must have the following hardware:

- A Tandy personal computer, or PC-compatible personal computer supported by DeskMate
- One or two diskette drives, or a hard drive and a diskette drive
- A color or monochrome monitor and graphics board (if not built in to your system)
- A keyboard; a mouse or other pointing device is optional.

2-2 Installation

Memory Requirements

To use Lotus-DM, your computer must have a minimum of 512 kilobytes (K) of system memory.

NOTE Lotus-DM does not support expanded memory.

Operating System Requirements

To use Lotus-DM, you must have Disk Operating System (DOS) 3.2 or above, and DeskMate version 3.0 or above.

New versions of DOS and DeskMate can affect whether you can run Lotus-DM on your computer. Before you use Lotus-DM, check for compatibility with any versions of DOS or DeskMate other than those listed. This information is available from your computer dealer or technical resource person.

Using DeskMate to Install Lotus-DM

This section describes the procedure to install Lotus-DM using DeskMate. If you are not familiar with DeskMate, refer to your DeskMate manual for more information.

NOTE To install the runtime version of Lotus-DM, refer to Appendix A.

Installing Lotus-DM on a Diskette System

Follow the instructions in this section to install Lotus-DM on a diskette system. DeskMate must already be started when you begin these instructions.

NOTE If you are a DeskMate user, use the Desktop (F7) to install Lotus-DM; **do not** type install at the system prompt.

1. Place the System Disk in drive A and close the door.
2. Select Install from the Desktop (F7) menu.
You see the Display Menu list box.
3. Select the size for the Lotus-DM list box and press ENTER.
4. Position the Lotus-DM list box on the Desktop and press ENTER.

You see the Lotus-DM Install information screen. Press ENTER when you finish reading the screen.

NOTE If your system does not have DeskMate in ROM, you must insert the DeskMate disk with the file DeskMate.CFG in drive A. After the file is updated, you re-insert the Lotus-DM System Disk in drive A and continue with the installation procedure.

5. You see an information screen. After you read it, press ENTER, and you see the Licensee Information dialog box.
6. Type your first name and last name in the Your Name field.
You can type up to 30 characters. If you make a typing mistake, use BACKSPACE to erase characters to the left of the cursor. Or, to insert new characters, move the cursor to the appropriate place and then type the new characters.
7. Press TAB or ↓ to move to the Your Company's Name field and type your company's name.
If you don't have a company name, type your name again. You can type up to 30 characters.
8. Do one of the following:
 - Press ENTER to confirm the information you typed.
 - Press ESC to cancel the information you typed and exit without installing Lotus-DM.

If you pressed ENTER, you see the Final Confirmation information box that shows the information as it will be recorded on the System Disk if you continue with the installation.

9. Do one of the following:
 - If you are sure that you have provided the correct information, press ENTER. The information will be permanently recorded on the System Disk and Lotus-DM will display this information every time you start Lotus-DM. You will not be able to change the names once they are recorded.
 - If this is not the information you want to record on the System Disk, press ESC to end the Install program. Any information you have typed will be deleted and you must follow Steps 1 through 10 again to run the Install program.
- (NOTE) If you cancel the Install program, select Delete from the Desktop (F7) menu and delete Lotus-DM from the Menus list box before you again try to install Lotus-DM.

10. When the Install program is complete, proceed to "Backing Up the Lotus-DM Disks" later in this chapter.

(NOTE) If your system does not have DeskMate in ROM, you must insert the DeskMate disk with the file DeskMate.PDM in drive A when the Install program is complete.

Installing Lotus-DM on a Hard-Disk System

Follow the instructions in this section to install Lotus-DM on a hard-disk system. DeskMate must already be started when you begin these instructions.

- (NOTE) If you are a DeskMate user, use the Desktop (F7) to install Lotus-DM; **do not** type install at the system prompt.

2-4 Installation

1. Place the System Disk in drive A and close the door.
2. Select Install from the Desktop (F7) menu.
You see the Display Menu list box.
3. Select the size for the Lotus-DM list box and press ENTER.
4. Position the Lotus-DM list box on the Desktop and press ENTER.
You see the Lotus-DM Install information screen. Press ENTER when you finish reading the screen.

NOTE If your system does not have DeskMate in ROM, you must insert the DeskMate disk with the file DeskMate.CFG in drive A. After the file is updated, you re-insert the Lotus-DM System Disk in drive A and continue with the installation procedure.

5. You see an information screen. After you read it, press ENTER, and you see the Licensee Information dialog box.
6. Type your first name and last name in the Your Name field.
You can type up to 30 characters. If you make a typing mistake, use BACKSPACE to erase characters to the left of the cursor. Or, to insert new characters, move the cursor to the appropriate place and then type the new characters.
7. Press TAB or ↓ to move to the Your Company's Name field and type your company's name. If you don't have a company name, type your name again. You can type up to 30 characters.
8. Do one of the following:
 - Press ENTER to confirm the information you typed.
 - Press ESC to cancel the information you typed and exit without installing Lotus-DM.

NOTE If you cancel the Install program, select Delete from the Desktop (F7) menu and delete Lotus-DM from the Menus list box before you again try to install Lotus-DM.

If you pressed ENTER, you see the Final Confirmation information box that shows the information as it will be recorded on the System Disk if you continue with the installation.

9. Do one of the following:
 - If you are sure that you have provided the correct information, press ENTER. The information will be permanently recorded on the System Disk and Lotus-DM will display this information every time you start Lotus-DM. You will not be able to change the names once they are recorded.
 - If you are not certain that this is the information you want to record on the System Disk, press ESC to end the Install program. Any information you have typed will be deleted and you must follow Steps 1 through 16 again to run the Install program.

NOTE If you cancel the Install program, select Delete from the Desktop (F7) menu and delete Lotus-DM from the Menus list box before you again try to install Lotus-DM.

10. Once you confirm the names, you see the Specify Directory dialog box. Either accept the default path displayed (C:\Lotus-DM) or type the path you want Lotus-DM copied into.

A **path** identifies the location of a file by showing the disk drive letter, directory, and subdirectory the file is in. For example, given the path C:\Lotus-DM\DATA\STATS.WK1, the file STATS.WK1 is located in a subdirectory named DATA within a directory named Lotus-DM on drive C.

The Lotus-DM files are copied to the specified directory. The Install program will tell you what disks to insert during the copying process.

NOTE If you press ESC to cancel the Install program after completing this step, you must run the Install program to copy the disks to the directory. You can not enter your name or company name again, as it has already been recorded on the System Disk.

11. You see an information screen that indicates when the Install program is complete.

NOTE If your system does not have DeskMate in ROM, you must insert the DeskMate disk with the file DeskMate.PDM in drive A when the Install program is complete.

Press ENTER to see the DeskMate desktop.

12. Select Redefine from the Desktop (F7) menu.
You see the Redefine Menu list box.
13. Select Lotus-DM and press ENTER.
14. Press TAB four times to move the cursor to the Start-up Directory field.
15. Do one of the following:
 - If you installed Lotus-DM in the default directory in Step 11, type C:\Lotus-DM and press ENTER.
 - If you installed Lotus-DM in a different directory in Step 11, type the name of the directory and press ENTER.

Proceed to "Backing Up the Lotus-DM Disks" later in this chapter.

Backing Up the Lotus-DM Disks

Use backup copies of the Lotus-DM disks and keep the originals in a safe place. A backup is a copy of an original disk. If anything happens to the backup copy you are using, you can make another copy from the original disk.

2-6 Installation

NOTE If you have a hard-disk system, and have installed Lotus-DM on your hard disk, the following instructions are optional. Once Lotus-DM is installed, you can use the original Lotus-DM disks as backup copies.

Follow the instructions in this section to make backup copies of your Lotus-DM disks.

1. Turn your computer on.
With some computers, you have to turn the monitor on with a separate switch.
2. Start DeskMate.
On some Tandy computers, DeskMate starts once you turn your computer on. On others, you have to place the DeskMate Startup diskette in drive A. Refer to your DeskMate manual for more information.
3. Select Diskcopy from the Disk (F4) menu.
The Copy Disk dialog box is displayed.
4. Type the name of the drive that will contain the Lotus-DM original disk in the From field and press TAB to move to the To field.
5. Type the name of the drive that will contain the Lotus-DM backup disk in the To field.
You can use either formatted or unformatted disks. Diskcopy formats disks if they are not formatted.
6. Select OK to begin the copy process.
Your screen displays the message "Insert Source diskette" in the drive entered in Step 4, "Insert Target diskette" in the drive entered in Step 5, and "Press any key when ready."
7. Place the Lotus-DM System Disk in the drive specified in Step 4 and close the door.
8. Place the backup disk in the drive specified in Step 5 and close the door.
9. Press ENTER to start copying.
The message "Copying" appears on the screen, the lights on the disk drives go on, and the drives make some noise. Copying can take as long as a minute. When the process is finished, the lights on the disk drives go out, and the message "Copy another diskette (Y/N)" is displayed.

NOTE If Diskcopy has to format the disk, the copying process takes longer.

10. Repeat Steps 7 through 9 to copy the remaining Lotus-DM disks.
Label each backup disk with the name and release number. Use this checklist as you proceed (you already copied the System Disk).

5.25" Disks

- System Disk
- PrintGraph and Translate Disk
- Help and Sample Files Disk
- Runtime Disk

3.5" Disks

- System and Runtime Disk
- Translate, PrintGraph, Help, and Sample Files Disk

Chapter 3

Starting and Ending Lotus-DM

This chapter explains how to start and end a Lotus-DM session. It also provides an overview of the Lotus-DM on-line Help system and an overview of Lotus-DM for those users who are familiar with Lotus 1-2-3.

Starting a Lotus-DM Session

The following instructions tell you how to start Lotus-DM. You can start Lotus-DM from the DeskMate File (F2) menu, Programs list box, or Lotus-DM list box.

NOTE To start the runtime version of Lotus-DM, refer to Appendix A.

Starting Lotus-DM from the DeskMate File (F2) Menu

1. Select Run from the File (F2) menu. You see the Run File dialog box.
2. Type Lotus-DM in the Program field.
If Lotus-DM is not in the current directory, type the full path name, including the drive and directory.
Leave the Data File and CPU Clock Speed fields as they appear.
3. Press ENTER.
The Tandy logo screen is displayed while the Lotus-DM files are being loaded. Once the Lotus-DM files are loaded, an information screen, "About Lotus-DM," displays momentarily over the worksheet.

3-2 Starting and Ending Lotus-DM

Starting Lotus-DM from the Programs List Box

1. Select Lotus-DM.PDM in the Programs list box.
If the Programs list box is not displayed, perform the following steps:
 - Select Display from the Desktop (F7) menu.
 - Select Programs from the Display Menu dialog box.
 - Select the size of the list box.
 - Press ENTER.
 - Position the list box where you want it and press ENTER.
 - Move the cursor to Lotus-DM.PDM.
2. Press ENTER.
The Tandy logo screen is displayed while the Lotus-DM files are being loaded. Once the Lotus-DM files are loaded, an information screen, "About Lotus-DM," displays momentarily over the worksheet.

Starting Lotus-DM from the Lotus-DM List Box

1. Select the Lotus-DM list box.
If the Lotus-DM list box is not displayed, perform the following steps:
 - Select Display from the Desktop (F7) menu.
 - Select Lotus-DM from the Display Menu dialog box.
 - Select the size of the list box.
 - Press ENTER.
 - Position the list box where you want it and press ENTER.
2. Press ENTER.
The Tandy logo screen is displayed while the Lotus-DM files are being loaded. Once the Lotus-DM files are loaded, an information screen, "About Lotus-DM," displays momentarily over the worksheet.

Ending a Lotus-DM Session

The following instructions tell you how to end a Lotus-DM session. You can end Lotus-DM with the Lotus-DM File (F2) menu or with the ESC key.

NOTE Before you leave Lotus-DM, be sure to save your work.

Ending Lotus-DM from the Lotus-DM File (F2) Menu

1. Select Exit from the Lotus-DM File (F2) menu. You see the Save Changes dialog box.
2. Do one of the following:

- Select OK to save the worksheet. You see the File Save as dialog box. Enter the filename to save the worksheet and then select OK.
- Select NO to exit Lotus-DM without saving the worksheet.
- Select CANCEL to return to the worksheet in READY mode.

Ending Lotus-DM Using ESC

1. Press ESC. You see the Save Changes dialog box.
2. Do one of the following:
 - Select OK to save the worksheet. You see the File Save as dialog box. Enter the filename to save the worksheet and then select OK.
 - Select NO to exit Lotus-DM without saving the worksheet.
 - Select CANCEL to return to the worksheet in READY mode.

Using the Lotus-DM Help System

You can press HELP (F1 or CTRL-F1) at any time in a Lotus-DM session to see a screen of information about the part of the program you are using. When you press HELP, the worksheet temporarily disappears and a Help screen appears. If you press HELP when a dialog box or error message is displayed on screen, a Help screen specific to the related menu command or error condition appears. Otherwise, a Help index appears. From the index, you can view a Help screen on any topic you choose. To select from the Help index, highlight the topic you want and press ENTER.

Once you select a topic, notice the words that appear in a contrasting color or a brighter intensity within the current Help screen and at the bottom of the screen. These words represent related topics on which you can also get Help. To select one of these topics, highlight the topic you want and press ENTER.

To leave Help and return to Lotus-DM, press ESC.

Lotus-DM for the 1-2-3 User

Lotus-DM is a spreadsheet program for the Tandy DeskMate operating environment running under DOS. DeskMate is software from Tandy that provides a graphics-oriented user interface to work with your computer. Lotus 1-2-3 is a character-based spreadsheet program for personal computers running under DOS.

While designed for different operating interfaces, Lotus-DM and Lotus 1-2-3 Release 2.01 are functionally compatible. Table 3-1 lists some of the main differences between the two programs.

3-4 Starting and Ending Lotus-DM

Table 3-1 Differences between Lotus-DM and Lotus 1-2-3

Feature	1-2-3 Release 2.01	Lotus-DM
Spreadsheet interface	Character-based	Graphical
Input/selection device	Keyboard	Keyboard, mouse, joystick
Input operation	Choose action or function then select object (e.g., choose Range Erase, then specify the range to be erased)	Select object then choose action or function (e.g., specify the range to be erased, then choose Range Erase)
Menu types	Standard 1-2-3 style	Pull-down style
Menu access	Slash (/) key	Function keys (F2 - F10) or pointing device
Main menu	Ten selections: Worksheet, Range, Copy, Move, File, Print, Graph, Data, System, Quit	Six selections: File, Edit, Worksheet, Range, Graph, Data
Function keys	Keys F2 through F10 to perform tasks (e.g., F2 = Edit cell)	Key combinations of CTRL and F2 through F10 to perform tasks (e.g., CTRL-F2 = Edit cell)
Macros	Standard 1-2-3 macros	DeskMate keystroke capture facility
Character set	Lotus International Character Set (LICS)	Subset of LICS and ASCII (IBM Code Page 437)
Add-ins	Standard 1-2-3 Add-ins	Not available
Clipboard	Not available	Standard on DeskMate, allows you to copy text and graphs from Lotus-DM to other DeskMate applications which support the Clipboard
Calculator, Phone List, Corkboard, Month, Alarm, To Do List	Not available	Standard on DeskMate
I/O drivers	Standard 1-2-3 drivers	DeskMate supported drivers
Video display colors	1-2-3 default	Selectable through DeskMate Setup accessory
Expanded Memory	Optional (LIM 3.2)	Not available
Exit program	/Quit	Exit item from File menu, or ESC

For more information on character sets, see Appendix B in *Reference*. For more information on how Lotus-DM differs from 1-2-3 Release 2.01, see Appendix C in *Reference*.

Part Two

User's Guide

Part Outline

Chapter 4 Learning About Lotus-DM

Chapter 5 Creating an Income Statement

Chapter 6 Graphing a Home Budget

Chapter 7 Managing an Employee Database Table

Chapter 4

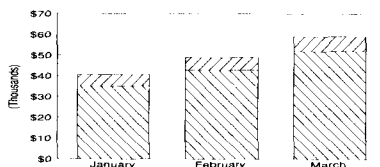
Learning About Lotus-DM

The *User's Guide* introduces the basic components of Lotus-DM—worksheets, graphs, and database tables. Each component represents a separate way of organizing and manipulating data. Figure 4-1 illustrates how each component displays information.

Worksheet

	A	B	C	D
1		Sales	Expenses	Profits
2	January	\$35,000	\$5,600	\$29,400
3	February	\$43,000	\$6,200	\$36,800
4	March	\$52,000	\$7,100	\$44,900

Graph



February - Sales Report

Database Table

Name	Office	Sales	Expenses
J. Reed	East	\$12,300	\$1,800
B. Smith	West	\$10,950	\$1,740
L. Paine	North	\$10,250	\$1,525
C. Caster	South	\$9,500	\$1,135

Figure 4-1 Basic components of Lotus-DM

4-2 Learning About Lotus-DM

Each chapter in the *User's Guide* presents an example of the work you can do with Lotus-DM—in business and at home. If you are new to spreadsheet software, read each chapter in turn. Along with step-by-step instructions, you will find complete descriptions of the basic concepts for designing and using worksheets, graphs, and databases.

If you are experienced in using spreadsheet software, review the chapters that describe the work you use a spreadsheet for—"Creating an Income Statement," "Graphing a Home Budget," or "Using an Employee Database Table." Lotus-DM works like Lotus 1-2-3 Release 2.01, but it presents menu selections and command options in a new way. See Appendix C in *Reference* for a description of the differences between Lotus-DM and Lotus 1-2-3 Release 2.01. Practice with the examples in the *User's Guide* before you work with your own data.

Each chapter in the *User's Guide* contains several lessons. Each lesson takes no more than 30 minutes to complete. Try to set aside enough time to complete all the lessons in one chapter, but if you need to stop within a chapter, you can save your work at the end of a lesson and return where you left off.

Each lesson contains instructions on how to enter and edit data, select options, and specify ranges. For in-depth descriptions, see Chapter 8 in *Reference*.

The next sections describe how to start from the main window, move around Lotus-DM, select commands, correct mistakes, get help, save and retrieve your work, exit Lotus-DM, and learn more about commands.

Starting from the Main Window

Before you begin the lessons in the *User's Guide*, make sure that you have installed and started Lotus-DM and that the Lotus-DM main window is on your screen.

(NOTE) If the main window is not on your screen, read "Installation" and "Starting and Ending a Lotus-DM Session" in *Getting Started*.

Viewing the Main Window

The main window divides the screen into four areas: the title bar, the menu bar, the edit panel, and the worksheet area.

The first line at the top of the screen is the **title bar**. The title bar contains Help (F1), the current date, the product name (Lotus-DM) and current file name, and the current time. If the current file does not have a file name, you see (Untitled) in the title bar.

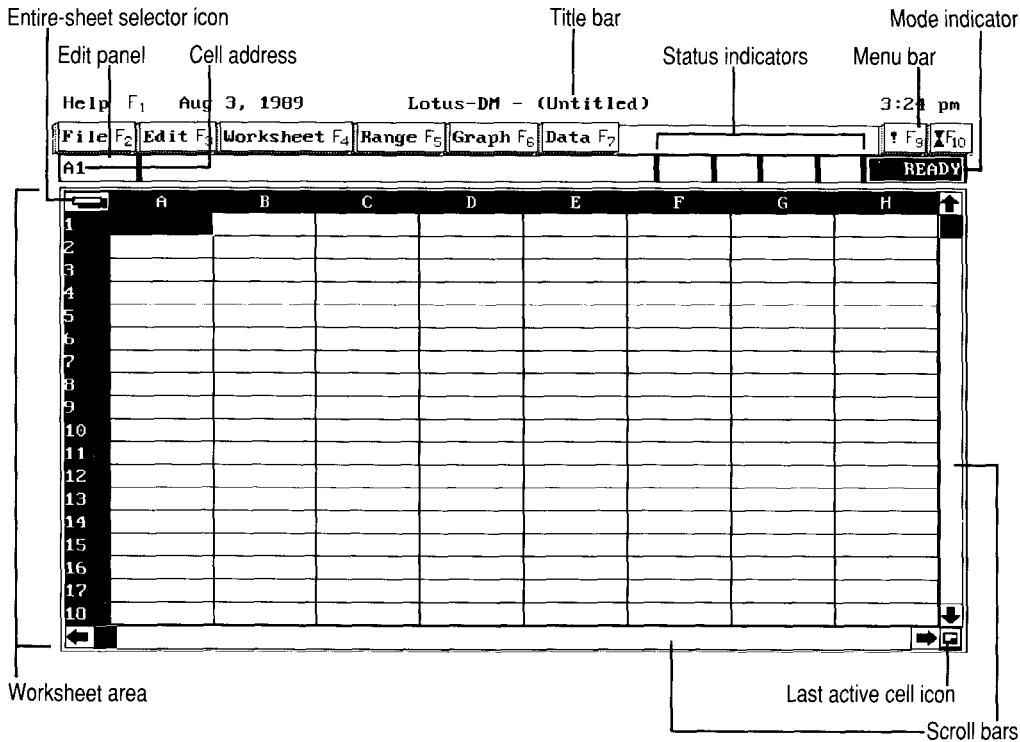


Figure 4-2 Lotus-DM main window

The **menu bar** contains the Lotus-DM main menu and the DeskMate Setup accessory (F10). The Lotus-DM main menu contains six command categories: File (F2), Edit (F3), Worksheet (F4), Range (F5), Graph (F6), and Data (F7). Use these commands to create, save, and print worksheets, graphs, and databases. See "Using the Setup Accessory" in Appendix A for information on DeskMate Setup (F10). F8 and F9 are inactive.

The third line at the top of the screen is the **edit panel**. The edit panel contains four sections: the current cell address, the current cell contents, the status indicators, and the mode indicator.

A **cell** is a worksheet space where you can enter information. At least one cell is highlighted, or current, at any given time. The entry in the highlighted cell shows in the current cell contents section of the edit panel. If the cell is blank, the cell contents section is empty.

The **status indicators** display names of certain keys and error messages, and the **mode indicators** describe the tasks you can perform in Lotus-DM at any given time. When you start Lotus-DM, the READY mode indicator shows in the edit panel. This means that Lotus-DM is waiting for your next instruction.

4-4 Learning About Lotus-DM

The **worksheet area** occupies the largest section of the screen. It contains the worksheet display, the column heading area, the row heading area, the entire-sheet selector icon, the vertical and horizontal scroll bars, and the last active cell icon.

The **worksheet** is a grid made up of rows and columns. Each intersection of a row and a column forms a cell, in which you can store data. The **column headings** are letters across the top of the worksheet, running from A-Z, then AA-AZ, then BA-BZ, and so on to IV (for a total of 256 columns). The **row headings** are consecutive numbers, running from 1 to 8192, along the left side of the worksheet. The **cell address** is the combined column letter and row number that mark the cell's location. For example, A1 is the address for the cell in column A, row 1.

The **entire-sheet selector icon**, located at the intersection of the column and row headings in the upper left corner of the worksheet area, highlights the active area of the worksheet.

The scroll bars adjust your view of the current worksheet. The **vertical scroll bar**, which contains up and down arrows, is located on the far right side of the screen. The **horizontal scroll bar**, which contains left and right arrows, is located at the bottom of the screen.

The **last active cell icon**, located at the intersection of the vertical and horizontal scroll bars in the lower right corner of the worksheet area, moves the cell pointer to the last active cell in the worksheet.

You can select the entire-sheet selector icon, the scroll bars, and the last active cell icon only when you use a pointing device, such as a mouse.

Moving Around Lotus-DM

Each chapter in the *User's Guide* includes instructions for the keyboard and for pointing devices, such as a mouse. Your current location in the active area of the worksheet is marked with a highlighted cell, or **cell pointer**. When you are making a selection or entering information in a dialog box, your current location is marked by a highlighted line, or **cursor**. When you are entering data or editing an entry in the edit panel, the cursor marks your position in the text.

Using a Mouse

The Lotus-DM design is especially well suited to pointing devices, such as a mouse or a joystick. A **mouse** is a small tracking device, sized to fit in your hand. Hold the mouse so the cord extends in front of your hand. Be sure you do not hold it backwards. As you move the mouse across the top of your desk, the tracking ball on its underside communicates your movements to the arrow on the screen. You move the arrow to **point** to your selection.

A mouse comes with one or two buttons on its top side. You use only one button with Lotus-DM. If your mouse is equipped with two buttons, use the left one. You press, or **click**, the button to make selections on the screen.

NOTE If you run out of space on your desk when moving a mouse, pick it up and place it back down in a more convenient location. The arrow on the screen will not move unless the tracking ball is touching the top of the desk.

A **joystick** is another type of tracking device, similar to a manual gear shift in an automobile. As you move the joystick around its center point, the cursor traces your movements on the screen. A joystick comes equipped with a button on top. You press, or **click**, the button to make your selections on the screen.

The most common type of pointing device is the mouse. The instructions for using a joystick are the same as for using a mouse. For simplicity, then, this manual refers to the pointing device as a mouse.

Using the Keyboard

Use the keys on your keyboard to move around the screen. You can use single keys or combinations of keys to get from one location to another. This manual refers to single keys by the name or symbol that appears on the keyboard; for example, ↑ refers to the key with the up arrow printed on it.

When the instructions refer to more than one key, the following conventions apply:

- When two keys are separated by a hyphen, press and hold down the first key, press the second key, and then release both keys. For example, to use the SHIFT-TAB combination, press and hold down SHIFT, press TAB, and then release both keys.
- When two keys are separated by a space, press the first key and release it, then press the second key and release it. For example, to use the END HOME combination, press END and release it, and then press HOME and release it.

Some key combinations are named, for example, BIG RIGHT (CTRL - →). Press the keys that follow in parentheses to use the key combination.

Certain keys perform several actions, depending on the location of the cell pointer or cursor when you use them. The actions of the keys differ in the worksheet, the edit panel, a menu, and a dialog box. A **dialog box** follows many commands and accepts additional information. Both dialog boxes and the edit panel contain **edit fields**, which are fields that accept information.

Table 4-1 describes the cursor-movement and pointer-movement keys.

4-6 Learning About Lotus-DM

Table 4-1 Movement keys

Press	To move
↑	Up one row, up to the previous option in a dialog box, or up one item in a menu
↓	Down one row in the worksheet, down to the next option in a dialog box, or down one item in a menu
→	Right one column in the worksheet, right one character in an edit field, right one option in a dialog box, or right to the next pull-down menu
←	Left one column in the worksheet, left one character in an edit field, left one option in a dialog box, or left to the previous pull-down menu
TAB	Right one screen in the worksheet or right to the next set of options in a dialog box
BACKTAB (SHIFT-TAB)	Left one screen in the worksheet or left to the previous set of options in a dialog box
BIG RIGHT (CTRL - →)	Right one screen in the worksheet or to the last character in the edit panel
BIG LEFT (CTRL - ←)	Left one screen in the worksheet or to the first character in the edit panel
PGUP	Up one screen in the worksheet
PGDN	Down one screen in the worksheet
HOME	To cell A1 in the worksheet or to first character in an edit field
END HOME	To the lower right corner of the active area of the worksheet
END ↑	Up to the next cell where blank and filled cells meet or to the first cell of a column in the worksheet
END ↓	Down to the next cell where blank and filled cells meet or to the last cell of a column in the worksheet
END →	Right to the next cell where blank and filled cells meet or to the last cell of a row in the worksheet
END ←	Left to the next cell where blank and filled cells meet or the first cell of a row in the worksheet

(NOTE)

Pressing ← at the first character position or → at the last character position in the edit panel completes the entry and moves the cell pointer left or right one column. END must be used in combination with another pointer-movement key. When you press END, the END status indicator is highlighted in the edit panel. This prompts you to press the next key.

Selecting Commands

You communicate your instructions to Lotus-DM by selecting **commands**. The menu bar contains the names of the Lotus-DM command categories. Each command category has a list of commands called a **pull-down menu**. You use the commands from pull-down menus to build a worksheet, graph, or database table. In order to use a command, you must first **select** the command category from the menu bar to display its pull-down menu.

When you display a pull-down menu, some commands may be shadowed, meaning that they are not currently available. Some command names contain a row of dots (...), meaning that the command uses a dialog box, which contains further options for the commands. You can customize your work with the options available for some commands. For more information, see "Working with Dialog Boxes" in Chapter 8.

Each full command name contains two parts: the name of the command category and the name of the command on the pull-down menu. For example, to select Worksheet Format, select Worksheet from the menu bar to display its pull-down menu, then select Format.

Using a Mouse

To select a command with a mouse, you must first point to it, then click once to highlight it, and double-click to select it.

NOTE If you are unsure of where to find the command you want to use, you can press the mouse button and hold it down while you **drag** across the menu bar. You see each pull-down menu as you drag across it. This way, you can see the contents of each pull-down menu without having to select each one in turn.

Using the Keyboard

If you are using the keyboard, you can select pull-down menus only with function keys or accelerator keys. Function keys are the numbered keys beginning with the letter F on your keyboard. They are located either along the top of your keyboard or on the far left side. Accelerator keys are key combinations that select a pull-down menu or a command. To use accelerator keys, hold down the first key while you press the second. Table 4-2 lists the keys you press to select a pull-down menu.

See Table 8-7 in Chapter 8 for a list of the accelerator keys that select pull-down menu commands.

Select a command from a pull-down menu by highlighting your choice using ↓ or ↑ and pressing ENTER.

Table 4-2 Function keys and accelerator keys that select pull-down menus

Select	Function Key	Accelerator Key	To
File	F2	ALT-F	Open, save, and print files.
Edit	F3	ALT-E	Copy images to the DeskMate clipboard and paste clipboard images to the worksheet; copy and move data within the worksheet.
Worksheet	F4	ALT-W	Specify the settings for the worksheet as a whole or for parts of the worksheet.
Range	F5	ALT-R	Use worksheet data in blocks, or ranges, of cells.
Graph	F6	ALT-G	Create, save, and print graphs.
Data	F7	ALT-D	Analyze information in a database table.

You can also select a command from a pull-down menu by typing the first letter of the command and pressing ENTER. When you type a letter, Lotus-DM automatically highlights the first command beginning with that letter in the menu. If your selection is not the first item beginning with the designated letter, type the letter again until you highlight your selection. Press ENTER to select the highlighted command.

Correcting Mistakes

To correct a mistake when selecting a command, press ESC to back up step by step.

If you make a mistake while entering data, you can correct it. You can press BACK-SPACE to move the cursor back to the error, erasing the characters as you back up, or you can press ← to move back to the error without erasing the characters as you back up. You can also press DEL to erase the character above the cursor. Then, retype the entry from that point.

If you make a mistake in a worksheet cell, you can edit it. Move the cell pointer to the cell containing the error, and press CTRL-F2. You see the EDIT mode indicator on the right side of the edit panel. This means you can move the cursor within the cell contents section of the edit panel and correct the mistake.

Getting Help

Lotus-DM provides on-line information that you can view during a Lotus-DM session. When you press HELP (F1 or CTRL-F1), Lotus-DM displays a screen with related information. The Lotus-DM Help system is context-sensitive: it describes what you are currently doing in the program when you press HELP.

Each Help screen includes a menu of additional Help topics, which appear in a contrasting color or in a brighter intensity on the screen. Highlight the topic you want to see, and double-click or press ENTER to display the related Help screen. When you have finished reading about the selected topic, you can select another. You can select as many topics as you need.

When you finish using Help, press ESC to return to the worksheet in the same place where you left it.

Saving and Retrieving Your Work

If you need to stop before you finish a chapter, you can stop at the end of a lesson. However, you need to save your work. This way, you can later retrieve your work at the point where you left off.

To save your work, select File Save as and type the name of the file. You do not have to specify a password in the Password field, but if you do, you will need it to retrieve the file later. File Save as saves your work and names the file in one step. To save the file subsequent times, press CTRL-S.

When you start the next lesson in the chapter, you can retrieve your work by selecting File Open and specifying the file that you saved. Select OK to retrieve the file and begin where you left off.

Exiting Lotus-DM

To exit Lotus-DM, select File Exit or press ESC. You see a message asking if you want to leave Lotus-DM. Select OK to return to the DeskMate desktop or the DOS prompt, depending on where you began your Lotus-DM session.

Learning More About Commands

The *User's Guide* focuses on the basics of creating and using worksheets, graphs, and database tables. For comprehensive information about a command, see Part III, *Reference*, and read the related information about the command.

Chapter 5

Creating an Income Statement

This chapter describes the basic skills and concepts you need to use worksheets. It includes selecting commands, entering data, performing calculations, formatting numbers, and printing a worksheet.

Think of a worksheet as being made up of two parts:

- A grid that provides a basic structure for entering, calculating, and storing data.
- The data you enter into the grid.

The basic structure is designed for a specific purpose, such as creating an income statement, a general ledger, or personnel records. In this chapter, you see how to build a sample income statement similar to one that a company might use to analyze product sales and expenses.

Lesson 1 Learning Worksheet Basics

To use Lotus-DM effectively, you need to master some basic worksheet concepts, such as moving around the worksheet, correcting errors, and using the Help system. Start this lesson at a blank worksheet in the Lotus-DM main window.

Moving Around the Worksheet

When you work in the worksheet area, you move from cell to cell as you enter, change, and calculate data. There are a number of ways to move around a worksheet quickly and efficiently using a pointing device, such as a mouse or a joystick, or the keyboard.

When you begin a Lotus-DM session, the cell pointer is in A1.

Using a Mouse

To move the cell pointer from A1 to B2 with a mouse, move the mouse across your desk and point to B2. Notice that as you move the mouse, the arrow on the screen traces your movements with the mouse. **Click** (quickly press and release the mouse button) the cell to select it. When selected, the cell is highlighted. The cell address in the left corner of the edit panel changes to reflect the new location of the cell pointer and now displays B2.

To move the cell pointer a number of cells at a time, use the scroll bars. Click the scroll-down arrow to move the cell pointer down to B5. Click the scroll-right arrow to move the cell pointer over to cell H5.

You can also click next to the elevator box on either scroll bar to scroll the screen in the corresponding direction.

See "Using a Mouse or Joystick" in Chapter 4 for more information on using a mouse.

Using the Keyboard

To move the cell pointer from A1 to B2 with the pointer-movement keys, press ↓ then →. The cell address in the left corner of the edit panel changes to reflect the new location of the cell pointer and now displays B2.

The pointer-movement keys move the cell pointer one cell at a time. Now try some keys that move the cell pointer a number of cells at a time. Press PGDN to move down one screen. Press PGUP to move back to the previous screen.

Several pointer-movement keys are actually key combinations. Key combinations linked with a hyphen must be pressed simultaneously; for example, BIG RIGHT (CTRL-→) means that you press and hold CTRL while you press →. Press BIG RIGHT (CTRL- →) to move right one screen. Press BIG LEFT (CTRL- ←) to move left to the previous screen.

For key combinations that are not linked with a hyphen, you must press and release the first key, then press and release the second key. For example, you can use END in combination with other pointer-movement keys to move the cell pointer. To move to the last row of the worksheet (8192) press END ↓. Press END first and release it. You see the END status indicator highlighted in the edit panel. This prompts you to press the second key in the combination. Press ↓. Notice the row numbers. The cell pointer is in row 8192. To move back to A1, press HOME.

NOTE The effect of pressing END and a pointer-movement key varies when there is data in the worksheet. See "Using the Keyboard" in Chapter 4 for a complete list of movement keys.

Correcting Errors

If you make a typing error, Lotus-DM may not recognize the data you are trying to enter. If you haven't yet pressed ENTER, you can press BACKSPACE to erase an incorrect character to the left of the cursor and then continue to type the entry.

If, however, you see a typing error after you press ENTER, you can correct it in one of two ways. One way is to move the cell pointer to the cell that contains the incorrect entry, type a new entry; and press ENTER. This method is the best choice for replacing an entire entry.

Another way is to move the cell pointer to the cell that contains the incorrect entry and press EDIT (CTRL-F2). You see EDIT highlighted in the edit panel. This means that Lotus-DM is in EDIT mode. Lotus-DM displays the entry in the edit panel. You then use the cursor-movement keys to move to the location of the mistake in the entry. To insert new text, type the new characters; to erase characters, use BACKSPACE or DELETE. When you are finished editing, press ENTER. You see the corrected entry in the worksheet. This is the best method for making a minor change in a long entry.

Using the Help System

You can press HELP (F1 or CTRL-F1) at any time in a Lotus-DM session to see a screen of information about the part of the program you are using. You can also press HELP whenever an error message box is displayed. Help provides information about how to fix the error. When you press HELP, the worksheet temporarily disappears and you see a Help screen. To try Help, press F1.

You see the Help index. From there, you can view a Help screen on any topic you choose. To select a topic from the Help index, move the cursor to the topic you want, and press ENTER.

To leave Help and return to the worksheet, press ESC.

Lesson 2 Opening the Income Statement File

You can create an income statement from scratch or build on existing data. In this lesson you begin with existing data.

5-4 Creating an Income Statement

To build on the income statement, you first open (or retrieve) a worksheet file. To perform tasks such as opening a file, you use commands. You select commands from pull-down **menus**—sets of related commands that Lotus-DM displays in the menu bar.

Selecting Commands

To open the sample income statement file, use the File Open command. First select File (F2) from the menu bar.

To select File with a mouse, point to File in the menu bar and click.

To select File with a keyboard, press the F2 function key. Function keys are the numbered keys beginning with the letter F on your keyboard. They are located either along the top of your keyboard or on the far left side.

(NOTE) You can also use accelerator keys to select certain commands. An accelerator key is a combination of keystrokes that invokes a command. See "Using the Keyboard" in Chapter 4 for more information.

Once you select from the menu bar, you see a pull-down menu of commands. Some of these commands may be shadowed, meaning that they are not currently available. Some commands contain a row of dots (...), meaning that these commands use dialog boxes. You can view information, enter information, or select options in dialog boxes.

When you select File (F2), you see the pull-down menu of file commands.

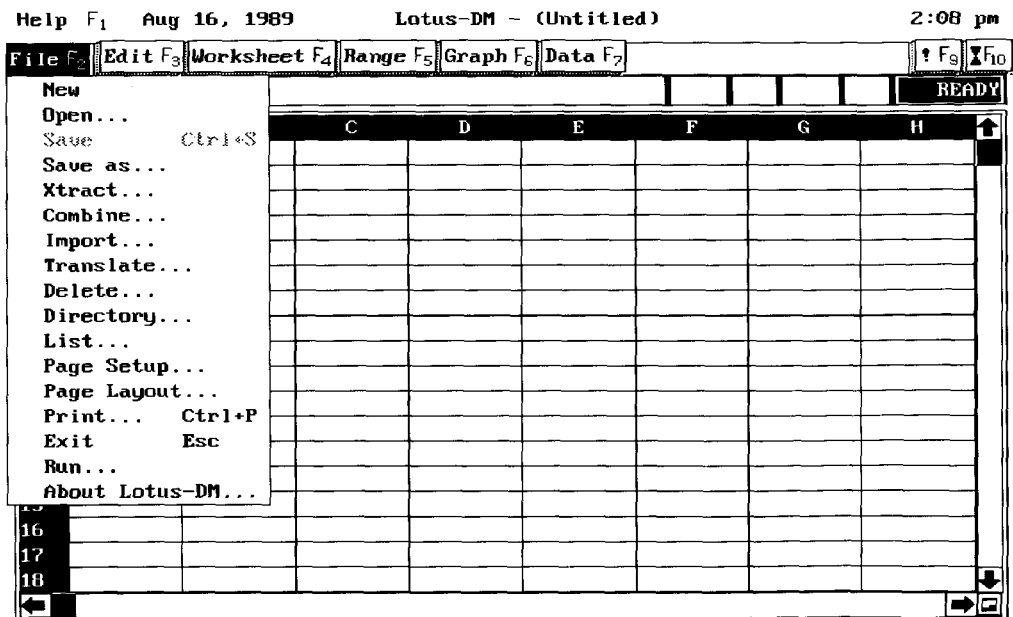


Figure 5-1 File commands

The next step in retrieving the income statement file is selecting Open from the pull-down menu.

To select Open with a mouse, point to Open on the pull-down menu. Click to highlight the command and **double-click** (click the left mouse button twice in rapid succession) to select the command.

To select Open with a keyboard, use the cursor-movement keys to highlight Open on the pull-down menu and press ENTER.

(NOTE) You can also press the first letter of a command on a pull-down menu and press ENTER to select it. See "Selecting Commands" in Chapter 4 for more information.

When you select Open from the File menu, you see the Open File dialog box.

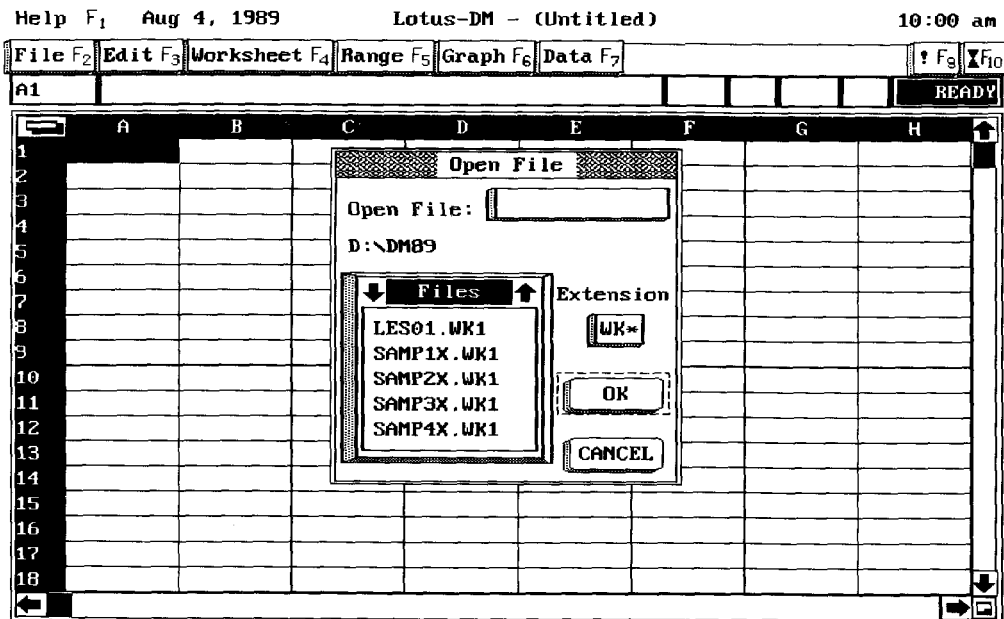


Figure 5-2 Open file dialog box

Retrieving a File

Once you have selected File Open and see the Open File dialog box, you are ready to enter information that tells Lotus-DM what file to retrieve.

The **dialog box** accepts information you specify or lists options that you can select. Any information you enter becomes effective when you select OK. You select OK by double-clicking the OK button if you are using a mouse, or by highlighting it and pressing ENTER if you are using a keyboard.

5-6 Creating an Income Statement

NOTE The following instructions assume a directory named Lotus-DM on drive D as the current directory. If your files are located on a different drive and/or in a different directory, specify that drive and/or directory.

You can specify a file to retrieve by typing the first letter of the file name to highlight the file name in the File list box. Or, you can press TAB to move to the Open File field and type the name of the file.

To open the income statement file with a mouse, double-click on LES01.WK1 in the Files list box.

To open the income statement file with the cursor-movement keys, press TAB to move the Open File field, type LES01.WK1, and select OK.

	A	B	C	D	E	F
1	INCOME STATEMENT Year End					
2						
3		Totals 19	Totals 19	Totals 1988		
4						
5						
6						
7						
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		
13	Telephone	1800	1900	1508		
14	Maintenance & Repairs	19916	21488	18555		
15	Gas & Oil	1275	1477	1700		
16	Depreciation	2000	2200	2400		
17	Utilities	1099	1067	1090		
18	Other Operating Expenses	0	0	0		

Figure 5-3 Income statement worksheet

You can see in Figure 5-3 that the sample file contains some data for an income statement that has already been entered for you. In the remainder of this chapter, you build on that income statement worksheet.

Saving a File

One of the most important Lotus-DM commands is File Save As, which copies your worksheet data from the computer's memory to a file on a hard disk, and lets you name the file. This procedure makes the data in your worksheet permanent; if you don't save your work, your data is lost when you retrieve a new file or end Lotus-DM.

NOTE Use File Save As early in your session to name and save the file, and then save your work frequently to minimize the risk of losing data from unforeseen events, such as a power failure. One quick method is to press CTRL-S to save a file at any point in READY mode.

To save the current worksheet, select File, Save As. You see the File Save dialog box. You specify a file name in the Save As field by typing a name of up to eight characters. You can use uppercase or lowercase letters when you enter a file name; Lotus-DM displays the file name in the title line as you entered it.

Type INCSTMT in the Save As field as the name for the income statement. Leave the Password field blank, and press ENTER to save the file.

You can specify a password to prevent someone else from reading or using your file, but leave the Password field blank for this lesson. For future reference, passwords can contain up to 15 characters.

NOTE If you enter a password, make sure you write it down in case you forget it. You will not be able to access a password-protected file without specifying the password.

Lesson 3 Entering Data

Start with the worksheet file you created in Lesson 2, named INCSTMT.WK1, on the screen. If INCSTMT.WK1 is not on the screen, you must retrieve it. Select File Open, and select INCSTMT.WK1 from the Files list box or type INCSTMT.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

In this lesson, you begin entering data into the income statement worksheet.

A cell can store two types of data: labels and values. You enter labels and values by moving to the cell, typing the entry, and pressing ENTER. **Labels** are text, such as Net Sales or Operating Expenses. **Values** are numbers, such as 65 or 495.9, or formulas that result in numbers. Values can also be cell or range addresses, or range names, that contain numbers or numeric formulas.

Entering and Editing Labels

Lotus-DM assumes that an entry beginning with a letter is a label. If Lotus-DM interprets an entry as a label, it automatically inserts the default label prefix (an apostrophe) in front of the label.

Any entry, however, including a number, can be a label if you begin it with a **label prefix**, a character that controls the label's position in a cell. You learn more about label prefixes at "Aligning Labels" later in this chapter.

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Entering a Label

To enter a company name in the income statement worksheet, press HOME (to make sure the cell pointer is in A1). Then move the cell pointer to D1, type M&M Industries, and press ENTER. Your screen should look the one shown in Figure 5-4.

	A	B	C	D	E	F
1	INCOME STATEMENT	Year End		M&M Industries		
2						
3		Totals 1986	Totals 1987	Totals 1988		
4						
5						
6						
7						
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		
13	Telephone	1800	1900	1508		
14	Maintenance & Repairs	19916	21488	18555		
15	Gas & Oil	1275	1477	1700		
16	Depreciation	2000	2200	2400		
17	Utilities	1099	1067	1090		
18	Other Operating Expenses	0	0	0		

Figure 5-4 Entering a company name label

Notice that even though you entered the label in D1, it overflows into the blank cell to the right (E1). A label that contains more characters than the width of the column is called a **long label**. Although the label appears to occupy more than one cell, Lotus-DM stores it entirely in D1, and the complete text of the label appears in the edit panel. Verify this by moving the cell pointer to E1. See in the edit panel and in E1 that it contains no entry.

A cell can contain more information than can fit within the width of the column. In fact, a cell can hold up to 240 characters.

(NOTE) Notice that the labels Totals 1986 (B4), Totals 1987 (C4), and Totals 1988 (D4) are truncated, or shortened. You will fix them later in this chapter.

Using EDIT (CTRL-F2)

You can use EDIT (CTRL-F2) to change cell entries. To add a date to the income statement title, move the cell pointer to A1. Press EDIT (CTRL-F2). Notice that the

cell contents are highlighted in the edit panel. Press END and then press the space bar once to insert a space after Year End. Next, type December 1988 as the date for the income statement. Press ENTER to return to READY mode.

Using GOTO (CTRL-F5)

GOTO (CTRL-F5) is a shortcut for moving around a worksheet. It is especially useful for moving around large worksheets when the cell you want to move to may not be visible on the screen.

Use GOTO (CTRL-F5) to move to cells within the worksheet area. First, press GOTO (CTRL-F5), type A4, and press ENTER. The cell pointer moves to A4. Then type Net Sales, press ENTER, and press ↓. Lotus-DM enters the label in A4 and moves down one cell to A5. Next, type Cost of Goods Sold and press ENTER to enter the label in A5. Finally, press GO TO (CTRL-F5), type A7, and press ENTER. The cell pointer moves to A7. Type Gross Profit, and press ENTER to enter the label in A7.

Your screen should look like the one in Figure 5-5.

	A	B	C	D	E	F
1	INCOME STATEMENT	Year End	December 1988	M&M Industries		
2						
3		Totals 19	Totals 19	Totals 1988		
4	Net Sales					
5	Cost of Goods Sold					
6						
7	Gross Profit					
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		

Figure 5-5 Entering cell labels

Entering and Copying Values

Lotus-DM recognizes an entry as a value when you begin with a number (0 through 9) or with one of the following numeric symbols: . (+ \$ @ - #.

Entering Values

When you type an entry and press → ← ↑ or ↓ instead of ENTER, Lotus-DM enters the label or value in the cell and moves the cell pointer one cell in the specified direction.

(NOTE) Pressing ← at the first character position, or → at the last character position in the edit panel, completes the entry and moves the cell pointer left or right one column.

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To enter the Net Sales figures move the cell pointer to B4. Type 340000, press →, type 390000, press →, and type 450000. To enter the Cost of Goods Sold figures press ↓, then press ← two times. Type 195400, press →, and type 223080. Finally, press →, type 257400, and press ↓.

Take a minute to check that your screen looks like the one in Figure 5-6. Correct any typing errors you made before continuing with this lesson.

	A	B	C	D	E	F
1	INCOME STATEMENT	Year End December 1988	M&M Industries			
2						
3		Totals 1987	Totals 1988			
4	Net Sales	340000	390000	450000		
5	Cost of Goods Sold	195400	223080	257400		
6	Gross Profit					
7	Operating Expenses					
8	Sales Salaries	29700	31500	32600		
9	Advertising	2300	4000	3800		
10	Sales Commissions	6000	5800	6020		
11	Administrative Salaries	29500	32045	32000		
12						

Figure 5-6 Entering values

Copying Values

Once you enter information in one location, you can copy it to other cells in the worksheet. To enter values for Other Operating Expenses for 1986, press GOTO (CTRL-F5), type B18, and press ENTER. Then, type 3800, and press ENTER.

To copy the same value to Other Operating Expenses for 1987 and 1988, select Edit Copy Range (CTRL-C). The edit panel displays the Copy From range (B18..B18).

You enter the range you want to copy to in the highlighted part of the edit panel. To enter the range for Other Operating Expenses for 1987 and 1988, type C18..D18 in the edit panel and press ENTER.

Your screen should look like the one in Figure 5-7.

Entering Formulas

The numeric formulas you create in Lotus-DM can include any combination of mathematical operations: addition, subtraction, multiplication, division, and/or exponentiation. They can perform any type of calculation from simple arithmetic to advanced financial and statistical analysis.

Whenever you enter a formula in a cell, Lotus-DM calculates the formula's result automatically and displays the result in the cell.

	A	B	C	D	E	F
1	INCOME STATEMENT	Year End	December 1988	M&M Industries		
2						
3		Totals 19	Totals 19	Totals 1988		
4	Net Sales	340000	390000	450000		
5	Cost of Goods Sold	195400	223080	257400		
6						
7	Gross Profit					
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		
13	Telephone	1800	1900	1508		
14	Maintenance & Repairs	19916	21488	18555		
15	Gas & Oil	1275	1477	1700		
16	Depreciation	2000	2200	2400		
17	Utilities	1099	1067	1090		
18	Other Operating Expenses	3800	3800	3800		

Figure 5-7 Copying cell values

To calculate gross profit, subtract the Cost of Goods Sold in 1986 from Net Sales for 1986. Move the cell pointer to B7, type 340000-195400, and press ENTER. The result 144600 is displayed in B7, as shown in Figure 5-8.

File F₂ Edit F₃ Worksheet F₄ Range F₅ Graph F₆ Data F₇

B7 340000-195400

READY

	A	B	C	D	E	F
1	INCOME STATEMENT	Year End	December 1988	M&M Industries		
2						
3		Totals 19	Totals 19	Totals 1988		
4	Net Sales	340000	390000	450000		
5	Cost of Goods Sold	195400	223080	257400		
6						
7	Gross Profit	144600				
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		

Figure 5-8 Entering formulas with numbers

You can perform the same calculation by specifying a formula with the addresses of the cells that contain the numbers instead of typing the numbers themselves. When a

5-12 Creating an Income Statement

formula starts with a cell address, you must type a + (plus sign) in front of the formula. Otherwise, the first character of the cell address is a letter which Lotus-DM reads as a label, and adds the default label prefix to it.

To calculate gross profit, use a formula in B7 to subtract the Cost of Goods Sold in 1986 from Net Sales for 1986. Move the cell pointer to B7, type +B4-B5, and press ENTER. Notice that the formula result in B7 is the same as it was when you subtracted the numbers.

File F ₂ Edit F ₃ Worksheet F ₄ Range F ₅ Graph F ₆ Data F ₇						F ₉	F ₁₀
B7	+B4-B5					READY	
	A	B	C	D	E	F	
1	INCOME STATEMENT	Year End	December	1988	M&M Industries		
2							
3		Totals 19			Totals 19		
4	Net Sales	340000	390000	450000			
5	Cost of Goods Sold	195400	223000	257400			
6							
7	Gross Profit	144600					
8	Operating Expenses						
9	Sales Salaries	29700	31500	32600			
10	Advertising	2300	4000	3800			
11	Sales Commissions	6000	5800	6020			
12	Administrative Salaries	29500	32045	32000			

Figure 5-9 Entering formulas with cell addresses

The advantage of using cell addresses in formulas is that you can change the contents of any cell referred to in the formula and Lotus-DM automatically recalculates the formula. If you use the numbers in the cells, you have to edit the formula every time you changed a number in one of the cells, or the formula would no longer be correct.

Copying Formulas

Once you create a formula in one location, you can copy it to other cells in the worksheet.

To copy the gross profit formula for 1987 and 1988, select Edit Copy Range (CTRL-C). Type C7..D7 in the edit panel at the To prompt and press ENTER. Now move the cell pointer to C7. Notice the formula in the edit panel in Figure 5-10.

When you copy a formula, Lotus-DM adjusts cell references within the formula based on the formula's new cell address. This is because Lotus-DM uses relative cell addresses for the cells referenced in the formula. For example, Lotus-DM interprets the formula in C7 (+C4 - C5) to mean "Subtract the value in the cell that is two cells up from the value in the cell that is three cells up." When you copy the formula, it still looks for a value located two cells above it and another value located three cells above it.

File F ₂	Edit F ₃	Worksheet F ₄	Range F ₅	Graph F ₆	Data F ₇	F ₉	F ₁₀
C7	+C4-C5					READY	
	A	B	C	D	E	F	
1	INCOME STATEMENT	Year End	December 1988	M&M Industries			
2							
3		Totals 19	Totals 19	Totals 1988			
4	Net Sales	340000	390000	450000			
5	Cost of Goods Sold	195400	223080	257400			
6							
7	Gross Profit	144600	166920	192600			
8	Operating Expenses						
9	Sales Salaries	29700	31500	32600			
10	Advertising	2300	4000	3800			
11	Sales Commissions	6000	5800	6020			
12	Administrative Salaries	29500	32045	32000			

Figure 5-10 Copying cell formulas

Using an @Function

The @functions (pronounced "at functions") are built-in formulas that perform a variety of mathematical, statistical, financial, and other specialized calculations. Each @function is made up of three parts:

- The @ (at sign), which you must type as the first character.
- The name of the @function, which you can type in uppercase or lowercase letters.
- One or more **arguments** enclosed in parentheses. An argument specifies the data the @function works on and can be anything from a single value to a range of cells, depending on the particular @function.

The @SUM @function lets you add a range of values without typing a + (plus sign) and cell address for each cell in the range.

To calculate the Total Operating Expenses for 1986, move the cell pointer to B19, type @SUM(B9..B18), and press ENTER. Type the entry exactly, leaving no spaces. The Total Operating Expenses for 1986 were 97390.

You need to preserve the data in INCSTMT.WK1 in case you want to begin this lesson over again. But you also need to use the data from this lesson. So now create a copy of INCSTMT.WK1 under a new name.

Select File Save As. Type INCSTMT1.WK1 in the Save As field. Select OK to save a copy of the data in INCSTMT.WK1 under the new name, INCSTMT1.WK1.

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File F ₂ Edit F ₃ Worksheet F ₄ Range F ₅ Graph F ₆ Data F ₇						F ₉	F ₁₀
B19	=SUM(B9..B18)					READY	
	A	B	C	D	E	F	
3		Totals 19	Totals 19	Totals 1988			
4	Net Sales	340000	390000	450000			
5	Cost of Goods Sold	195400	223080	257400			
6							
7	Gross Profit	144600	166920	192600			
8	Operating Expenses						
9	Sales Salaries	29700	31500	32600			
10	Advertising	2300	4000	3800			
11	Sales Commissions	6000	5800	6020			
12	Administrative Salaries	29500	32045	32000			
13	Telephone	1800	1900	1508			
14	Maintenance & Repairs	19916	21488	18555			
15	Gas & Oil	1275	1477	1700			
16	Depreciation	2000	2200	2400			
17	Utilities	1099	1067	1090			
18	Other Operating Expenses	3800	3800	3800			
19	Total Operating Expenses	97390					
20	Net Operating Income						

Figure 5-11 Entering @functions

Lesson 4 Working with Ranges

Start with the worksheet file you created in Lesson 3, named INCSTMT1.WK1, on the screen. If INCSTMT1.WK1 is not on the screen, you must retrieve it. Select File Open, and select INCSTMT1.WK1 from the Files list box or type INCSTMT1.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve INCSTMT1.WK1, in case you want to refer back to Lesson 3 or begin this lesson over again. Therefore, create a copy of it with a new name, INCSTMT2.WK1.

Select File Save As. Type INCSTMT2.WK1 in the Save As field and select OK.

In the previous lessons, you used some commands that asked you to specify ranges. This section discusses some of the rules for using ranges. A **range** is a cell or a block of adjoining cells that is treated as a unit.

A range can be a single cell, a single row or column of cells, or a block of cells composed of many rows and many columns. Ranges specify the data you want to work with when you are using a command or entering a formula.

To specify a range, you indicate the location, or address, of that range in the worksheet. A **range address** consists of the cell addresses of the two most distant cells in the range separated by two periods.

You can specify a range by typing the range address (this is the method you used in the previous sections), typing the range name, selecting the range in the worksheet, using NAME (CTRL-F3), or using a remembered range.

Naming a Range

A **range name** is a name you assign to a range in the worksheet. Naming ranges often makes a worksheet much easier to work with. For example, it is easier to remember that a name like QTRLY_SALES refers to the range that contains the quarterly net sales figure than it is to remember that cells B5 through E5 comprise the range. After creating a range name, you can use the name with any command that requires a range.

To create a range name for 1987 Operating Expenses, you need to specify the range in the worksheet (C9..C18). You specify a range by using a mouse or the pointer-movement keys to expand the highlight to cover all cells you want to specify. Before you highlight a range, however, the cell pointer must be anchored in one corner of the range so it remains stationary.

If you are using a mouse, point and click C9. C9 now is the anchor cell. Drag the cell pointer until last cell in the range (C18) is highlighted.

If you are using the pointer-movement keys to anchor the cell pointer in the C9, highlight C9 and press SHIFT-ENTER. Press ↓ until the cell pointer highlights the last cell in the range (C18).

Figure 5-12 shows what the highlighted range looks like in your worksheet.

To name the range, select Range Name (CTRL-N). Notice that the Range field in the dialog box shows the range you just highlighted (C9..C18). Type EXPENSES87 in the Range Name field, and press ENTER.

To create a range name for 1988 Operating Expenses, specify D9..D18. Select Range Name (CTRL-N). Type EXPENSES88 in the Range Name field, and press ENTER.

Using Ranges in Formulas

You can use ranges in your formulas by typing the range name. To calculate the total operating expenses for 1987, move the cell pointer to C19, type @SUM(EXPENSES87), and press ENTER. Figure 5-13 shows the result in your worksheet.

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	A	B	C	D	E	F
3		Totals 19	Totals 19	Totals 1988		
4	Net Sales	340000	390000	450000		
5	Cost of Goods Sold	195400	223080	257400		
6						
7	Gross Profit	144600	166920	192600		
8	Operating Expenses					
9	Sales Salaries	29700	31500	32600		
10	Advertising	2300	4000	3800		
11	Sales Commissions	6000	5800	6020		
12	Administrative Salaries	29500	32045	32000		
13	Telephone	1800	1900	1508		
14	Maintenance & Repairs	19916	21488	18555		
15	Gas & Oil	1275	1477	1700		
16	Depreciation	2000	2200	2400		
17	Utilities	1099	1067	1090		
18	Other Operating Expenses	3800	3800	3800		
19	Total Operating Expenses	97390				
20	Net Operating Income					

Figure 5-12 Highlighting a range

File F₂ Edit F₃ Worksheet F₄ Range F₅ Graph F₆ Data F₇

↑ F₉ ↑ F₁₀

C19 @SUM(EXPENSES87)

READY

	A	B	C	D	E	F	
3		Totals 19	Totals 19	Totals 1988			
4	Net Sales	340000	390000	450000			
5	Cost of Goods Sold	195400	223080	257400			
6							
7	Gross Profit	144600	166920	192600			
8	Operating Expenses						
9	Sales Salaries	29700	31500	32600			
10	Advertising	2300	4000	3800			
11	Sales Commissions	6000	5800	6020			
12	Administrative Salaries	29500	32045	32000			
13	Telephone	1800	1900	1508			
14	Maintenance & Repairs	19916	21488	18555			
15	Gas & Oil	1275	1477	1700			
16	Depreciation	2000	2200	2400			
17	Utilities	1099	1067	1090			
18	Other Operating Expenses	3800	3800	3800			
19	Total Operating Expenses	97390	105277				
20	Net Operating Income						

Figure 5-13 Using cell ranges in formulas

Using NAME (CTRL-F3)

Once you name a range, you can press NAME (CTRL-F3) to display a list of range names in the worksheet. This allows you to select a range name from the list rather than by typing its name whenever you have to specify a range.

To calculate the total operating expenses for 1988, move the cell pointer to D19, and type @SUM(. Press NAME (CTRL-F3), and select EXPENSE88 from the list of range names. Then, press ENTER, type), and press ENTER again.

File F ₂	Edit F ₃	Worksheet F ₄	Range F ₅	Graph F ₆	Data F ₇	F ₉	F ₁₀
D19	@SUM(EXPENSE88)					READY	
	A	B	C	D	E	F	
3		Totals 19	Totals 19	Totals 1988			
4	Net Sales	340000	390000	450000			
5	Cost of Goods Sold	195400	223080	257400			
6							
7	Gross Profit	144600	166920	192600			
8	Operating Expenses						
9	Sales Salaries	29700	31500	32600			
10	Advertising	2300	4000	3800			
11	Sales Commissions	6000	5800	6020			
12	Administrative Salaries	29500	32045	32000			
13	Telephone	1800	1900	1508			
14	Maintenance & Repairs	19916	21488	18555			
15	Gas & Oil	1275	1477	1700			
16	Depreciation	2000	2200	2400			
17	Utilities	1099	1067	1090			
18	Other Operating Expenses	3800	3800	3800			
19	Total Operating Expenses	97390	105277	103473			
20	Net Operating Income						

Figure 5-14 Using NAME (CTRL-F3)

To complete the income statement, you need to enter a formula to calculate Net Operating Income. Move the cell pointer to B20, type (B7-B19), and press ENTER. Now, copy the formula to calculate Net Operating Income for 1987 and 1988. Select Edit Copy Range (CTRL-C). Type C20..D20 at the To prompt, and press ENTER.

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name INCSTMT2.WK1.

Lesson 5 Formatting the Worksheet

Start with the worksheet you created in Lesson 4, named INCSTMT2.WK1, on the screen. If INCSTMT2.WK1 is not on the screen, you must retrieve it. Select File Open, and select INCSTMT2.WK1 from the Files list box or type INCSTMT2.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve INCSTMT2.WK1, in case you want to refer back to Lesson 4 or begin this lesson over again. Therefore, create a copy of it with a new name, INCSTMT3.WK1.

Select File Save As. Type INCSTMT3.WK1 in the Save As field and select OK.

Lotus-DM offers a variety of options for tailoring, or **formatting** the appearance of your worksheet. The way data is displayed helps clarify the worksheet. It is especially important to think about the appearance of the worksheet before you print copies for others to look at.

Changing the Cell Format

Lotus-DM uses several **cell formats**, which are ways of displaying values in worksheet cells. You might, for example, want to display some values with one decimal place (100.1) and others with a percent sign (75%). You can specify one cell format for the entire worksheet with Worksheet Format. You can also specify a variety of cell formats for individual cells and ranges with Range Format (CTRL-F5).

To format the worksheet figures in comma format with two decimal places, select the range B4..D20. Next select Worksheet Format. You see the Global Format dialog box, where you can change the format settings for entire worksheet. The button next to General in the Type list box is highlighted, indicating that it is selected. You know an option is selected when the button next to it is highlighted or when the check box next to it contains an X.

To change the format using a mouse, point and click the , (comma) button in the Type list box. Press TAB to move the cursor to the Decimal Places field. Type 2 and press ENTER.

To change the format using the cursor-movement keys, press ↑ to move the cursor to the , (comma) button in the Type list box, and press the space bar to select it. Press TAB to move the cursor to the Decimal Places field. Type 2 and press ENTER.

(NOTE) The new format makes the numbers too wide to fit within the current column width, so Lotus-DM displays asterisks instead. Don't worry about the asterisks now; you will fix them in the next section.

In an income statement, the first (Net Sales) and last (Net Operating Income) rows of figures usually include a currency symbol.

	A	B	C	D	E	F
3		Totals 19	Totals 19	Totals 1988		
4	Net Sales	*****	*****	*****		
5	Cost of Goods Sold	*****	*****	*****		
6						
7	Gross Profit	*****	*****	*****		
8	Operating Expenses					
9	Sales Salaries	*****	*****	*****		
10	Advertising	2,300.00	4,000.00	3,800.00		
11	Sales Commissions	6,000.00	5,800.00	6,020.00		
12	Administrative Salaries	*****	*****	*****		
13	Telephone	1,800.00	1,900.00	1,508.00		
14	Maintenance & Repairs	*****	*****	*****		
15	Gas & Oil	1,275.00	1,477.00	1,700.00		
16	Depreciation	2,000.00	2,200.00	2,400.00		
17	Utilities	1,099.00	1,067.00	1,090.00		
18	Other Operating Expenses	3,800.00	3,800.00	3,800.00		
19	Total Operating Expenses	*****	*****	*****		
20	Net Operating Income	*****	*****	*****		

Figure 5-15 Formatting the worksheet

To format the Net Sales worksheet rows in Currency format, select the range B4..D4. Then select Range Format (CTRL-F). You see the Range Format dialog box, where you can change the format for a range in the worksheet. Select the Currency option in Type list box. Next, move the cursor to the Decimal Places field, type 2, and press ENTER.

To format the Net Operating Income worksheet rows in Currency format, select the range B20..D20. Then select Range Format (CTRL-F). Select Currency in the Type list box, then move the cursor to the Decimal Places field. Type 2 and press ENTER.

Changing the Column Width

The Lotus-DM default column width (the width used for all columns unless you change it) is nine characters. This width is not sufficient to display the numbers in the format you specified, so Lotus-DM displays asterisks instead. By widening the columns that contain those figures to 14 characters, you can see the values of all columns in the worksheet.

To change the worksheet default column width, select Worksheet Column (CTRL-W). Select Global in the dialog box, and move the cursor to the Column Width field. Press DEL, if necessary, to erase the 9. Type 14 and press ENTER. When you see the worksheet again, move the cell pointer to A4.

When the columns are wide enough, the asterisks in the formatted cells are replaced with the actual entries. Notice that making the columns wider allows you to see all the characters in the Total columns that were previously cut off.

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	A	B	C	D	
3		Totals 1986	Totals 1987	Totals 1988	
4	Net Sales	\$340,000.00	\$390,000.00	\$450,000.00	
5	Cost of Goods Sold	195,400.00	223,080.00	257,400.00	
6					
7	Gross Profit	144,600.00	166,920.00	192,600.00	
8	Operating Expenses				
9	Sales Salaries	29,700.00	31,500.00	32,600.00	
10	Advertising	2,300.00	4,000.00	3,800.00	
11	Sales Commissions	6,000.00	5,800.00	6,020.00	
12	Administrative Salaries	29,500.00	32,045.00	32,000.00	
13	Telephone	1,800.00	1,900.00	1,500.00	
14	Maintenance & Repairs	19,916.00	21,488.00	18,555.00	
15	Gas & Oil	1,275.00	1,477.00	1,700.00	
16	Depreciation	2,000.00	2,200.00	2,400.00	
17	Utilities	1,099.00	1,067.00	1,090.00	
18	Other Operating Expenses	3,800.00	3,800.00	3,800.00	
19	Total Operating Expenses	97,390.00	105,277.00	103,473.00	
20	Net Operating Income	\$47,210.00	\$61,643.00	\$89,127.00	

Figure 5-16 Formatting the column width

(NOTE) Column A is not affected because its default width was not changed as part of this section.

Aligning Labels

The column labels (Totals 1986 through Totals 1988) in cells B4 through D4 do not line up with the figures in the columns. The labels are left-aligned while the columns of values below them are right-aligned. You can't change the alignment of the values (values are always right-aligned), but you can change the alignment of the labels to make the worksheet look better and easier to read.

Label prefixes, special characters at the beginning of a label, control the alignment of labels. Table 5-1 shows the Lotus-DM label prefixes that control alignment.

Table 5-1 Label prefixes

Label prefix	Cell display	Alignment
'	label	Left-aligned
^	label	Centered
"	label	Right-aligned

You can override the default label prefix, ' (apostrophe), by typing a different label prefix when you enter a label. In addition, you can change the alignment of labels you have already entered in a range by using Range Label.

To center the Total columns, highlight the range B3..D3. Select Range Label. Select Center in the dialog box, and press ENTER.

File F ₂ Edit F ₃ Worksheet F ₄ Range F ₅ Graph F ₆ Data F ₇					F ₉	F ₁₀
D3	^Totals 1988				READY	
	A	B	C	D		
3		Totals 1986	Totals 1987	Totals 1988		
4	Net Sales	\$340,000.00	\$390,000.00	\$450,000.00		
5	Cost of Goods Sold	195,400.00	223,080.00	257,400.00		
6						
7	Gross Profit	144,600.00	166,920.00	192,600.00		
8	Operating Expenses					
9	Sales Salaries	29,700.00	31,500.00	32,600.00		
10	Advertising	2,300.00	4,000.00	3,800.00		
11	Sales Commissions	6,000.00	5,800.00	6,020.00		
12	Administrative Salaries	29,500.00	32,045.00	32,000.00		
13	Telephone	1,800.00	1,900.00	1,508.00		
14	Maintenance & Repairs	19,916.00	21,488.00	18,555.00		
15	Gas & Oil	1,275.00	1,477.00	1,700.00		
16	Depreciation	2,000.00	2,200.00	2,400.00		
17	Utilities	1,099.00	1,067.00	1,090.00		
18	Other Operating Expenses	3,800.00	3,800.00	3,800.00		
19	Total Operating Expenses	97,390.00	105,277.00	103,473.00		
20	Net Operating Income	\$47,210.00	\$61,643.00	\$89,127.00		

Figure 5-17 Setting label prefixes

Lotus-DM moves the labels to the center of each cell. The label prefix changes in the edit panel from the character for left-aligned labels (') to the character for centered labels (^).

Inserting Rows

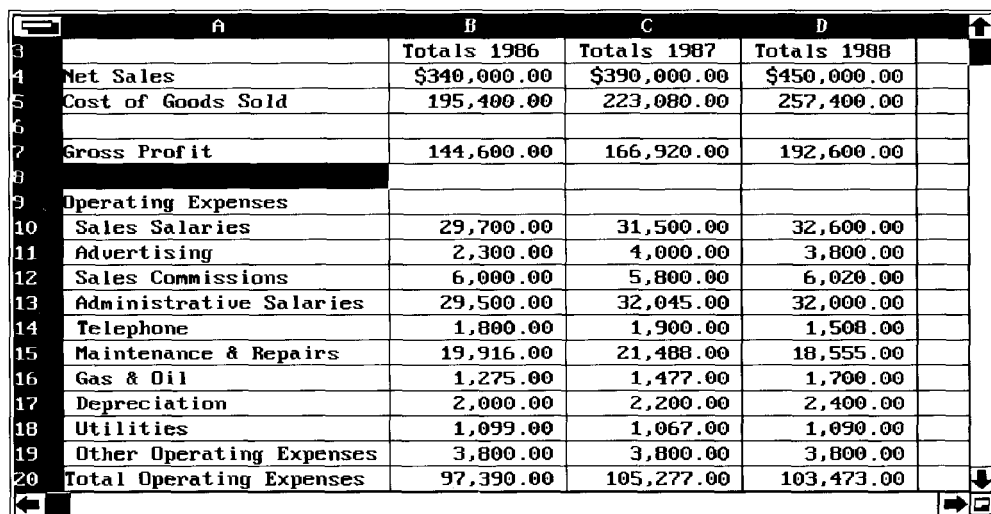
As you develop a worksheet, you may need to insert blank rows and columns, either to improve the appearance of the worksheet or to make room for new data.

Lotus-DM inserts rows between the current row (the row that contains the cell pointer) and the rows above it, and inserts columns between the current column and the column to its left.

To improve the appearance of the income statement worksheet, you need to add (or insert) a row to separate Gross Profit from Operating Expenses. First, move the cell pointer to A8. Then select Worksheet Insert/Delete. Insert is already selected in the dialog box, and the range is already specified. Select Rows, and press ENTER. Your screen should look like the one in Figure 5-18.

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name INCSTMT3.WK1.

5-22 Creating an Income Statement



	A	B	C	D
3		Totals 1986	Totals 1987	Totals 1988
4	Net Sales	\$340,000.00	\$390,000.00	\$450,000.00
5	Cost of Goods Sold	195,400.00	223,080.00	257,400.00
6				
7	Gross Profit	144,600.00	166,920.00	192,600.00
8				
9	Operating Expenses			
10	Sales Salaries	29,700.00	31,500.00	32,600.00
11	Advertising	2,300.00	4,000.00	3,800.00
12	Sales Commissions	6,000.00	5,800.00	6,020.00
13	Administrative Salaries	29,500.00	32,045.00	32,000.00
14	Telephone	1,800.00	1,900.00	1,508.00
15	Maintenance & Repairs	19,916.00	21,488.00	18,555.00
16	Gas & Oil	1,275.00	1,477.00	1,700.00
17	Depreciation	2,000.00	2,200.00	2,400.00
18	Utilities	1,099.00	1,067.00	1,090.00
19	Other Operating Expenses	3,800.00	3,800.00	3,800.00
20	Total Operating Expenses	97,390.00	105,277.00	103,473.00

Figure 5-18 Inserting rows

Lesson 6 Printing the Worksheet

Start with the worksheet you created in Lesson 5, named INCSTMT3.WK1, on the screen. If INCSTMT3.WK1 is not on the screen, you must retrieve it. Select File Open, and select INCSTMT3.WK1 from the Files list box or type INCSTMT3.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve INCSTMT3.WK1, in case you want to refer back to Lesson 5 or begin this lesson over again. Therefore, create a copy of it under a new name, INCSTMT4.WK1.

Select File Save As. Type INCSTMT4.WK1 in the Save As field and select OK.

Now that you have entered all the information in a worksheet, you can print out a copy of the income statement to give to others or to keep for your records.

(NOTE) Before you continue, be sure your printer is properly connected to your computer, is turned on, and is on-line (ready to print).

First, check the page format to see how it is set for printing. Select File, then Page Setup. You can see that the dialog box presents you with the default options for printing the worksheet. You'll use these default options to print the income statement, so select OK.

Next, you can check the page layout. Select File Page Layout. You can specify headers, footers, and borders for printing a worksheet. You don't need to use any of these options to print the income statement, so select OK without specifying them.

To print the income statement, select File Print. Specify Printer in the dialog box, then select All Worksheet. Finally, select OK to start printing. When printing is complete, Lotus-DM returns to READY mode.

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name INCSTMT4.WK1.

Designing Worksheets Efficiently

Now that you have learned the fundamentals of building a Lotus-DM worksheet, consider some essential issues. The worksheets you build become the basis for important decisions. The care you exercise in designing and building worksheets is the key to using Lotus-DM successfully. Try following these guidelines each time you build a new worksheet:

- Always start with a plan for your worksheet. Before you even start Lotus-DM, it's a good idea to sketch out the worksheet. Consider the data you have and the questions you need to answer. Be specific about what you want to accomplish.
- Duplicate layouts with which you are familiar. If you use a particular layout in your account books or budget, use the same layout in your Lotus-DM worksheet.
- Use successful worksheets as models. Modify an existing worksheet and save it with a new file name to preserve the original.
- Arrange all worksheet data in either columns or rows, not a combination of both. A visually consistent worksheet is easier to read, reduces the possibility of mistakes, and makes creating formulas easier.
- Check a new worksheet carefully to make sure the formulas do what you intend by testing them. Enter some sample values and check the results.
- Document your worksheets. As soon as the worksheet begins to take form, write down the logic, details, assumptions, and procedures you used to build the worksheet. If you document your worksheet, you will find it easier to work with later. In addition, you will make it easier for someone else to work with the worksheet.
- Make a list of checks and balances, or tests that you might perform if you or someone else modifies the worksheet at a later date.
- To make it easier to identify your data and use a worksheet, name ranges as often as possible and use those names in commands and formulas.

Chapter 6

Graphing a Home Budget

Graphs display your worksheet data in a lively and accessible way. Use graphs to help understand the relationships among the numbers in your worksheet and to visualize your data. Because each graph type shows numbers in a distinct way, you gain new insight into your data when you view it from a variety of perspectives.

In this chapter, you enter your preliminary and revised budget data in worksheets, and create and view graphs that illustrate your monthly expenses. When you finish your budget analysis, you print two pie charts: one that illustrates your average level of expenses and one that illustrates your projected budget. The two charts reflect the data you have entered and analyzed in your worksheets.

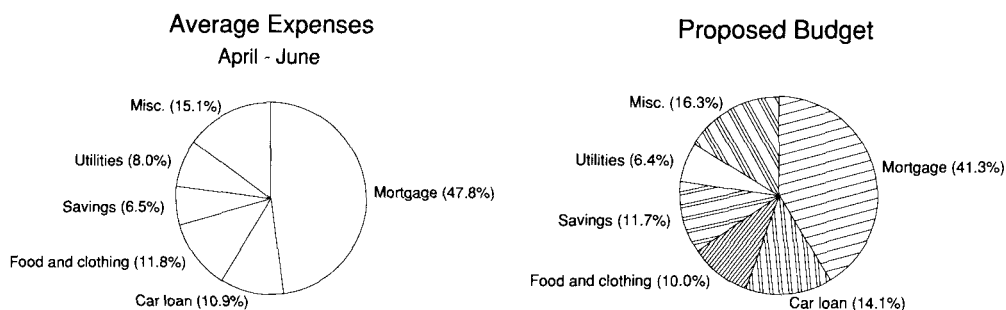


Figure 6-1 Graphs illustrating a home budget

Lesson 1 Entering Worksheet Data

Start this lesson with a blank worksheet in the Lotus-DM main window.

In this exercise, you are concerned that you are spending more and saving less each month, and you want to find out what your added expenses are. When you have identified where your money is going every month, you can devise a budget that meets your monthly obligations and maintains a regular schedule of savings.

First, you sort through your bank statements, checkbook entries, and receipts to identify your expenses for the past three months. You group your monthly expenses into six categories (mortgage, car loan, food and clothing, savings, utilities, and miscellaneous). Now you are ready to enter your budget data into your Lotus-DM worksheet.

Entering Labels

You want to construct a worksheet that displays your expenses for three months, beginning with April, and for your proposed budget.

Move the cell pointer to cell B2. Type April. Look at the right side of the edit panel, where LABEL is highlighted.

Lotus-DM interprets all data as either labels or values. Labels are text entries preceded by a label prefix. Values are numbers and formulas that evaluate to numbers. You have typed a label, so Lotus displays LABEL to signal that it interprets your entry as a label.

Press ENTER to add the label to the worksheet. Look at the current cell contents in the edit panel, which reads 'April. The ' (apostrophe) is a **label prefix**, which identifies the entry as a label. The apostrophe is the default label prefix. See "Entering Labels" in Chapter 8 for more information on label prefixes.

Press → to move the cell pointer to cell C2. Type May, and press → to enter the label. The cell pointer moves to the next cell on the right, D2. You can use the pointer-movement keys to enter data into the current cell and move the cell pointer to an adjacent cell.

Now enter the labels for the remaining month and for your budget data. Enter June and Budget in cells D2 and E2, respectively.

Next, enter the labels that describe your income and expenses. Move the cell pointer to cell A4 and type Income (after taxes). Press ENTER.

Note that the entry is too long for the cell. Lotus-DM displays the entry as a long label, with the extra characters in a blank cell to the right. If a cell to the right contains data, however, only part of a long label shows on the screen. (Lotus-DM retains the full label in memory, though.)

NOTE Values that are too long do not run into the next cell, as labels do. Instead, Lotus-DM displays a row of asterisks to represent the long value.

You enter data in cell B4 later in this lesson, so widen column A in order to read the entire label.

Setting the Worksheet Column Width

With the cell pointer still in cell A4, select Worksheet Column. If you are using a mouse, point to Worksheet (F4) and click to display the Worksheet pull-down menu. Point to Column and click to highlight it. Double-click to select the command. If you are using the keyboard, press F4 to display the Worksheet pull-down menu and type C to highlight Column. Press ENTER to select the command.

NOTE You can also use an accelerator key (CTRL-W) as a shortcut for selecting Worksheet Column.

You see the Worksheet Column dialog box, where you can change the column settings for a range or for the entire worksheet. The buttons next to Range and Set-Width are highlighted, indicating that they are selected.

If Range or Set-Width is not selected, move the cursor to the adjacent button and select it. If you are using the keyboard, press ↑ ↓ ← or → to move from option to option, and press TAB to move among groups of options. Click or press the space bar to select the option. You use the same procedure to deselect an option.

NOTE Do not press ENTER to select an option nor press ESC to deselect an option. Pressing ENTER accepts the changes you make in the dialog box and returns you to the worksheet. Pressing ESC cancels your selections and returns you to the worksheet without making any changes.

Look at the Range field, which displays the highlighted range. The cell pointer currently highlights one cell, A4, so the field displays A4..A4 as the current range.

You want to widen column A to display the full length of your long label. Move the cursor to the Width field. If you are using a mouse, you may need to press DEL to erase 9 (the default setting). Type 20. Select OK to implement your changes and return to the worksheet. The label is now fully displayed in column A.

To finish entering labels, move the cell pointer to cell A6 and type Expenses. Move the cell pointer to cell A8, where you enter the labels for the categories of expenses in your budget. Do not leave a blank row between these entries. Using ↓ to enter each label, type the following labels in cells A8 through A13, in the following order: Mortgage, Car loan, Food and clothing, Savings, Utilities, Misc.

Next, move the cell pointer to cell A15, type Total expenses and press ENTER. Your worksheet should look like Figure 6-2.

6-4 Graphing a Home Budget

	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)						
5							
6	Expenses						
7							
8	Mortgage						
9	Car loan						
10	Food and clothing						
11	Savings						
12	Utilities						
13	Misc.						
14							
15	Total expenses						
16							
17							
18							

Figure 6-2 Labels entered in the worksheet

NOTE If you make a mistake in your worksheet, you can correct it. If an entry is misspelled, move the cursor to highlight the cell, and retype the entry or press CTRL-F2 and edit it. Read "Correcting Mistakes" in Chapter 4 for instructions on how to correct mistakes.

Entering Values

Now you are ready to enter the data you have collected. First, enter the monthly after-tax income. Your income remained constant at \$2,300 during the three months under study, so you can enter that number for all three months.

Move the cell pointer to B4 and type 2300. Look at the right side of the edit panel, where VALUE is highlighted. Values are numbers or formulas that evaluate to numbers. Cell or range addresses—or range names—that contain numbers or formulas are also values. You typed a number, which Lotus-DM interprets as a value. You can plot only values in a graph, so it is important to know that Lotus-DM accepts as values the data you plan to graph.

Press → to enter 2300 in B4 and to move the cell pointer to C4. Enter 2300 in C4, and enter it again in D4.

Your fixed expenses did not change during the past three months. Your mortgage is \$1,100 per month, and your car loan is \$250 per month. Enter 1100 in B8 through D8. Enter 250 in B9 through D9.

Your variable expenses climbed during the past three months, while your savings dropped sharply. Enter the following information for the months of April, May, and June:

Food and clothing	225	275	312
Savings	200	150	100
Utilities	150	174	225

You fill in the Budget column in Lesson 3. The worksheet now looks like Figure 6-3.

	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)	2300	2300	2300			
5							
6	Expenses						
7							
8	Mortgage	1100	1100	1100			
9	Car loan	250	250	250			
10	Food and clothing	225	275	312			
11	Savings	200	150	100			
12	Utilities	150	174	225			
13	Misc.						
14							
15	Total expenses						
16							
17							
18							

Figure 6-3 Values and labels entered in the worksheet

All of your out-of-pocket expenses for which you do not have receipts, such as commuting costs and entertainment, are grouped under Misc. To determine how much you spent on these unaccounted miscellaneous expenses, use Lotus-DM's mathematical capabilities to calculate them.

Entering Formulas

Now that you have entered your fixed income and your accounted expenses, you can manipulate the data in your worksheet. To calculate your miscellaneous expenses, you can use formulas to total all your accounted expenses and subtract them from your after-tax income.

You can enter formulas manually or use @functions (pronounced "at functions"). Start by entering a formula manually. (You work with @functions in a later lesson.)

6-6 Graphing a Home Budget

Move the cell pointer to B13. You want to subtract each of the expenses in B8 through B12 from your after-tax income in B4. Type `+B4-B8-B9-B10-B11-B12`. You can use uppercase or lowercase letters. Otherwise, type the formula exactly as it is printed. You see the VALUE indicator on the right side of the edit panel.

It is especially important to begin the formula with a plus sign. The plus sign is a **numeric symbol**, which is a prefix that tells Lotus-DM that your entry represents a formula. See "Entering Values" in Chapter 8 for more information on numeric symbols.

Without the numeric symbol, Lotus-DM reads the first letter of the entry (B) as text and treats the entry as a label. If you see the LABEL mode indicator in the edit panel, press ← to move the cursor to the beginning of the formula and type +.

Press ENTER to accept the formula.

If you see an error message when you enter a formula, you can select OK to clear the message or you can select HELP. See "Using the Help System" in Chapter 8 for more information on Help. Press ENTER and examine the formula in the edit panel. It should not contain spaces and should refer to cells that contain data. Correct your formula and press ENTER.

You see the formula in the edit panel and the result in the cell. Look at B13; you see 375, the result of your calculation. Look at the edit panel; you see the formula.

Copying Formulas

You can copy formulas from one cell to another cell or range of cells. Lotus-DM adjusts the addresses of cells in the formula to reflect the movement within the worksheet.

With the cell pointer still in B13, select Edit Copy Range (CTRL-C).

The Copy From range displays B13..B13. Type C13..D13 in the highlighted To field in the edit panel, which specifies the two remaining cells in the row labeled Misc. Press ENTER to copy the formula from B13 to C13 and D13.

The results (351 and 313) show in C13 and D13, respectively. Move the cell pointer to C13. Note that the cell addresses in the formula have changed. Lotus-DM automatically adjusts a formula to the copied range. Move the cell pointer to D13; the formula has changed there, too.

CAUTION As you change other expenses in the worksheet, the Misc. values rise and fall to reflect the unaccounted funds. If you type a value in one of the cells in the Misc. row, you overwrite the formula and jeopardize the accuracy of your data.

When you finish, the worksheet looks like Figure 6-4.

	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)	2300	2300	2300			
5							
6	Expenses						
7							
8	Mortgage	1100	1100	1100			
9	Car loan	250	250	250			
10	Food and clothing	225	275	312			
11	Savings	200	150	100			
12	Utilities	150	174	225			
13	Misc.	375	351	313			
14							
15	Total expenses						
16							
17							
18							

Figure 6-4 Formulas added to the worksheet

Saving Your Work

It's a good idea to save your work frequently to minimize the amount of work you could lose in the event of power failure. To save your worksheet for the first time, select File Save as. Type HOMEBUD1 in the Save as field. Leave the Password field blank. Lotus-DM automatically adds a worksheet extension (.WK1) the first time you save a worksheet file. Select OK to save your worksheet in a file named HOMEBUD1.WK1 in the current directory. You can save your file as you work on it subsequently by pressing CTRL-S.

Lesson 2 Graphing Your Expenses

In this lesson, you create and view a bar graph that illustrates your expenses over the past three months. Then you view the same data from a different perspective using a stacked bar graph.

Start with the worksheet you created in Lesson 1, named HOMEBUD1.WK1, on the screen. If HOMEBUD1.WK1 is not on the screen, you must retrieve it. Select File Open, and select HOMEBUD1.WK1 from the Files list box or type HOMEBUD1.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

6-8 Graphing a Home Budget

You need to preserve the data in HOMEBUD1.WK1 in case you want to refer back to Lesson 1 or begin this lesson over again. But you also need to use the data for this lesson. So now create a copy of HOMEBUD1.WK1 under a new file name.

Select File Save as. Type HOMEBUD2 in the Save as field. Select OK to save a copy of the data in HOMEBUD1.WK1 under a new name.

Look at the title bar at the top of your screen. HOMEBUD2.WK1 is the current file name.

Now you are ready to create and view graphs depicting your home budget data.

All Lotus-DM graph types except pie charts share the following characteristics: a grid structure, x- and y-axes, ranges, and graph settings. The **frame** is the box around the graph; the lines that extend from side to side and from top to bottom within the frame are the **grid lines**. The bottom line is the **x-axis**, and the left line is the **y-axis**.

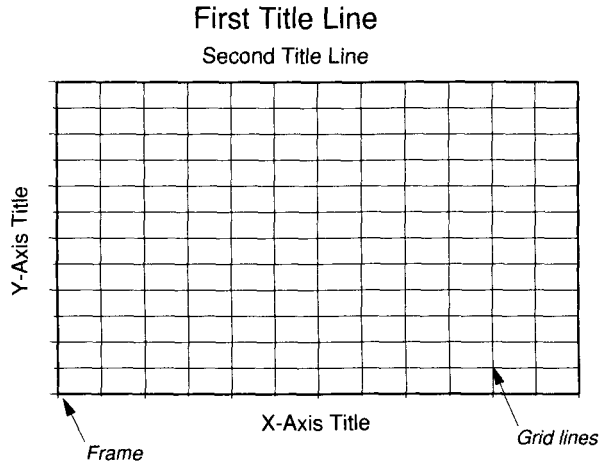


Figure 6-5 Parts of a graph

The **ranges** are sets of values or labels that you create in your worksheet. You must specify at least one y-axis range for every graph type except pie charts. Your graph plots points, lines, and the height of bars at the intersection of corresponding x-axis and y-axis ranges. You can enhance the appearance of your graph with the **graph settings**: graph type, text, grids, scaling, and formats.

Selecting a Graph Type

Each graph type depicts information in a distinct way.



Figure 6-6 Types of graphs

In all graph types except pie charts, you create each set of points, lines, or bars in your graph by specifying a corresponding set of ranges in a worksheet. You can specify up to six y-axis ranges labeled A through F and one x-axis range labeled X.

Each graph type uses ranges in its own way. The **y-axis ranges** represent the values you plot within the graph. Lotus-DM automatically adds labels for the y-axis. In all graphs except pie charts and XY graphs, the **x-axis** range represents the labels that show along the x-axis. (You learn more about pie charts in Lesson 4. See "Type" in Chapter 13 for more information on XY graphs.)

Select Graph Type (CTRL-T). You see the Graph Type dialog box. Select Bar to create a **bar graph**. You typically use bar graphs to compare related data at a given point in time. Bar graphs consist of one or more bars. Each bar represents one value from each y-axis range, plotted above the corresponding x-axis label specified in the X range.

Select OK to select Bar as the graph type and return to the worksheet.

Specifying Graph Ranges

Once you have selected the graph type, the next step is to specify the ranges of data you want to illustrate in the graph.

Select Graph Ranges (CTRL-R). You see the Graph Ranges dialog box. The A through F ranges represent the y-axis values (the expenses in this exercise).

Start by specifying the range for April expenses. First, move the cursor to the A field. If you are using the keyboard, press \uparrow \downarrow or TAB to move the cursor from field to field. Then, type B8..B13.

Next, specify the range for May expenses. Move the cursor to the B field, and type C8..C13.

Specify the range for June expenses. Move the cursor to the C field, and type D8..D13.

Leave the D, E, and F fields blank, and move the cursor to the X field. The X range represents the x-axis labels that describe the types of expenses in the budget. Type A8..A13.

If you make a mistake in the dialog box, move the cursor to the field and use the cursor-movement keys, BACKSPACE, or DEL to edit or retype the entry.

6-10 Graphing a Home Budget

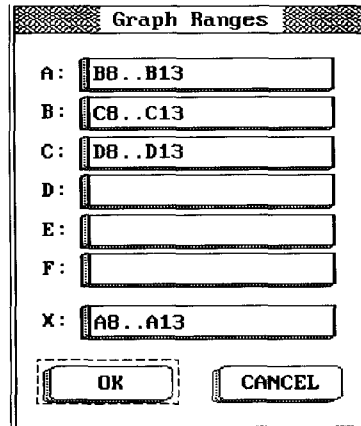


Figure 6-7 Graph Ranges dialog box

Select OK to specify your y-axis and x-axis ranges and return to the worksheet.

Adding Titles

Now you have specified the basics for your graph: the graph type, y-axis ranges for your expenses that will plot as bars on the graph, and x-axis ranges for the labels that will display along the x-axis. The next step is to add a main title and a subtitle to the graph.

Select Graph Titles to display the Graph Titles dialog box.

Move the cursor to the First field and type Monthly Expenses. This first title line displays in large type on the graph, centered at the top.

Next, move the cursor to the Second field and type April - June. The second line displays beneath the first title line on the graph, in regular type.

Leave the X-Axis and Y-Axis fields blank.

When you finish, select OK to add the titles to the graph.

Viewing the Graph

Now you are ready to see the results of your work.

Select Graph View (CTRL-F10) to display the graph based on the current graph settings. You view the current graph in black-and-white or, if you have a color monitor, in color. Lotus-DM adjusts the display mode to accommodate your monitor. The graphs you see in this chapter show as black-and-white hatch patterns. If you have a color monitor, you see colors instead of hatch patterns when you view your graphs.

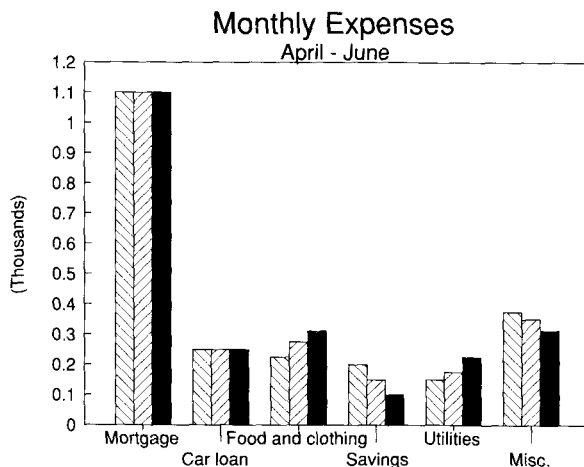


Figure 6-8 Bar graph of monthly expenses

When you finish viewing the current graph, press ENTER or CTRL-F10 to return to the current worksheet.

Changing the Graph Type

You can change the graph type from Bar to another type to view the same information in a slightly different form.

Select Graph Type (CTRL-T) to display the Graph Type dialog box. Select Stacked Bar to create a **stacked bar graph**. Then select OK to change to a stacked bar graph type and return to the worksheet.

Select Graph View (CTRL-F10) to display the same information in a stacked bar graph.

Stacked bar graphs compare values by stacking sections of bars one on top of another to form a single bar. Different colors or hatch patterns show the separate parts of the bar. In Figure 6-9, each stacked bar represents three values: one from each y-axis range.

When you finish viewing the graph, press ENTER or CTRL-F10 to return to the current worksheet.

Naming the Graph

If you want to work with the more than one set of graph settings, you can save your work by creating a named graph within your worksheet file and then saving your worksheet file. **Current graph settings** include all the information you specified for

6-12 Graphing a Home Budget

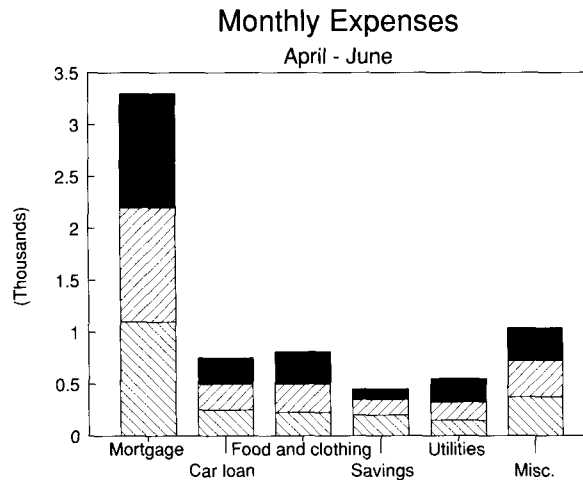


Figure 6-9 Stacked bar graph of monthly expenses

the graph: the graph type, the y-axis ranges, the x-axis range, and the titles. The graph settings are linked to the worksheet data. When you make changes to the worksheet, you also change the graph.

If you do not create a named graph, the current graph settings are overwritten when you select new settings, retrieve another worksheet, or exit Lotus-DM, and you have to re-create them.

Select Graph Name (CTRL-E). You see the Graph Name dialog box.

Select Create to store the current graph settings with your worksheet file as a named graph. Type Monthly in the Selected Name field.

Select OK to save the current graph settings as a named graph.

Now save your worksheet and the named graph by pressing CTRL-S. Lotus-DM saves the graph and worksheet in a file named HOMEUD2.WK1.

Lesson 3 Creating a Preliminary Budget

In Lesson 1, you entered your monthly expenses in the worksheet; in Lesson 2, you created and viewed bar and stacked bar graphs of your monthly expenses. In this lesson, you work with the data in your worksheet to create a preliminary budget, based on your average monthly expenses.

Start with the worksheet you created in Lesson 2, named HOMEBUD2.WK1, on the screen. If HOMEBUD2.WK1 is not on the screen, you must retrieve it. Select File Open, and select HOMEBUD2.WK1 from the Files list box or type HOMEBUD2.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve HOMEBUD2.WK1, in case you want to refer back to Lesson 2 or begin this lesson over again. Therefore, rename it as HOMEBUD3.WK1.

Select File Save as. Type HOMEBUD3 in the Save as field and select OK.

Now you are ready to analyze your data and create a preliminary budget.

Calculating Budget Data

Now it's time to fill in the Budget values in your worksheet. First, enter your fixed values: income, mortgage payment, and car loan payment. Enter 2300 in E4, 1100 in E8, and 250 in E9.

Next you calculate the average for your variable expenses for the past three months using the @AVG @function. An @function is a built-in formula that performs a calculation. Chapter 17 in *Reference* provides comprehensive information about @functions.

Entering Formulas Using @Functions

Move the cell pointer to E10. Type @AVG(B10..D10) and press ENTER. @AVG calculates the average value for the range.

You see the average value, 270.6666, in E10; the formula itself shows in the edit panel.

You can copy the formula to the remaining cells in the Budget column. Select Edit Copy Range (CTRL-C). Note that the currently selected cell in the edit panel (E10..E10) is the specified Copy From range. You want to copy the formula to the Savings and Utilities rows, so specify E11..E12 as the To range and press ENTER. Lotus-DM calculates the average expenses for Savings as 150 and for Utilities as 183.

To complete the Budget column, move the cell pointer to E13. You want to subtract your Budget expenses for mortgage and car loan payments, food and clothing, savings, and utilities from your income.

Use @SUM and the arithmetic operator - (minus sign) to add those Budget expenses together and then subtract them from income all in one formula.

Enter +E4-@SUM(E8..E12) in E13. Use uppercase or lowercase letters. Otherwise, type the formula exactly, leaving no spaces and without adding any other characters. You see the result, 346.3333, in the worksheet. The formula shows in the edit panel.

6-14 Graphing a Home Budget

Double-checking Your Data

You want to build in a safeguard to protect the accuracy of your data. Your total expenses should always match your income. (The Misc. expenses adjust to maintain the balance.) If you maintain an on-going record of your total expenses, you can compare it with the entries for Income to ensure that your data is in balance.

To calculate the total expenses for April, move the cell pointer to B15 and type @SUM(B8..B13). Press ENTER. The result, 2300, shows in the worksheet; the formula remains in the edit panel. This matches the total after-tax income for April and, thus, validates the accuracy of your entries.

Next copy the formula across the row. With the cell pointer remaining in B15, select Edit Copy Range (CTRL-C). Type C15..E15 to specify the remaining cells in the Total expenses row as the To range. Press ENTER.

The same number, 2300, shows straight across the row. This verifies the monthly expenses data.

NOTE If you see a number other than 2300 in the Total expenses row, review your worksheet. Check the Misc. row to make sure that the formulas remain intact. If you overwrite a formula in one of the Misc. cells, your data no longer balances.

Now that you have finished entering values in your worksheet, you can change their appearance.

Formatting a Range of Data

You can change the appearance of the numbers in your worksheet to show that they are dollar amounts. First, specify the range of cells containing the expense values.

Move the cell pointer to B4. If you are using a mouse, click once to select the cell. POINT shows on the right side of the edit panel. Move the mouse to highlight all the numbers in the worksheet, moving right to column E and down to row 15. You see in the edit panel that you have selected the range B4..E15.

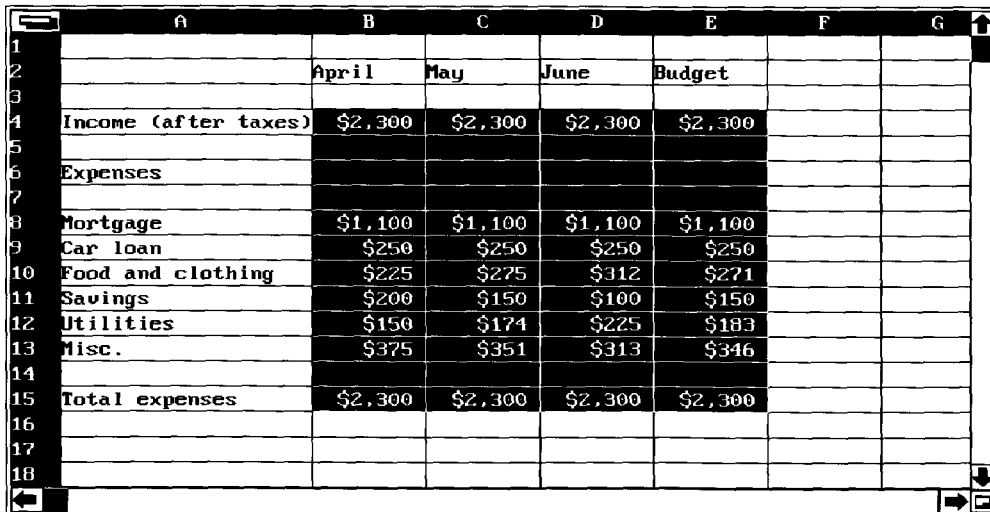
If you are using the keyboard, press SHIFT-ENTER. POINT shows on the right side of the edit panel. Press ↓ to expand the highlight to row 15, then press → to expand the highlight to column E. The highlight covers all the numbers in the worksheet. You see in the edit panel that you have selected the range B4..E15. Press ENTER to select the range.

To change the format of these cells, select Range Format (CTRL-F). You see the Range Format dialog box. Select Currency as the format type.

You can also specify the number of characters that show after the decimal point. The default setting is 2. Move the cell pointer to the Decimal Places field. If you are using

a mouse, you may need to press DEL to erase the 2. Then type 0. With 0 decimal places, Lotus-DM stores the full value of each entry but displays it in the worksheet rounded to the nearest whole number.

To change all the values in the specified range to Currency format, select OK. When you finish, the worksheet looks like Figure 6-10.



	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)	\$2,300	\$2,300	\$2,300	\$2,300		
5							
6	Expenses						
7							
8	Mortgage	\$1,100	\$1,100	\$1,100	\$1,100		
9	Car loan	\$250	\$250	\$250	\$250		
10	Food and clothing	\$225	\$275	\$312	\$271		
11	Savings	\$200	\$150	\$100	\$150		
12	Utilities	\$150	\$174	\$225	\$183		
13	Misc.	\$375	\$351	\$313	\$346		
14							
15	Total expenses	\$2,300	\$2,300	\$2,300	\$2,300		
16							
17							
18							

Figure 6-10 Worksheet with formatted cells

Now your worksheet is complete and ready for analysis.

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name HOMEHUD3.WK1.

Lesson 4 Analyzing Your Budget

Your average expenses for three months form your preliminary budget. In this lesson, you view this information in a pie chart, then you use a what-if analysis to change the budget data in your worksheet and view the pie chart again.

Start with the worksheet you created in Lesson 3, named HOMEHUD3.WK1, on the screen. If HOMEHUD3.WK1 is not on the screen, you must retrieve it. Select File Open, and select HOMEHUD3.WK1 from the Files list box or type HOMEHUD3.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve HOMEHUD3.WK1, in case you want to refer back to Lesson 3 or begin this lesson over again. Therefore, rename it as HOMEHUD4.WK1.

6-16 Graphing a Home Budget

Select File Save as. Type HOMEBUD4 in the Save as field, and select OK.

A pie chart is especially well suited to illustrating your home budget. The whole pie represents your available income. Each slice represents one category of expense. The size of each slice represents its proportion to the whole.

Creating and Viewing a Pie Chart

The current worksheet contains all the information you need to graph your average expenses for three months. But you need to change the current graph settings that you specified in Lesson 2 to create a pie chart. The current graph settings include the graph type, graph ranges, and titles.

Select Graph Type (CTRL-T). You see the Graph Type dialog box. Stacked Bar is the current setting. Select Pie, then select OK to change the graph type to Pie.

Now select Graph Ranges (CTRL-R). The dialog box shows that the A through C ranges remain the range addresses for the monthly expenses, and the X range remains the range address for the labels. These are **remembered ranges**. You need to change the A through C ranges for this graph, because pie charts use ranges differently than other types of graphs.

Pie charts can have up to three ranges: A, B, and X. The A range represents the values for every slice of the whole pie, the B range specifies hatch patterns, and the X range specifies labels for each pie slice.

Move the cursor to the A field, and type E8..E13 to specify the range address that contains the Budget expenses.

Next, erase the B range by moving the cursor to the B field and pressing DEL. Then move the cursor to the C field and erase the C range. Leave the B and C fields blank.

Keep the remembered range in the X field as it is. It specifies the range that contains the expense labels.

Select OK to accept the new range specifications.

Next, you want to change the graph title. Select Graph Titles. Change the First title line to Average Expenses. Retain the Second title line (April - June). Select OK to change the graph title.

The graph settings for your pie chart are complete, and you are ready to view it. Select Graph View (CTRL-F10).

When you finish viewing the current graph, press ENTER or CTRL-F10 to return to the worksheet.

Creating a Named Graph

You want to save the graph settings for this pie chart by naming them. Select Graph Name (CTRL-E). You see the Graph Name dialog box, with one named graph, MONTHLY, which you created in Lesson 2.

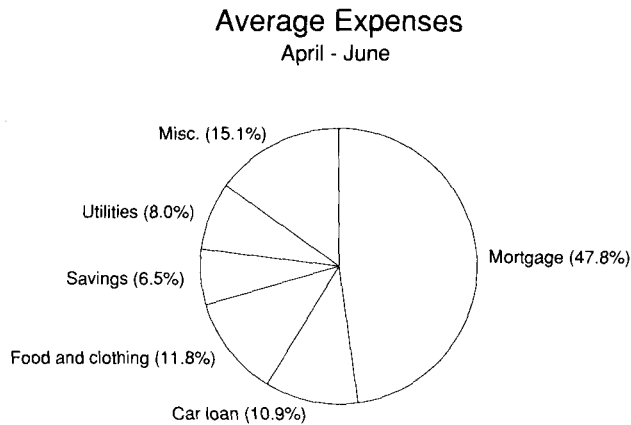


Figure 6-11 Pie chart of average monthly expenses

Move the cursor to the Operation options, where Use is selected. Select Create. Now move the cursor to the Selected Name field and type Average.

Select OK to save the pie chart's current settings with the worksheet as a graph named Average. You cannot save the selected worksheet values in a named graph, however. When you change the values in a worksheet, the appearance of all the associated named graphs changes too.

Saving the Pie Chart in a Graph File

If you want to save a copy of the graph by itself, breaking its link to the worksheet, save a copy as a graph file. A **graph file** is a separate file only for graphs that has the extension .PIC. A graph file is not associated with a worksheet and cannot be viewed or modified within a worksheet. You cannot change the appearance of a graph file; you can only view it or print it with PrintGraph or another program that uses .PIC files.

Select Graph Save to display the Save File dialog box. Move the cursor to the Save as field, and type AVERAGE. Select SAVE to save a copy of the pie chart in a graph file named AVERAGE.PIC.

Using a What-if Analysis

You can change a value in your worksheet to see how it affects the rest of the worksheet. For example, move the cell pointer to D11, which shows your Savings expense for the month of June. Enter 40 to change the monthly savings from 100 to 40. You

6-18 Graphing a Home Budget

do not need to type a dollar sign, because the cell is formatted for currency, and Lotus-DM adds the currency symbol automatically. The new Savings expense shows in the worksheet, with the Currency format.

Values elsewhere in the worksheet also change. Look at E11. Lotus-DM automatically recalculates the average expenses for Savings, and the cell now contains \$130. Cell D13 also contains a formula that references the value you just changed. Lotus-DM has also recalculated this value, which now is \$373.

To return your worksheet data to its original values, enter 100 in D11. The values in E11 and D13 return to their original values.

This process of changing worksheet data to examine the effects of new information or revised assumptions is called a **what-if analysis**. Use a what-if analysis to see the effects of changing some of your spending habits.

Changing Worksheet Data and Viewing the Results

As you examine your monthly budget, you see that you are spending more on daily living expenses and saving less for the future. You want to cut down on your living expenses and save more for the future.

Suppose you want to save at least \$200 a month. Move the cell pointer to E11, and enter 200. When you enter the new value, the related worksheet formulas change accordingly. Look at the Misc. expense in E13. It now reads \$296.

You know that you need at least \$300 a month for out-of-pocket expenses, but you cannot overwrite the formula in the Misc. row. Instead, you can make up the difference by reducing your expenses in other categories.

You believe you can cut back on your utilities to save \$35 a month. Enter 148 in E12. You can also take lunch to work once in a while, so you do not have to pay for lunch in a restaurant as often. This should save about \$40 per month. Type 231 in E10.

You want to take a vacation next year, and you estimate that it will cost \$700. You have 10 months to save for it, so you need to add \$70 to your monthly budget, which is now \$200. Type 270 in E11. Your budget now looks like Figure 6-12.

Your budget is balanced, because your monthly expenses equal your monthly income. Select Graph View (CTRL-F10) to view it on the screen, using the current graph settings. When you finish viewing the current graph, press ENTER or CTRL-F10 to return to the current worksheet.

Reviewing Your Data Again

Suppose you are still not satisfied with your budget. You want to see what would happen if you make some drastic changes in your financial situation. Perhaps you obtained your mortgage when interest rates were very high. Interest rates have dropped considerably since then, and you have the opportunity to refinance your mortgage at a significantly lower rate. As a result, your monthly payment drops to \$950. Enter 950 in E8. This frees up \$150 a month.

	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)	\$2,300	\$2,300	\$2,300	\$2,300		
5							
6	Expenses						
7							
8	Mortgage	\$1,100	\$1,100	\$1,100	\$1,100		
9	Car loan	\$250	\$250	\$250	\$250		
10	Food and clothing	\$225	\$275	\$312	\$231		
11	Savings	\$200	\$150	\$100	\$270		
12	Utilities	\$150	\$174	\$225	\$148		
13	Misc.	\$375	\$351	\$313	\$301		
14							
15	Total expenses	\$2,300	\$2,300	\$2,300	\$2,300		
16							
17							
18							

Figure 6-12 Worksheet results of what-if analysis

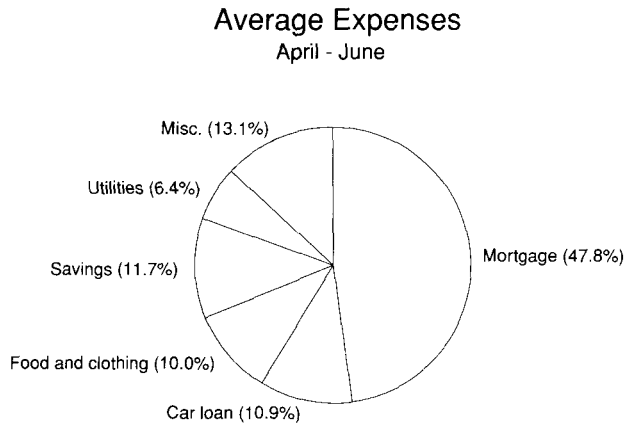


Figure 6-13 Pie chart of what-if analysis

You still have a year to go on your car loan, but as your car ages it will require more frequent repair. You want to set aside \$75 per month to pay for repairs as they are needed. Enter 325 in E9.

You now have an additional \$75 per month in your Misc. expenses account, so you have more leeway in your budget than you had using your previous calculations.

Enhancing Your Graph

You want to view your proposed budget as a pie chart, but you want to make a few enhancements. Select Graph Titles to specify a more accurate title for the new budget. Type Proposed Budget in the First field. Erase the current entry in the Second field. Select OK to change the graph title.

Next, you want to improve the appearance of your graph by adding hatch patterns (or colors, if you have a color monitor) to the pie slices.

For pie charts, the B range determines the color or hatch pattern of each pie slice. Each color and hatch pattern relates to a code number between 1 and 8, which you specify in your worksheet. See Figure 13-7 in Chapter 13 of *Reference* for hatch patterns and corresponding codes.

Enter the code numbers next to the related values in the range E8..E13. Enter 7 in F8. This specifies color or hatch pattern number 7. Move the cell pointer to F9, and enter 3. This specifies color or hatch pattern number 3. Enter the following code numbers for the remaining cells in the range (E10 through E13) in this order: 1, 5, 8, 6.

In order to include these colors and hatch patterns in your pie chart, you must specify the codes as the B range in the graph settings. Select Graph Ranges (CTRL-R). Note that the current graph ranges remain specified in the Graph Ranges dialog box. These are remembered ranges. Move the cursor to the B field, and type F8..F13. Select OK to accept the specified ranges and return to the worksheet.

	A	B	C	D	E	F	G
1							
2		April	May	June	Budget		
3							
4	Income (after taxes)	\$2,300	\$2,300	\$2,300	\$2,300		
5							
6	Expenses						
7							
8	Mortgage	\$1,100	\$1,100	\$1,100	\$950	7	
9	Car loan	\$250	\$250	\$250	\$325	3	
10	Food and clothing	\$225	\$275	\$312	\$231	1	
11	Savings	\$200	\$150	\$100	\$270	5	
12	Utilities	\$150	\$174	\$225	\$148	8	
13	Misc.	\$375	\$351	\$313	\$376	6	
14							
15	Total expenses	\$2,300	\$2,300	\$2,300	\$2,300		
16							
17							
18							

Figure 6-14 Color and hatch patterns codes in the B range

Now you can view your proposed budget in a pie chart. Select Graph View (CTRL-F10). The graphs you see in this chapter show as black-and-white hatch patterns. If you have a color monitor, you see colors instead of hatch patterns when you view your graphs.

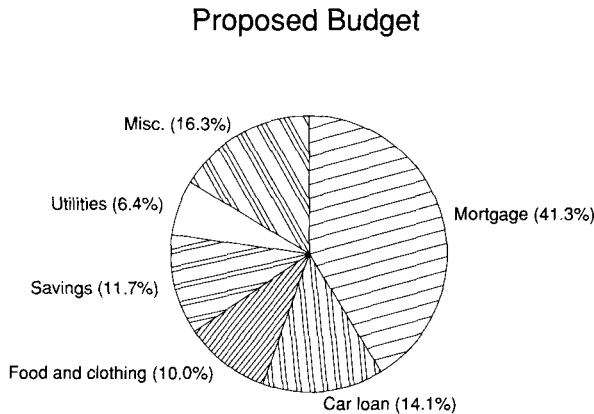


Figure 6-15 Pie chart of projected budget

Notice that the menu bar remains at the top of the screen. Some Lotus-DM commands remain available while you view a graph. Select Graph Options. You see the Graph Options dialog box. Depending on your type of monitor, the Display Mode is either Black & White or Color. Select Black & White. This setting retains the hatch patterns in your pie chart when you print it. Select OK to set the Display Mode and return to the graph, which displays in black and white.

When you finish viewing the current graph, press ENTER or CTRL-F10 to return to the current worksheet.

Saving Your Work

You want to save your worksheet and graph settings together in a worksheet file, and you also want to save a copy of the graph for printing in a graph file.

First, link the graph settings to the worksheet by naming them. Then the graph settings will be saved with the worksheet when you save the worksheet file.

Select Graph Name (CTRL-E). You see the Graph Name dialog box, which contains two graph names you have already specified: AVERAGE and MONTHLY. Select Create as the Operation option, then type Budget in the Selected Name field.

Select OK to save the current settings as a graph named Budget.

6-22 Graphing a Home Budget

Next, break the link between the worksheet and a copy of the current graph by saving it in a graph file. Select Graph Save to display the File Save dialog box. Type BUDGET in the Save as field, and select SAVE to save a copy of the graph in the current directory in a graph file named BUDGET.PIC. Now save your worksheet file by pressing CTRL-S. Lotus-DM saves the file with the file name HOMEBUD4.WK1.

Lesson 5 Printing Graphs

In this lesson, you use PrintGraph to print two pie charts, representing your average expenses over the past three months and your proposed monthly budget.

Before you begin your PrintGraph session, make sure that you are using a printer capable of printing graphs and that your printer is on-line and ready. If you are not sure whether your printer can print graphs, check your printer manual. In addition, you can use your printer with PrintGraph only if you have selected an appropriate printer driver with Setup (F10). For more information on selecting a printer driver, see your DeskMate manual or "Using the Setup Accessory" in Appendix A.

Select Graph PrintGraph to run PrintGraph, a separate program within Lotus-DM. This program prints only graph files with a .PIC extension or the current clipboard image. See "Image(s)" in Chapter 15 for information on printing the current clipboard image. When you start PrintGraph, you see the PrintGraph screen.

Help F ₁ Aug 16, 1989 PrintGraph - 4:43 pm		
File F ₂ Edit F ₃ † F₉ X F₁₀		
Images	Image Directory	Size
	C:\LOTUS-DM	Full
	Font Directory	Font 1
	C:\LOTUS-DM	Font: <u>MODERN</u> Attributes: <u>Normal</u>
	Page Setup	Font 2
	Left Margin: <u>5</u> Printed Line Width: <u>100</u> Total Lines/Page: <u>45</u> Printed Lines/Page: <u>45</u> Pause Between Pages: <u>Yes</u> Orientation: <u>L</u>	Font: <u>MODERN</u> Attributes: <u>Normal</u>

Figure 6-16 PrintGraph screen

The PrintGraph screen displays the main menu and boxes with the default settings.

NOTE If you are using a mouse, you can click or double-click any one of the seven boxes to select the related PrintGraph command.

Lotus-DM's default settings print standard graphs on the specified printer. Use the PrintGraph options to customize the text in your graph and the print area it occupies on the page. In this lesson, you use the default settings. Now you are ready to select, preview, and print two graphs: AVERAGE and BUDGET.

Selecting and Previewing Image Files

Before you can print your graph files, you must select them. Select File Image(s) (CTRL-I) to display the File Image(s) dialog box. Type Average in the Image field. You can preview the selected image before you exit the File Image(s) dialog box.

Previewing a Selected Graph

Select Preview (CTRL-F10). With Preview, you can see how the selected graph looks on the printed page. You see the pie chart titled Average Expenses.

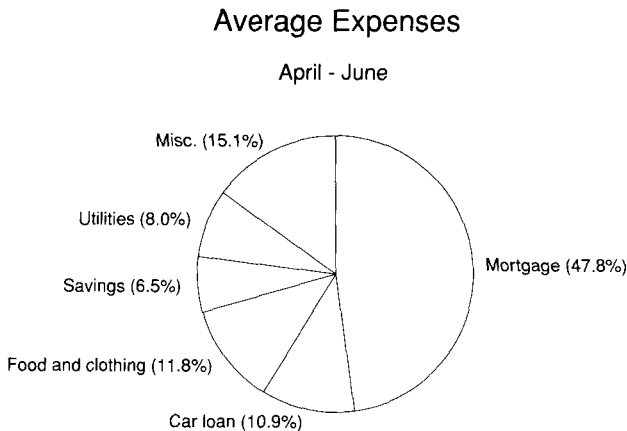


Figure 6-17 Pie chart of average expenses

When you finish viewing the selected image, press ENTER or CTRL-F10 to return to the File Image(s) dialog box.

Selecting Your Graph Files

You can select more than one file in the Image Files list box. Select AVERAGE and BUDGET for printing.

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If you are using a mouse, point to AVERAGE, click, then drag to highlight BUDGET, if they are next to each other in the Image Files list box. If the files are not next to each other, press SHIFT and click each file in turn. Release SHIFT when you have highlighted both file names.

You can select both AVERAGE and BUDGET at once using the keyboard. If the files are listed next to each other in the Image Files list box, move the cursor to highlight AVERAGE, then press SHIFT and ↓ to scroll down one to BUDGET. Release SHIFT when you have highlighted both. If the files are not listed next to each other in the Image Files list box, press CTRL while you scroll the list with ↑ and ↓. Press the space bar next to each selection. Do not release CTRL until you have selected both files.

When you finish, select OK to select the highlighted graph files for printing and to return to the PrintGraph screen. If you are using the keyboard, press TAB to move the cursor to select OK.

The PrintGraph screen lists AVERAGE.PIC and BUDGET.PIC in the Images box.

Printing the Selected Graphs

Now you are ready to print the selected graphs. Select File Print (CTRL-P) to begin printing. You see a Print message box. To stop printing early, select CANCEL. Do not turn the printer off.

The printer pauses after it completes printing AVERAGE. You see another Print message box. Select YES to make another copy of the graph, select NO to print the next selected graph or to finish printing, or select CANCEL to stop printing and return to the PrintGraph screen.

Select NO. PrintGraph prints the next graph, BUDGET. When PrintGraph finishes printing BUDGET, you see the Print message box again. Select NO. You return to the PrintGraph screen automatically.

Select File Exit (ESC) to return the current worksheet.

Using the Graph Commands

In this chapter you have learned how to design worksheet data for graphs; select and change graph settings; view, name, and save the current graph settings; and select, preview, and print graph files. You have also learned how to use Lotus-DM's mathematical capabilities to analyze your data, experiment with what-if analysis, and view the results immediately in the worksheet and in the current graph.

For more information about the Graph commands, see Chapter 13 in *Reference*.

Chapter 7

Managing an Employee Database Table

On occasion you might want to enter information in a worksheet and then organize it in a particular way. For example, if you run a small business, you can enter information about all your employees and organize this information by last name, first name, address, and so on. You do this in Lotus-DM by creating a **database table**. A database table is a special kind of range that you can create in a Lotus-DM worksheet. A database table can contain a client list, a parts inventory, a sales force commission history, or a real estate sales log. A database table works the same way regardless of the kind of information you enter in it.

This chapter explains how to create a database table, how to arrange the information in the database table, and how to find certain information in the database table. To illustrate a more advanced command, Data Table, this chapter also explains how to perform a basic what-if analysis. And to show you the results of your work, this chapter also describes how to create a report by printing a range of information from the database table.

The lessons in this chapter use a database table to organize information about employees who work at a hardware store. You will use data commands to identify employees who meet certain criteria, perform a what-if analysis to see if you can increase salaries for full-time employees by 5%, and create a report that presents the

7-2 Managing an Employee Database Table

results of the what-if analysis. These lessons cover only some of the Lotus-DM commands you can use to manage database tables. For more information about commands you can use with database tables, see Chapter 14 in *Reference*.

Lesson 1 Creating a Database Table

A Lotus-DM database table is a collection of related information organized like a table, that is, in rows and columns. Each column in the database table constitutes one **field**, and the information in the field is categorically the same. Each cell in the first row of the database table contains a label, called a **field name**, identifying the kind of information appearing in the field below. Each row in the database table contains a single **record**, with information about one particular item in the database table.

Organizing an Employee Database Table

The hardware store employs 10 persons, and each employee's record contains five categories of information. Therefore, the database table must have 11 rows (1 for the field names and 10 for the employee records) and five fields (one for each category of information). The categories of information and corresponding field names are Last Name, First Name, Date Hired, Employment Status, and Hourly Rate.

Entering Information in the Employee Database Table

Now that you know the structure of the employee database table, you can begin entering the field names that will organize the employee information. Begin with a blank worksheet in the Lotus-DM main window.

Specify the field names in the first row (row 1) of the worksheet. If you are using the keyboard, use ↑ ↓ ← or → or press HOME to move the cell pointer to A1. If you are using a mouse, move the arrow to A1 and click to highlight the cell.

The cell address section of the edit panel shows A1, indicating that A1 is selected. Type FIRST NAME. You see that LABEL mode indicator is highlighted because FIRST NAME is a **label**, or a text entry. Press ENTER. You see the phrase FIRST NAME in A1. You also see 'FIRST NAME in the edit panel. The ' (apostrophe) is called a label prefix. The label prefix indicates that FIRST NAME is a left-aligned label.

Notice that FIRST NAME exceeds the width of the cell. When a label is longer than the cell's column width, it is called a **long label**. Lotus-DM displays as much of the label as it can in the cells to the right, as long as these cells are empty. The worksheet should look like the one in Figure 7-1.

Lesson 1 Creating a Database Table 7-3

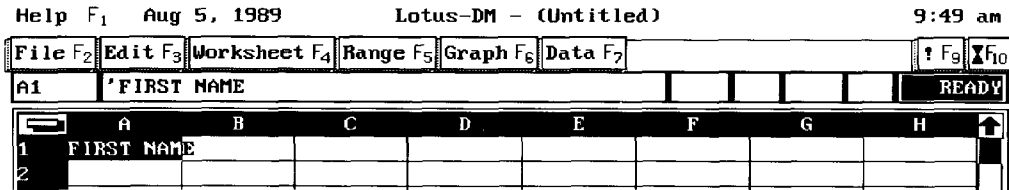


Figure 7-1 First Name field

Next, move the cell pointer to B1. Type LAST NAME and press ENTER. You see the phrase LAST NAME in B1 and in the edit panel, where it is preceded by an ' (apostrophe) to indicate that it is a left-aligned label. Notice that you can no longer see the E in FIRST NAME. Lotus-DM displays only part of the long label, because the cell to its right is no longer empty.

Move the cell pointer to C1. Enter each of the following three field names in cells C1, D1, and E1, respectively: DATE HIRED, STATUS, and HOURLY RATE. When you are finished, your worksheet should look like Figure 7-2.

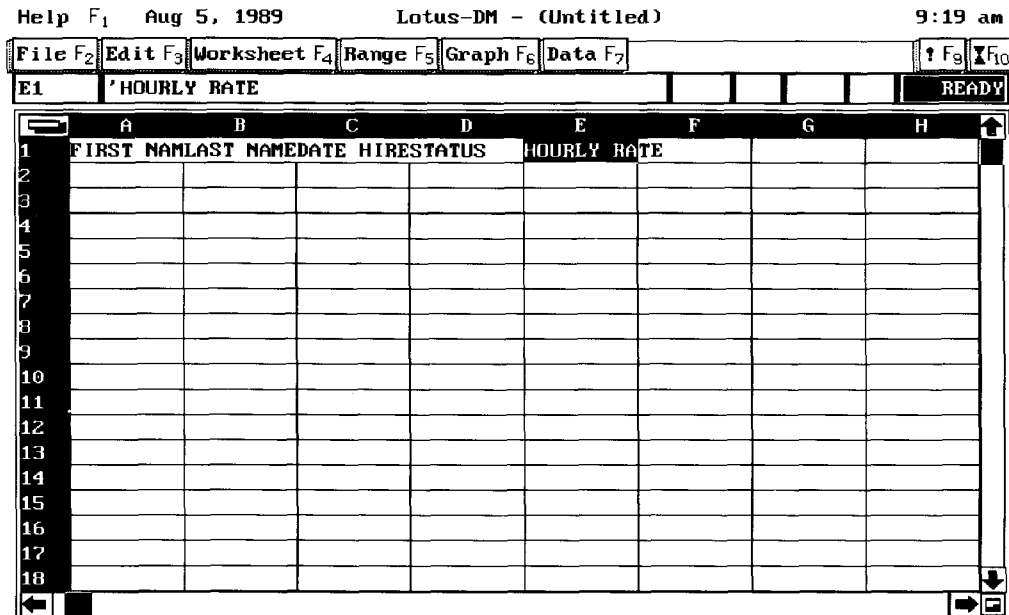


Figure 7-2 Field names

Saving Your Work

Save your work frequently during a session to minimize the work you could lose in the event of a power failure. To save your worksheet file for the first time, select File Save as. If you are using the keyboard, press F2 to display the pull-down menu of File commands. Note that Save is shadowed, which means that it is currently unavailable. You cannot use Save to save a new, untitled worksheet file. To name and save a new, untitled worksheet file, use Save as. Press ↓, or type s, to select Save as. If you are using a mouse, click File to display the File pull-down menu then click Save as. Press ENTER or double-click to select the command. You see the File Save As dialog box.

Type EMPDATA1 in the Save as field. Leave the password field blank. Lotus-DM automatically adds a worksheet extension (.WK1) the first time you save a worksheet file. Select OK to save your worksheet in a file named EMPDATA1.WK1 in the current directory and to return to the worksheet. You see EMPDATA1.WK1 in the title bar. Now when you work on the worksheet, press CTRL-S periodically to save your changes in the current worksheet file.

Refining the Appearance of a Database Table

You can refine the appearance of the database table to suit your needs. The remainder of this lesson shows you how to adjust field widths and to format fields so that certain types of data, such as currency and dates, display properly in your worksheet.

Adjusting the Field Width

Before you enter information in the fields beneath the field names, adjust the column widths so that any long labels are fully visible. To change the width of all columns in the worksheet, select Worksheet Column (CTRL-W). You see the Worksheet Column dialog box, where you can change the column settings for a range or the entire worksheet. The buttons for Range and Set-width are highlighted, indicating that they are selected. You know an option is selected when the button next to it is highlighted.

The current range address is in the Range field. Select Global. If you are using the keyboard, press ↑ ↓ ← or → to move from option to option, press TAB to move among groups of options. Press the space bar to select or deselect an option. Move the cursor to the Width field. If you are using a mouse, you may need to press DEL to erase the default width, 9. Now type 20.

NOTE

Do not press ENTER to select an option nor press ESC to deselect an option. Pressing ENTER accepts the changes you make in the dialog box and returns you to the worksheet. Pressing ESC cancels your selections and returns you to the worksheet without making any changes.

The Worksheet Column dialog box should look Figure 7-3.

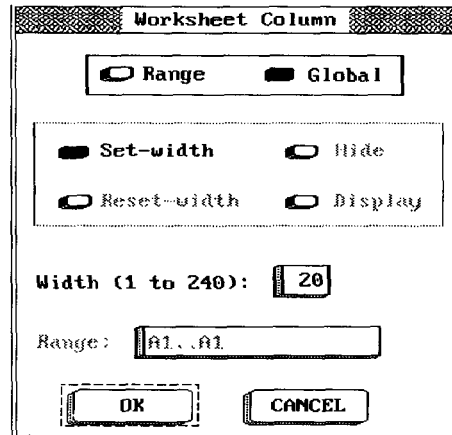


Figure 7-3 Worksheet Column dialog box

Select OK to set the width of all columns in the worksheet to 20 and to return to the worksheet. Then press HOME to highlight A1. The worksheet should now look like Figure 7-4.

A1	FIRST NAME				READY
	A	B	C	D	
1	FIRST NAME	LAST NAME	DATE HIRED	STATUS	
2					
3					

Figure 7-4 Column width of 20 characters

You can also change the column width of a specific field. The STATUS field, for example, will contain a single character: F for full-time status or P for part-time status. The width of the field, or column, needs only to be as wide as the field name STATUS, which is six characters in length. Change the width of the field STATUS to six characters.

To do this, move the cell pointer to D1. Select Worksheet Column (CTRL-W). You see the Worksheet Column dialog box. Range and Set-width are selected. Move the cursor to the Width field. If you are using the mouse, you may need to press DEL to erase the current width, 20. Now type 6. The Range field contains D1..D1. Select OK to change the width of the STATUS field to six characters and return to the worksheet. Press CTRL-S to save your work.

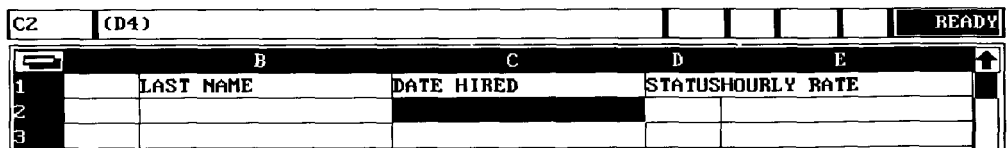
7-6 Managing an Employee Database Table

Formatting Fields

You can also format each field to control how the information is displayed. The default format for a Lotus-DM worksheet is General format, which displays numbers without thousands separators or zeros to the right of decimal places for integers, and with a minus sign for negative numbers. Three of the fields (FIRST NAME, LAST NAME, and STATUS) require General format, so you do not need to override the global format settings for these three fields. But DATE HIRED and HOURLY RATE display dates and currency values, respectively, and need to be formatted differently.

To change the format of the DATE HIRED field, select the range C1..C11, which will contain the dates you hired each employee. To select C1..C11 using the keyboard, highlight C1 then press SHIFT-ENTER to anchor the range. Now press ↓ until you highlight all the cells from C1 to C11. C1..C11 shows in the edit panel. Press ENTER to select the range. To select the range C1..C11 with the mouse, click on the first cell (C1) to highlight it and hold the button down, then drag the cell pointer until the last cell in the range is highlighted (C11).

Now select Range Format (CTRL-F). You see the Range Format dialog box. Select Date. The Date options are no longer shadowed. Select the MM/DD/YY date setting (D4). You see the format indicator (D4) for the Date format you selected in the edit panel. Select OK to format the range and return to the worksheet. Press ENTER or click to remove the highlight from the range.

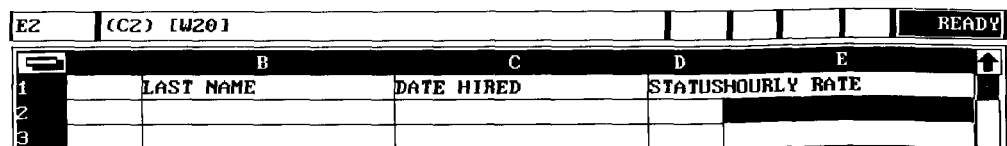


The screenshot shows the Lotus-DM worksheet interface. The edit panel at the top displays 'C2' and '(D4)'. The worksheet grid has columns labeled B, C, D, and E. Row 1 contains the headers 'LAST NAME', 'DATE HIRED', and 'STATUS'. Row 2 and Row 3 are empty. The 'DATE HIRED' column (C) is highlighted, indicating the date format (D4) has been applied.

	B	C	D	E
1	LAST NAME	DATE HIRED	STATUS	HOURLY RATE
2				
3				

Figure 7-5 MM/DD/YY date format (D4)

Now format the HOURLY RATE field. Select the range E1..E11. Select Range Format (CTRL-F). You see the Range Format dialog box. Select Currency. You see 2 in the Decimal Places field. You want to display two decimal places, so leave this field as is. Select OK to format the range and return to the worksheet. Press ↓ to remove the highlight from the range. The format indicator in the edit panel (C2) represents the Currency format with two decimal places.



The screenshot shows the Lotus-DM worksheet interface. The edit panel at the top displays 'E2' and '(C2) [W201]'. The worksheet grid is the same as in Figure 7-5. The 'HOURLY RATE' column (E) is highlighted, indicating the currency format (C2) has been applied.

	B	C	D	E
1	LAST NAME	DATE HIRED	STATUS	HOURLY RATE
2				
3				

Figure 7-6 Format indicator for Currency with two decimal places (C2)

Press CTRL-S to save your work. Refer to "Format" in Chapter 12 for more information on formatting a range.

Checking the Global Settings

You can quickly check the global settings of the worksheet to make sure they are what you want. To check the global settings, select Worksheet Status. You see the Status information box. The Status information box displays the current global settings as well as other current information. The information beneath the heading Cell Display tells you about the global settings for the worksheet. Notice that the worksheet format is General (G), and that the column width is 20. Because the column width of STATUS and the format of DATE HIRED and HOURLY RATE are range settings rather than global settings, that information is not displayed here. The Cell Display headings reflect only those settings that affect the entire worksheet. Select OK to return to the worksheet.

Lesson 2 Entering Records in a Database Table

In this lesson you enter records for 10 hardware store employees in the employee database table.

Start with the worksheet you created in Lesson 1, named EMPDATA1.WK1, on the screen. If EMPDATA1.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA1.WK1 from the Files list box or type EMPDATA1.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve the data in EMPDATA1.WK1 in case you want to refer back to Lesson 1 or begin this lesson over again. But you also need to use the data for this lesson. So now create a copy of EMPDATA1.WK1 under a new file name.

Select File Save as. Type EMPDATA2 in the Save as field. Select OK to save a copy of the data in EMPDATA1.WK1 under a new name, EMPDATA2.WK1. The title bar shows that you are now using a worksheet titled EMPDATA2.WK1.

Entering the First Record

Now you need to enter information for the first employee in the database table, Ann Smith. All the information about Ann Smith occupies one record and five fields. The five field names correspond to the five categories of information in the database table. The first name, Ann, goes in A2. Press GOTO (CTRL-F5) and type A2 in the edit panel, then press ENTER. The cell pointer highlights A2.

Type Ann in A2, under the field name FIRST NAME, and press ENTER. Next, move the cell pointer to B2, type Smith under the field name LAST NAME and press ENTER.

7-8 Managing an Employee Database Table

Next, enter information in the DATE HIRED field in Ann Smith's record. You formatted this field for dates in Lesson 1, so now you need to use a special type of formula, called an **@function** (pronounced "at function") to specify the date she was hired, which is November 11, 1982. An **@function** is a built-in formula that performs a calculation. All @functions use **arguments**, which supply the information for the calculation. Arguments for each @function follow a specific order, or **syntax**, and are enclosed in parentheses. Chapter 17 in *Reference* provides comprehensive information about @functions.

Use the @DATE @function to enter the date Ann Smith was hired. If you do not use @DATE, but simply enter 11/11/82 or November 11, 1982, Lotus-DM does not recognize the entry as a date. @DATE uses the following syntax: @DATE(year,month,day).

Move the cell pointer to C2, type @DATE(82,11,11) and press ENTER. You see the date displayed in the format you specified in Lesson 1, (D4). If you had entered the date using @DATE in a cell that was not formatted with a Date format, Lotus-DM would display the date number, 30266, which is the number of days between January 1, 1900 and the date you specified. See "Date and Time @Functions" in Chapter 17 for more information on date numbers.

Next, move the cell pointer to D2, type ^F under the field name STATUS, and press ENTER. The ^ (caret) is a label prefix that centers the label in the cell. Next, move the cell pointer to E2. Type 8.75 under the field name HOURLY RATE, and press ENTER. The currency symbol \$ (dollar sign) is displayed, because in Lesson 1 you formatted the range for hourly rates to Currency. The \$ is the default currency symbol.

Entering the Remaining Records

Once you have completed entering Ann Smith's record, you are ready to enter records for the rest of the employees. Make sure you use @DATE(yy,mm,dd) to enter all dates in the DATE HIRED field, and enter the ^ (caret) label prefix with P or F to center the data in the STATUS field. You do not need to type the \$ (dollar sign) before each hourly rate value, because Lotus-DM enters it for you. Enter the information shown in Figure 7-7 into your database table.

NOTE

If you make a mistake in your worksheet you can correct it. If an entry is misspelled, move the cursor to highlight the cell, and retype the entry or press CTRL-F2 and edit it. Read "Correcting Mistakes" in Chapter 4 for instructions on how to correct mistakes.

You have created an employee database table for the hardware store. Press CTRL-S to save your work in a file named EMPDATA2.WK1.

	A	B	C	D	E
1	FIRST NAME	LAST NAME	DATE HIRED	STATUS	HOURLY RATE
2	Ann	Smith	11/11/82	F	\$8.75
3	Nelly	Nelson	04/06/84	P	\$6.60
4	Harry	Nelson	04/06/84	P	\$6.60
5	Patricia	Bloom	05/16/87	F	\$5.25
6	John	Devlin	04/02/86	F	\$6.50
7	Nancy	Lee	11/07/81	F	\$15.00
8	Dave	Cameron	03/04/83	P	\$13.50
9	Shirley	Moore	12/07/82	P	\$14.25
10	Kerry	Kaia	12/18/87	P	\$4.00
11	Mindy	Kear	04/13/85	P	\$7.00
12					

Figure 7-7 Completed employee database table

Lesson 3 Rearranging Information

You realize that you entered the records for the employees of the hardware store randomly, and you would prefer that the records be in alphabetical order. You can use Data Sort to reorganize the information in your database table.

Start with the worksheet you created in Lesson 2, named EMPDATA2.WK1, on the screen. If EMPDATA2.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA2.WK1 from the Files list box or type EMPDATA2.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve EMPDATA2.WK1 in case you want to refer back to Lesson 2 or begin this lesson over again. Therefore, create a copy of it under a new name, EMPDATA3.WK1.

Select File Save as. Type EMPDATA3 in the Save as field and select OK. The title bar indicates that you are working with a worksheet titled EMPDATA3.WK1.

Using Data Sort

Select Data Sort to display the Data Sort dialog box. First, specify a sort range in the first field of the dialog box. A **sort range** is the range in the employee database table that Lotus-DM reorganizes. Move the cell pointer to the Sort Range field. Now type A2..E11 in the Sort Range field to specify the range that contains the records in the database table, but not the field names. The sort range includes the full width of the records so that the accompanying information is sorted with the record.

Next, move the cursor to the Cell Address field for the primary key. The **primary key** is the field that contains the information you want to sort. In this case, the primary key is the LAST NAME field. Any cell in the LAST NAME field, except the cell containing the field name (LAST NAME), can be used as the cell address for the primary

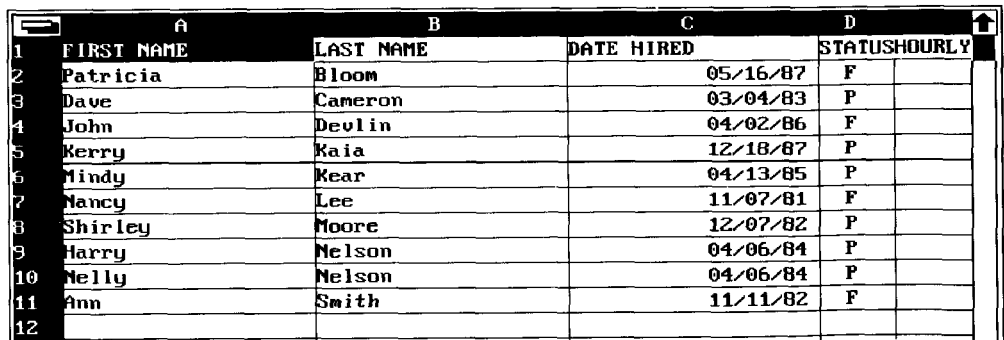
7-10 Managing an Employee Database Table

key. You want the records in the LAST NAME field sorted in Ascending (alphabetical) order. Type B2 in the primary key Cell Address field. Move the cursor to the Ascending order button and select it. This tells Lotus-DM to organize the records in the sort range in alphabetical order based on each record's entry in the same field as B2.

However, two of your employees have the same last name (Harry Nelson and Nelly Nelson). If you were sorting this by hand, you would use their first names as a tie-breaker and list Harry before Nelly. This tie-breaker field is called a **secondary key**. In this case the secondary key is the FIRST NAME field. You can use the cell address of any cell in the FIRST NAME field, except the cell containing the field name, as the cell address of the secondary key.

Move the cursor to the Secondary Key check box and select it. If you are using the keyboard, press the space bar to select a check box. If you are using a mouse, click the check box to select it. You see an X in the check box indicating that it is selected. Move the cursor to the Cell Address field and type A4. Move the cursor to the Ascending Order button and select it. This tells Lotus-DM that in the case of a tie, the records in the first field determine the sorting order for the records in the second field. Harry Nelson should be listed in the database table above Nelly Nelson, because H comes before N.

Select OK to sort the database table. Your database table should look like Figure 7-8.



	A	B	C	D	
1	FIRST NAME	LAST NAME	DATE HIRED	STATUS	HOURLY
2	Patricia	Bloom	05/16/87	F	
3	Dave	Cameron	03/04/83	P	
4	John	Devlin	04/02/86	F	
5	Kerry	Kaia	12/18/87	P	
6	Mindy	Kear	04/13/85	P	
7	Nancy	Lee	11/07/81	F	
8	Shirley	Moore	12/07/82	P	
9	Harry	Nelson	04/06/84	P	
10	Nelly	Nelson	04/06/84	P	
11	Ann	Smith	11/11/82	F	
12					

Figure 7-8 Sorted database table

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name EMPDATA3.WK1.

Lesson 4 Finding Information

You can find information in the employee database table that meets criteria you specify using Data Query. In this lesson, you use Data Query to find all employees who work full-time.

Start with the worksheet you created in Lesson 3, named EMPDATA3.WK1, on the screen. If EMPDATA3.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA3.WK1 from the Files list box or type EMPDATA3.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve EMPDATA3.WK1 in case you want to refer back to Lesson 3 or begin this lesson over again. Therefore, create a copy of it with a new name, EMPDATA4.WK1.

Select File Save as. Type EMPDATA4 in the Save as field and select OK. The title bar indicates that you are working with a worksheet titled EMPDATA4.WK1.

Setting Up the Worksheet for Data Query

You have to set up your worksheet in a certain way before you use Data Query. You need to create an input range and a criterion range in the worksheet. An **input range** is the part of the database table that contains the records you want Lotus-DM to search. A **criterion range** tells Lotus-DM which records to search for in your database table. The first row of the criterion range contains copies of the field names from the database table, and the second row contains the criterion by which Lotus-DM searches the database table.

First decide what the input range should be. For this lesson, use the whole database table, range A1..E11, as the input range. You enter this information in the Data Query dialog box later in this lesson.

Next, set up the criterion range. Remember that the first row of the criterion range contains copies of the field names you want Lotus-DM to search.

Copy all the field names to the range G1..K1. To copy the field names, select range A1..E1. Select Edit Copy Range (CTRL-C). You see the current range, the Copy From range, in the edit panel. Type G1 as the first cell of the To range and press ENTER.



Figure 7-9 Copy From and To prompts in the edit panel

Lotus-DM copies all the field names into the range that starts with G1. Lotus-DM fills as many cells as it needs to copy the From range. Move the cell pointer to G1 to see the copy of the FIRST NAME field.

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Now specify the criterion in the criterion range. You want Lotus-DM to find all the full-time employees. Move the cell pointer to J2, which is the first cell under the copy of the STATUS field name. Type F and press ENTER. (You do not need to enter the ^ label prefix because the alignment of the criterion for full-time employees, F, is unimportant.) Now select Data Query to display the Data Query dialog box.

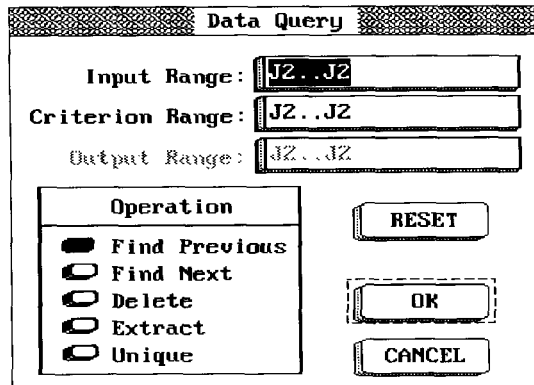


Figure 7-10 Data Query dialog box

Naming a Range

It is often easier to specify ranges using range names instead of range addresses. Next, you will create range names for the ranges you use in the Data Query dialog box. Select CANCEL to leave the dialog box and return to the worksheet.

Select (A1..E11), as the input range, which is the entire database table. Next select Range Name (CTRL-N) to display the Range Name dialog box. The current range address is in the Range field, and the Create operation is selected. Move the cursor to the Range Name field, and type DATATABLE.

Select OK to name the input range DATATABLE and return to the worksheet.

Now select (G1..K2) as the criterion range. Press CTRL-N to display the Range Name dialog box. You see DATATABLE in the Names Ranges list box and the current range in the Range field. The Create operation is selected. Move the cursor to the Range Name field and type CRITERIA1. The Range Name dialog box should look like the one in Figure 7-12.

Select OK to name the criterion range CRITERIA1 and return to the worksheet.

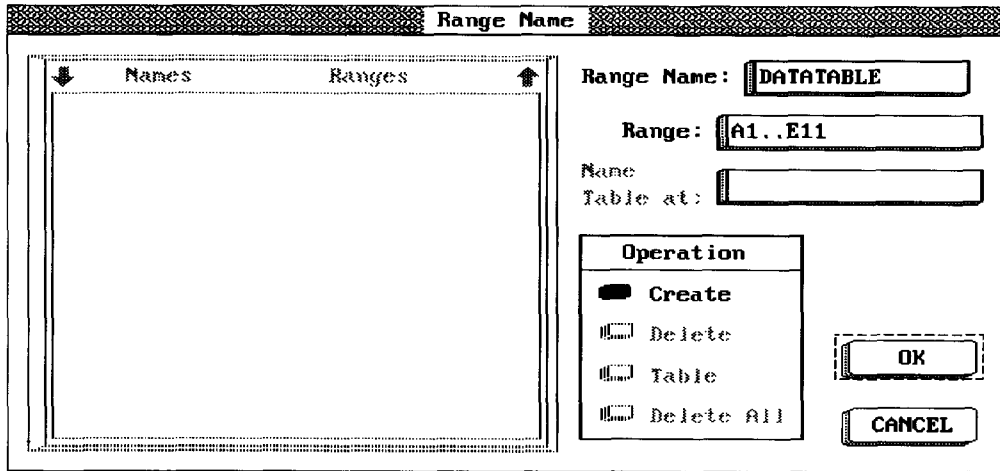


Figure 7-11 The Range Name dialog box

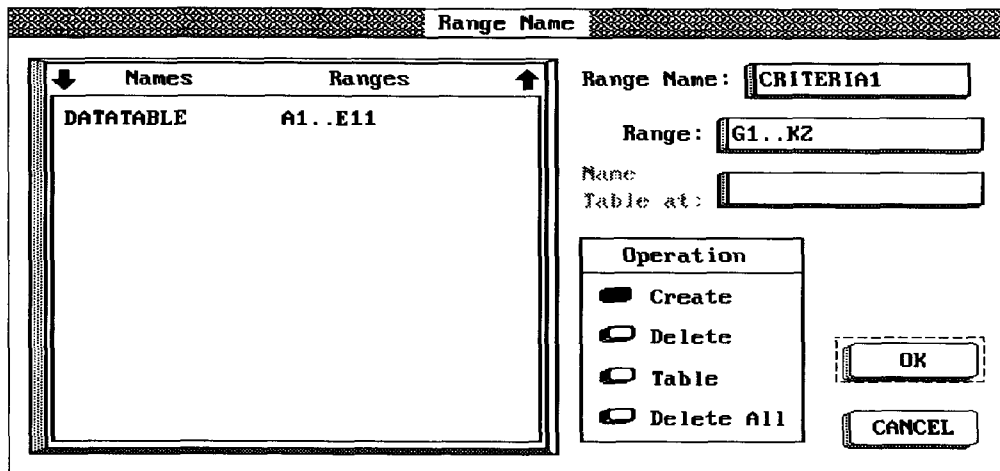


Figure 7-12 Naming the criterion range

Finding a Record Using Data Query

Now select Data Query. You see the Data Query dialog box. Type DATATABLE in the Input Range field. Move the cursor to the Criterion Range field, and type CRITERIA1, if it does not already show there. Move the cursor to the button to the left of the Find

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Next operation. Select Find Next. Find Next locates the next record in the input range that matches your criterion: a full-time employee. Select OK to query the database table. Your database table now looks like Figure 7-13.

Help F₁ Aug 4, 1989 Lotus-DM - EMPDATA4.WK1 11:08 am

File F₂ Edit F₃ Worksheet F₄ Range F₅ Graph F₆ Data F₇ F₉ F₁₀

A2 'F READY

	A	B	C	D
1	FIRST NAME	LAST NAME	DATE HIRED	STATUSHOURLY
2	Patricia	Bloom	05/16/87	F
3	Dave	Cameron	03/04/83	P
4	John	Devlin	04/02/86	F
5	Kerry	Kaia	12/18/87	P
6	Mindy	Kear	04/13/85	P
7	Nancy	Lee	11/07/81	F
8	Shirley	Moore	12/07/82	P
9	Harry	Nelson	04/06/84	P
10	Nelly	Nelson	04/06/84	P
11	Ann	Smith	11/11/82	F
12				
13				
14				
15				
16				
17				
18				

Figure 7-13 The first occurrence of a record that matches your criterion

To repeat Data Query using the same specifications, press CTRL-F7, the accelerator that repeats the last Data Query you specified. Lotus-DM selects the next record where the STATUS field contains F. Continue to press CTRL-F7 until Lotus-DM ceases to find records that match your criterion. Select Data Query again. Select Find Previous and then OK to find the previous record in the STATUS field that contains F, the criterion for a full-time employee.

Press CTRL-S to save the worksheet. Lotus-DM saves the file with the file name EMPDATA4.WK1.

Lesson 5 Extracting Records

You can use Data Query to extract records that meet criteria you specify from the database table. When you extract records, you need to specify an output range in addition to the input and criterion ranges.

Start with the worksheet you created in Lesson 4, named EMPDATA4.WK1, on the screen. If EMPDATA4.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA4.WK1 from the Files list box or type EMPDATA4.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve EMPDATA4.WK1 in case you want to refer back to Lesson 4 or begin this lesson over again. Therefore, create a copy of it with a new name, EMPDATA5.WK1.

Select File Save as. Type EMPDATA5 in the Save as field and select OK. The title bar indicates that you are working with a worksheet titled EMPDATA5.WK1.

This lesson shows you how to extract the hourly rates of only full-time employees. Your criteria range is already set up to do this. F is the criterion to find full-time employees. You do not need to type anything in the HOURLY RATE field: a blank cell in the criterion range indicates that you want Lotus-DM to match all records in that field, as long as the records meet all other criteria you specify.

Creating an Output Range

The **output range** is where Lotus-DM places the results of the query. To set up an output range, you need to specify the field names of those items you want extracted from the records in the database table. The record items are extracted (copied) to the output range only when they match the criteria you specify in the output range.

Because you want to extract records from only two fields in the database table, type the field names instead of copying them to the output range. Move the cell pointer to A15. Type STATUS. Move the cell pointer to B15. Type HOURLY RATE. This specifies that only the fields STATUS and HOURLY RATE need to match the criteria you specify in the criterion range. Your worksheet should look like Figure 7-14.

Now select Range Name (CTRL-N) to name the output range. You see the Range Name dialog box. The Create operation is selected. Move the cursor to the Range Name field, and type OUTPUT. Move the cursor to the Range field. Type A15..B26. Specify the range as A15..B26 because the output range must be as long as the database table to accommodate all records in the database table, plus one row for the field names. Select OK to name the specified range and return to the worksheet.

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	A	B	C	D	
1	FIRST NAME	LAST NAME	DATE HIRED	STATUS	HOURLY
2	Patricia	Bloom	05/16/87	F	
3	Dave	Cameron	03/04/83	P	
4	John	Devlin	04/02/86	F	
5	Kerry	Kaia	12/18/87	P	
6	Mindy	Kear	04/13/85	P	
7	Nancy	Lee	11/07/81	F	
8	Shirley	Moore	12/07/82	P	
9	Harry	Nelson	04/06/84	P	
10	Nelly	Nelson	04/06/84	P	
11	Ann	Smith	11/11/82	F	
12					
13					
14					
15	STATUS	HOURLY RATE			
16					

Figure 7-14 The Output Range in row 15

Using NAME (CTRL-F3)

In Lesson 5, you specified a range name in a dialog box field by typing it in. But now, you specify all range fields in the Data Query dialog box using NAME (CTRL-F3). You can use NAME (CTRL-F3) to open the Range Name Use dialog box and specify a range name by selecting it from a list box.

Select Data Query. You see the Data Query dialog box. To use NAME, move the cursor to the Input Range field and press CTRL-F3. You see the Range Name Use dialog box, which overlaps the Data Query dialog box. Select DATATABLE in the Names Ranges list box, then select OK to return to the Data Query dialog box. You see DATATABLE in the Input Range field. Now move the cursor to the Criterion Range field. Press CTRL-F3 to display the Range Name Use dialog box and select CRITERIA1. Select OK to return to the Data Query dialog box. You see CRITERIA1 in the Criterion Range field.

Now, select Extract as the operation. The Output Range field, which was shadowed, is now available. Move the cursor to the Output Range field. Press CTRL-F3 to see the Range Name Use dialog box. Select OUTPUT, and then select OK to return to the Data Query dialog box. The Data Query dialog box now looks like Figure 7-15.

Select OK to extract the records in the database table that meet your criteria. The output range should look like Figure 7-16.

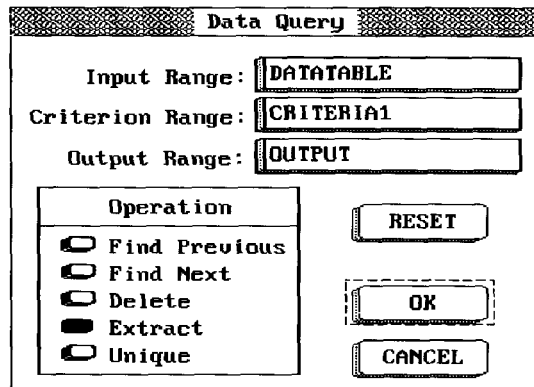


Figure 7-15 Data Query dialog box

	A	B	C	D
15	STATUS	HOURLY RATE		
16	F	\$5.25		
17	F	\$6.50		
18	F	\$15.00		
19	F	\$8.75		
20				

Figure 7-16 Extracted records in the output range

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name EMPDATA5.WK1.

Lesson 6 Performing a Basic What-if Analysis

So far you have created a database table, rearranged its records, and searched for and extracted the records that meet criteria you specified. In this lesson, you perform a basic what-if analysis using the data you extracted in Lesson 4.

Your hardware store had a great year. You want to give all full-time employees a 5% raise.

Start with the worksheet you created in Lesson 5, named EMPDATA5.WK1, on the screen. If EMPDATA5.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA5.WK1 from the Files list box or type EMPDATA5.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

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You need to preserve EMPDATA5.WK1, in case you want to refer back to Lesson 5 or begin this lesson over again. Therefore, create a copy of it under a new name, EMPDATA6.WK1.

Select File Save as. Type EMPDATA6 in the Save as field and select OK. The title bar indicates that you are working with a worksheet titled EMPDATA6.WK1.

Determining the Salaries of Full-Time Employees

You have already extracted the hourly rates of all full-time employees (see Figure 7-16). Now you need to determine their salaries by using a formula. The formula multiplies the hourly rate by 40 hours to determine the weekly pay; then it multiplies the weekly pay by 52 weeks to determine the annual salary for each employee.

You could multiply each hourly rate in the output range by 40 and then by 52, but that is time consuming. You can save time by using Data Table. With Data Table, you can create a table that shows how the results of a formula vary when you change the value of one variable in that formula.

Data Table uses one of two types of tables: Data Table 1 or Data Table 2. Data Table 1 calculates one or more formulas that use only one variable. Data Table 2 calculates only one formula that uses two variables. In this lesson, you use Data Table 1.

You have to set up your worksheet with a table range and an input cell before you can use Data Table 1. A **table range** is a range that contains a data table, comprising a blank cell, formulas, input values, and a results area. An **input cell** is a cell outside the table range in which Lotus-DM calculates the results of a formula as it substitutes a value for a variable. Figure 7-17 illustrates the Data Table 1 setup.

Creating an Input Cell for Data Table 1

Lotus-DM uses the input cell as a scratch pad when it makes calculations for a table. The input cell is as a reference to the variable in the formula that determines salaries. For the data table in this lesson, use B21 as the input cell. Leave it blank because Lotus-DM writes over the input cell's contents, if any, as it calculates the results of the formula. To identify the location of the input cell on the worksheet, create a label for the input cell in an adjacent cell. Move the cell pointer to A21, type Input Cell: and press ENTER.

Setting up the Table Range for Data Table 1

A table range consists of a blank cell, input values, formulas, and a results area. The table range you are going to create will occupy the range B15..C19. The blank cell is the intersection of the first row and the first column of the table range. It currently contains the HOURLY RATE field name. Move the cell pointer to B15, and press DEL to erase the field name so the cell is blank.

Data Table 1

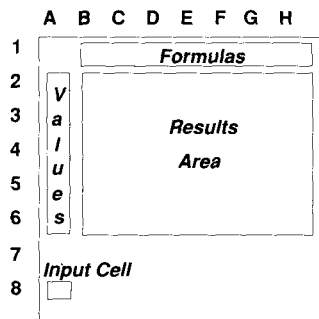


Figure 7-17 Data Table 1 setup

The input values are the hourly rates. They belong in the first column of the table range. Because they are already in the first column of the table range, the input values are all set.

The formula belongs in the first row of the table, but not in the leftmost cell. You can determine all salaries using one formula. Use the address of the input cell, B21, as the address for the variable. When you actually execute Data Table, Lotus-DM places a copy of each value one at a time in the input cell (B21). This happens very quickly, so you do not see it on your screen.

Now move the cell pointer to C15. Type the formula $(B21*40)*52$ and press ENTER. The formula multiplies the value in B21 by 40 to determine the weekly pay, then multiplies the weekly pay by 52 to determine the annual salary. You see 0 (zero) in C15, because Lotus-DM recognizes B21 as a blank cell having the value of zero. But once you select the command Table, Lotus-DM treats B21 as the input cell and performs accurate calculations.

The results area is the part of the table range below the formula and to the right of the input values. This is where Lotus-DM puts the salaries. Your worksheet should look like Figure 7-18. You have set up your worksheet. Now select Data Table to display the Data Table dialog box. Select Data Table 1. Move the cursor to the Table Range field. If you are using a mouse, you may need to press DEL to erase the current entry. Type B15..C19. Move the cursor to the Input Cell field and press DEL if necessary. Type B21. Select OK to determine the salaries of all full-time employees at the hardware store and to return to the worksheet. The results area displays the salaries.

Now format the results area to display the salaries in the correct format. Select the range of cells in the results area, C16..C19. Select Range Format (CTRL-F). You see the Range Format dialog box. Select Currency. The Decimal Places field contains 2. The Range field is C16..C19. Select OK to format the selected range in Currency format with two decimal places. Your worksheet should look like in Figure 7-19.

7-20 Managing an Employee Database Table

C15	(B21*40)*52				READY
	A	B	C	D	
4	John	Devlin	04/02/86	F	
5	Kerry	Kaia	12/18/87	P	
6	Mindy	Kear	04/13/85	P	
7	Nancy	Lee	11/07/81	F	
8	Shirley	Moore	12/07/82	P	
9	Harry	Nelson	04/06/84	P	
10	Nelly	Nelson	04/06/84	P	
11	Ann	Smith	11/11/82	F	
12					
13					
14					
15	STATUS	HOURLY RATE		0	
16	F	\$5.25			
17	F	\$6.50			
18	F	\$15.00			
19	F	\$8.75			
20					
21	Input Cell:				

Figure 7-18 Data Table 1 setup and the formula in the edit panel

C15	(B21*40)*52				READY
	A	B	C	D	
4	John	Devlin	04/02/86	F	
5	Kerry	Kaia	12/18/87	P	
6	Mindy	Kear	04/13/85	P	
7	Nancy	Lee	11/07/81	F	
8	Shirley	Moore	12/07/82	P	
9	Harry	Nelson	04/06/84	P	
10	Nelly	Nelson	04/06/84	P	
11	Ann	Smith	11/11/82	F	
12					
13					
14					
15	STATUS	HOURLY RATE		0	
16	F	\$5.25	\$10,920.00		
17	F	\$6.50	\$13,520.00		
18	F	\$15.00	\$31,200.00		
19	F	\$8.75	\$18,200.00		
20					
21	Input Cell:				

Figure 7-19 Resulting salaries formatted as Currency

Determining a 5% Salary Increase for Full-Time Employees

Now that you have determined the salaries of your full-time employees, you can perform a what-if analysis to determine 5% salary increases. To do this, you set up another Data Table 1.

Use F21 as the input cell. To identify the input cell on the worksheet, create a label adjacent to it. Move the cell pointer to E21, type Input Cell: and press ENTER. Copy the salaries in the results area (C16..C19) to the range E16..E19. To copy the range, select the range C16..C19. Select Edit Copy Range (CTRL-C). You see the current range (C16..C19) displayed in the edit panel. Type E16 at the To range prompt. Lotus-DM fills E16..E19 with copies of the salaries. E16..E19 is your new input values range.

Move the cell pointer to F15, type the formula (F21*.05), and press ENTER. You see 0 (zero) in F15. Select Data Table. You see the Data Table dialog box. Select Data Table 1. Move the cursor to the Table Range field. Type E15..F19. Move the cursor to the Input Cell field. Type F21 in the Input Cell field. Select OK to determine the 5% salary increases of full-time employees. The results area, F16..F20, displays the salary increases.

	E	F	G	H
15		0		
16	\$10,920.00	\$546.00		
17	\$13,520.00	\$676.00		
18	\$31,200.00	\$1,560.00		
19	\$18,200.00	\$910.00		
20				
21	Input Cell:			
22				

Figure 7-20 The resulting 5% increases

Now format the results area. Select F16..F19. Select Range Format (CTRL-F). You see the Range Format dialog box. Select Currency. The Decimal Places field now contains 2. The Range field is F16..F19. Select OK to format the selected range in Currency format with 2 decimal places. The table range should look like Figure 7-21.

Adding the 5% Increases to the Salaries of Full-Time Employees

You have determined the 5% increase for each full-time employee. Now add the 5% increases to the salaries of each full-time employee by using @SUM.

7-22 Managing an Employee Database Table

F15	(F21*0.05)					READY
	C	D	E	F		
4	04/02/86	F	\$6.50			
5	12/18/87	P	\$4.00			
6	04/13/85	P	\$7.00			
7	11/07/81	F	\$15.00			
8	12/07/82	P	\$14.25			
9	04/06/84	P	\$6.60			
10	04/06/84	P	\$6.60			
11	11/11/82	F	\$8.75			
12						
13						
14						
15	0			0		
16	\$10,920.00		\$10,920.00	\$546.00		
17	\$13,520.00		\$13,520.00	\$676.00		
18	\$31,200.00		\$31,200.00	\$1,560.00		
19	\$18,200.00		\$18,200.00	\$910.00		
20						
21			Input Cell:			

Figure 7-21 Results area in Currency format

When you use @SUM, you specify the addresses or range of the cells you want to add. In this lesson, you use relative cell addresses in @SUM so you can copy @SUM (instead of typing it out each time) to calculate all the new salaries without having to modify the cell addresses in the @function. A **relative cell address** is a cell address that Lotus-DM interprets as a location relative to the current cell. When you use a relative cell address in an @function, Lotus-DM uses the reference to determine the position of the specified cell relative to the cell that contains the @function. Then, if you copy the @function to another cell, Lotus-DM still interprets the @function in the same way. Lotus-DM adjusts the relative cell reference so that its relative position is maintained.

Move the cell pointer to J16. Type @SUM(E16,F16), where E16 contains the current salary and F16 contains 5% of this salary, and press ENTER. You see the new salary, 11466, in J16. The relative cell addresses in the @function are E16 and F16.

You can copy the formula to calculate the rest of the values. With the cell pointer still in J16, select Edit Copy Range (CTRL-C). Type J17..J19 to copy the formula from J16 to each cell in the range J17..J19. Press ENTER. You see the new salary, the current salary added to the 5% increase, for each full-time employee.

Now format the new salaries to display the salaries in Currency format. Select the range of new salaries, J16..J19. Select Range Format (CTRL-F). You see the Range Format dialog box. Now select Currency. The Decimal Places field is 2. The Range field is J16..J19. Select OK to format the selected range in Currency format with two decimal places. The range of new salaries looks like Figure 7-22.

J16	(C2) @SUM(E16,F16)				READY
	J	K	L	M	
16	\$11,466.00				
17	\$14,196.00				
18	\$32,760.00				
19	\$19,110.00				
20					

Figure 7-22 Salaries after adding the 5% increases

Press CTRL-S to save your worksheet. Lotus-DM saves the file with the file name EMPDATA6.WK1.

Lesson 7 Creating a Report

What-if analyses are most meaningful when you present their results in an organized report. You can create a report in Lotus-DM using three of the File commands: File Page Setup, File Page Layout, and File Print. Before you use these File commands, decide how you want to set up the report. For this lesson, create a two-column report that lists the last names of the full-time employees in one column and their new salaries in the other column.

Start with the worksheet you created in Lesson 6, named EMPDATA6.WK1, on the screen. If EMPDATA6.WK1 is not on the screen, you must retrieve it. Select File Open, and select EMPDATA6.WK1 from the Files list box or type EMPDATA6.WK1 in the Open File field. Select OK to retrieve the worksheet and its settings.

You need to preserve EMPDATA6.WK1 in case you want to refer back to Lesson 6 or begin this lesson over again. Therefore, create a copy of it under a new name, EMPDATA7.WK1.

Select File Save as. Type EMPDATA7 in the Save as field and select OK. The title bar indicates that you are working with a worksheet titled EMPDATA7.WK1.

Organizing the Report

You already have the new salaries for full-time employees in the worksheet. Move the cell pointer to J15. Type NEW SALARIES to label the salaries, and press ENTER.

You need to list the full-time employees and their respective salaries in the report. The command you use to accomplish this task is Data Query Extract. The input range and the criterion range are already set up on your worksheet. If you want to check the criterion range, press GOTO (CTRL-F5), type J2, and press ENTER. J2 displays F, which is the criterion. If J2 displays another entry, change it to F.

7-24 Managing an Employee Database Table

Now create the output range. Move the cell pointer to I15. Type LAST NAME and press ENTER.

Select Data Query to display the Data Query dialog box. You see DATATABLE (A1..E11) in the Input Range field, and CRITERIA1 (G1..K2) in the Criterion Range field. Select Extract if it is not already selected. Move the cell pointer to the Output Range field. Type I15..I19 in the Output Range field. Select OK to query the database table and create the final column for your report.

I15	LAST NAME				READY
15	LAST NAME	NEW SALARIES			
16	Bloom	\$11,466.00			
17	Devlin	\$14,196.00			
18	Lee	\$32,760.00			
19	Smith	\$19,110.00			
20					

Figure 7-23 Setting up the report with Data Query Extract

Adding the Final Touches to the Report

A good report contains meaningful information and is presented in a format that is easy to read. While this report provides important information, it needs some final touches to improve its appearance.

Apply the techniques you learned in Lesson 1 to set the field widths and to format the cells. For example, make sure that any cell that is supposed to display currency is formatted using Currency.

You have set up the report's content. Press CTRL-S to save your work. Now you have to determine how you want to print the report.

Setting Up the Page Format for the Report

This report is not very complicated. It would look fine printed from top to bottom (portrait orientation).

Select File Page Setup to display the File Page Setup dialog box. Portrait orientation, which is the narrower of the two page icons, is selected. Move the cell pointer to the Left Margin field. If you are using a mouse, you may need to press DEL to erase the default entry. Type 10 in the Left Margin field to create a one-inch left margin if you are using a font that prints 10 characters per inch.

Move the cursor to the Printed line width field and specify 76. Move the cursor to the Total lines per page field and specify 66. A Total lines setting of 66 means that the printer can print 66 lines per page (6 lines per vertical inch) in portrait orientation. This is the standard setting for 8.5 x 11" paper.

Move the cell pointer to the Printed lines per page field. If you are using a mouse, you may need to press DEL to erase the default entry. Type 60 in the Printed lines per page field to indicate that you want a maximum of 60 lines printed per page. The total number of printed lines center vertically on the page. Select OK to set up the page format for printing the report and return to the worksheet.

Creating a Header for the Report

You can create a header for your report. A **header** is a title that prints as a line of text just above the top margin of every page. To specify a header, select File Page Layout to display the File Page Layout dialog box. Type Salary Increases for Full-Time Employees in the Header field. The Format settings, are As-Displayed and Formatted, are selected. As-Displayed indicates that you want to print the report as it appears on your screen. This means that results of formulas, cell formats, and column widths are printed as they are displayed on the screen. Formatted retains the range and global formats you specified in the worksheet. Select OK to create the header for the report and return to the worksheet.

Printing the Report

Now you are ready to print the report and use the settings that you specified in File Page Layout and File Page Setup. Be sure your printer is connected to your computer properly and is on-line. Select File Print (CTRL-P) to display the File Print dialog box. Note that Lotus-DM prints the report according to the configuration determined by DeskMate Setup (F10). Refer to your DeskMate manual or "Using the Setup Accessory" in Appendix A for more information.

Select Printer and Range. Specify I15..J19, the range that your report occupies, in the Range field. Select OK to begin printing your report.

To stop printing early, select CANCEL. Do not turn the printer off.

To save your worksheet, press CTRL-S. Lotus-DM saves the file with the file name EMPDATA7.WK1.

Using the Data Commands

In this chapter, you created a database table, rearranged it data with Data Sort, located records that matched specific criteria with Data Query Find, performed a basic what-if analysis with Data Table, and created a report.

For more information on these and other Data commands, see Chapter 14 in *Reference*.

Part Three

Reference

Part Outline

Chapter 8 Using Lotus-DM

Chapter 9 File Commands

Chapter 10 Edit Commands

Chapter 11 Worksheet Commands

Chapter 12 Range Commands

Chapter 13 Graph Commands

Chapter 14 Data Commands

Chapter 15 PrintGraph Commands

Chapter 16 Translate Commands

Chapter 17 @Functions

Chapter 8 ---

Using Lotus-DM ---

This chapter explains the concepts that you need to use Lotus-DM efficiently and effectively. These concepts provide a foundation that will help you understand the information in other *Reference* chapters. This chapter provides information about

- Starting Lotus-DM
- Beginning a Lotus-DM session
- Moving around Lotus-DM
- Moving around the worksheet
- Working with indicators
- Selecting commands
- Working with dialog boxes
- Working with files
- Entering data
- Working with formulas
- Editing an entry
- Specifying ranges
- Using the Help system
- Leaving Lotus-DM
- Using *Reference*

Before you begin, make sure you have installed Lotus-DM properly. See *Getting Started* for instructions on how to install Lotus-DM with DeskMate. Start with the DeskMate desktop on your screen.

8-2 Using Lotus-DM

NOTE If you are using the runtime version of Lotus-DM (that is, you are starting from DOS and are working without DeskMate), see Appendix A for information on installing and starting Lotus-DM on your computer.

Starting Lotus-DM

The DeskMate desktop displays all the installed programs that you can use. A highlighted bar, called the **cell pointer**, shows your position on the screen. Depending on how you installed Lotus-DM, the Lotus-DM program files are either in a separate list box titled Lotus-DM or in the Programs list box at the bottom of the screen. Move the cell pointer to highlight the title of the Lotus-DM list box or the LOTUS-DM.PDM file in the Programs list box. To select Lotus-DM, press ENTER or click twice with a pointing device, such as a mouse or joystick. You see the Tandy icon while DeskMate loads the Lotus-DM program files, then you see the Lotus-DM main window.

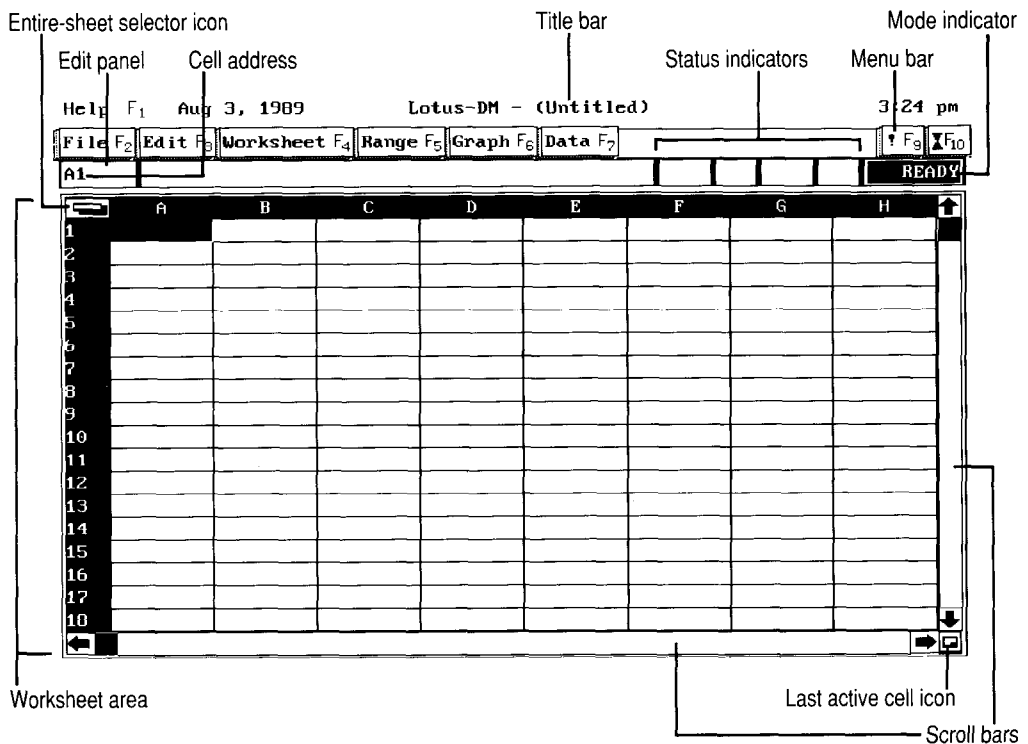


Figure 8-1 Lotus-DM main window

The main window divides the screen into four areas: the title line, the menu bar, the edit panel, and the worksheet area. The following describes each area.

Viewing the Worksheet Area

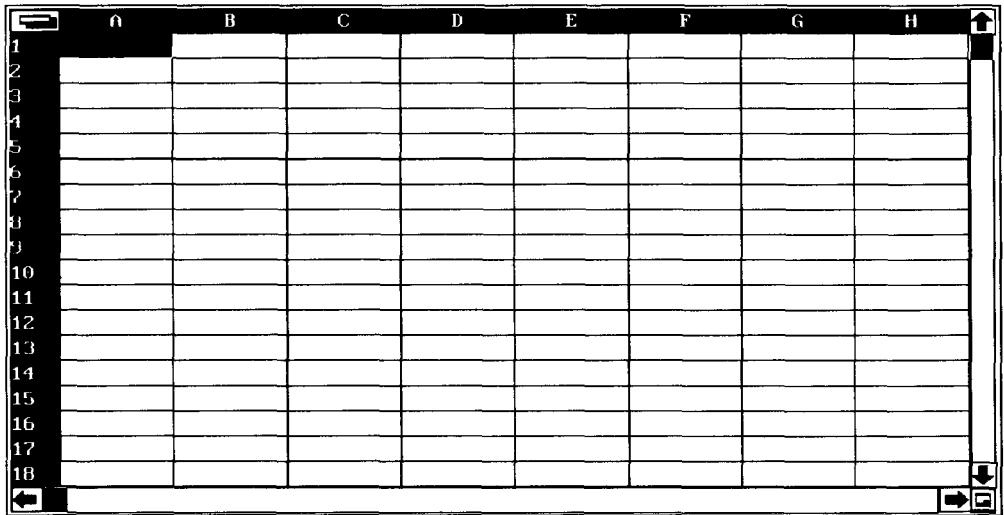


Figure 8-2 Worksheet area

The **worksheet area** occupies the largest section of the screen. The worksheet area contains the worksheet display, the column heading area, the row heading area, the entire-sheet selector, the vertical and horizontal scroll bars, and the last active cell selector.

The **worksheet** is a grid made up of rows and columns. Each intersection of a row and column forms a cell, in which you can enter information. The **column headings** are letters across the top of the worksheet, running from A-Z, then AA-AZ, then BA-BZ, and so on to IV (for a total of 256 columns). The **row headings** are consecutive numbers, running from 1 to 8192, along the left side of the worksheet. The cell address is the combined column letter and row number that mark the cell's location. For example, A1 is the address for the cell in column A, row 1.

The **entire-sheet selector icon** is located at the intersection of the column and row headings in the upper left corner of the worksheet area. The **vertical scroll bar** contains up and down arrows to adjust your view of the current worksheet and is located on the far right side the screen. The **horizontal scroll bar** contains left and right arrows and is located at the bottom of the screen. The **last active cell icon** is located at the intersection of the vertical and horizontal scroll bars in the lower right corner of the worksheet area.

An **icon** is a symbol that represents an activity. There are two icons in the worksheet area: the entire-sheet selector icon and the last active cell icon. You use the entire-sheet selector icon to select a range; you use the last active cell icon to move around the worksheet.

Beginning a Lotus-DM Session

When you start Lotus-DM, the cell pointer highlights a cell in the worksheet area. The highlighted cell is called the **current cell**. The mode indicator is READY. This means that Lotus-DM is waiting for your next instruction. Table 8-1 lists what you can do to begin your Lotus-DM session and refers you to the relevant section in this chapter for more information.

Table 8-1 Activities to begin a Lotus-DM session

To learn how to	Read
Change the cell pointer location	"Moving Around Lotus-DM," "Moving Around the Worksheet," and "Working with Indicators"
Select an action to be performed	"Selecting Commands" and "Working with Dialog Boxes"
Retrieve information from the disk	"Working with Files"
Enter data into the selected cell	"Entering Data" and "Working with Formulas"
Change the current cell contents	"Editing an Entry"
Specify a block of cells to work with	"Specifying Ranges"
Find more information	"Using the Help System"
End your Lotus-DM session	"Leaving Lotus-DM"

You can read each section in turn or read only the sections that relate to a specific task.

Moving Around Lotus-DM

Your current location on the Lotus-DM screen is marked with the cell pointer. When you are making a selection from a menu or entering information in a dialog box, a highlighted bar, or **cursor**, indicates your position. When you are entering data or editing an entry in the edit panel, the cursor marks your position in the text.

With Lotus-DM, you can use a pointing device, such as a mouse or a joystick, or the keyboard to move around the screen. The following sections explain how to move around the screen.

Using a Pointing Device

The Lotus-DM design is especially well suited to pointing devices, such as a mouse or a joystick. A **mouse** is a small tracking device, sized to fit in your hand. As you move the mouse across the top of your desk, the tracking ball on its underside communicates your movements to the arrow on the screen. This way, you can move the arrow very quickly.

A mouse comes with one or two buttons on its top side. You use only one button with Lotus-DM. If your mouse comes equipped with two buttons, use the left one. You press, or **click**, the button to make selections on the screen. (See "Selecting Main Menu Commands" and "Working with Dialog Boxes" for more information.)

NOTE If you run out of space on your desk when moving a mouse, pick it up and place it back down in a more convenient location. The arrow on the screen will not move unless the tracking ball is touching the top of the desk.

A joystick is another type of tracking device, similar to a manual gear shift in automobiles. As you move the joystick around its center point, the cursor traces your movements on the screen. A joystick comes equipped with a button on top. You press, or **click**, the button to make your selections on the screen.

The most common type of pointing device is the mouse. The instructions for using a mouse are the same as for using a joystick. For simplicity, then, this manual refers to the pointing device as a mouse from here on.

Using the Keyboard

The keys on your keyboard help you to move around the screen. You can use single keys or combinations of keys to get from one location to another. This manual refers to single keys by the name or symbol that appears on the keyboard; for example, **↑** refers to the key with the up arrow printed on it.

When the instructions refer to more than one key, the following conventions apply:

- When the text shows two keys separated by a hyphen, press and hold down the first key, press the second key, and then release both keys. For example, to use SHIFT-TAB, press and hold down SHIFT, press TAB, and then release both keys.
- When the text shows two keys separated by a space, press the first key and release it, then press the second key and release it. For example, to use END HOME, press END and release it, and then press HOME and release it.

Some key combinations are named, for example, BIG RIGHT (CTRL - →). Press the keys that follow in parentheses to use the key combination.

Table 8-2 describes the cursor-movement and pointer-movement keys on the keyboard.

Table 8-2 Movement keys

Press	To move
↑	Up one row in the worksheet, up to the previous option in a dialog box, or up one item in a menu
↓	Down one row in the worksheet, down to the next option in a dialog box, or down one item in a menu
→	Right one column in the worksheet, right one character in an edit field, right one option in a dialog box, or right to the next pull-down menu
←	Left one column in the worksheet, left one character in an edit field, left one option in a dialog box, or left to the previous pull-down menu
TAB	Right one screen in the worksheet or right to the next set of options in a dialog box
BACKTAB (SHIFT-TAB)	Left one screen in the worksheet or left to the previous set of options in a dialog box
BIG RIGHT (CTRL - →)	Right one screen in the worksheet or to the last character in the edit panel
BIG LEFT (CTRL - ←)	Left one screen in the worksheet or to the first character in the edit panel
PGUP	Up one screen in the worksheet
PGDN	Down one screen in the worksheet
HOME	To cell A1 in the worksheet or to first character in an edit field
END HOME	To the lower right corner of the active area of the worksheet
END ↑	Up to the next cell where blank and filled cells meet or to the first cell of a column in the worksheet
END ↓	Down to the next cell where blank and filled cells meet or to the last cell of a column in the worksheet
END →	Right to the next cell where blank and filled cells meet or to the last cell of a row in the worksheet
END ←	Left to the next cell where blank and filled cells meet or the first cell of a row in the worksheet

NOTE Pressing ← at the first character position, or → at the last character position in the edit panel, completes the entry and moves the cell pointer left or right one column. END must be used in combination with another pointer-movement key. When you press END, the END status indicator is highlighted in the edit panel. This prompts you to press the next key.

Some of these keys work differently in different sections of the screen. For example, when you are editing cell contents in the edit line, HOME moves the cursor to the first letter or number in the entry. When you are in the worksheet area, however, HOME moves the cell pointer to the first cell, A1. See "Entering Data" later in this chapter.

Moving Around the Worksheet

When you begin your Lotus-DM session, the cell pointer is in the worksheet. The highlighted cell is called the current cell, and the mode indicator is READY.

The worksheet is very large (256 columns wide and 8192 rows long), so not all of it is visible on the screen at once. You use different methods to move around the worksheet, depending on whether you are using a mouse or the keyboard. When you come to the edge of the screen, the worksheet scrolls to show the adjacent worksheet area.

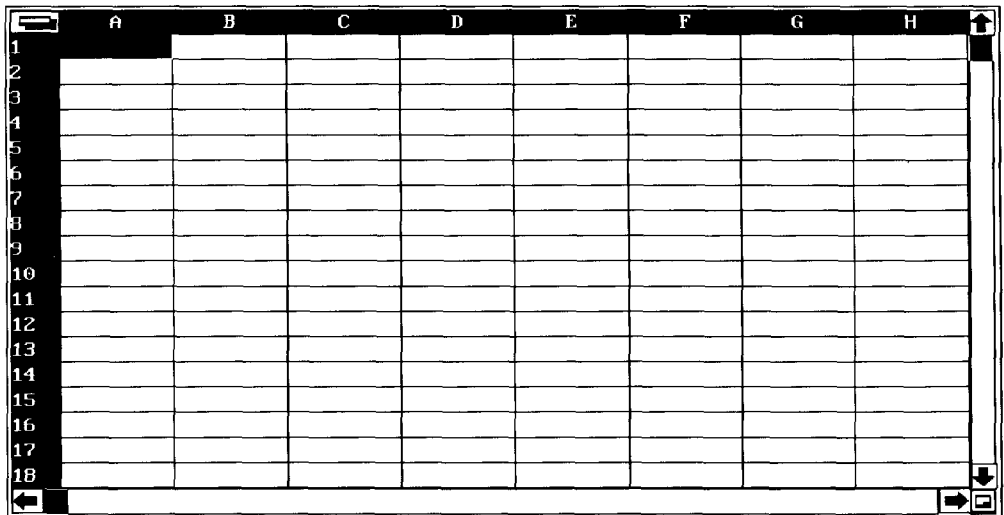


Figure 8-3 Lotus-DM worksheet

Using a Mouse

Use the mouse to move the arrow around the screen. Click once to select a cell. When selected, the cell is highlighted. The highlight is called the cell pointer. You can use the mouse to move the cell pointer around the worksheet. Click the arrows on the scroll bars to move the cell pointer one cell in the corresponding direction.

Each scroll bar contains a box, called an **elevator box**, that marks your position in the worksheet. Click next to the elevator box on either scroll bar to scroll the screen in the corresponding direction. Drag (point, click, hold down the button and move the mouse) the elevator box on either scroll bar to scroll the screen as you move the elevator box along the scroll bar. Click in either scroll bar to scroll the screen in the corresponding direction and move the elevator box to that point on the scroll bar.

Click the last active cell icon in the lower-right corner of the screen to move the cell pointer to the last active cell in the worksheet. The **last active cell** is the lowest and rightmost nonblank cell in the active area. (A **nonblank cell** is a cell that contains data, a label prefix, and/or formatting.)

When you use the horizontal and vertical scroll bars to move around the worksheet, the cell pointer maintains its relative position in the worksheet area.

Using the Keyboard

Use the pointer-movement keys to move the cell pointer around the worksheet. Some pointer-movement keys move only around the **active area**, a rectangular area between A1 and the **last active cell**, the lowest and rightmost nonblank cell in the active area. (A **nonblank cell** is a cell that contains data, a label prefix, and/or formatting.)

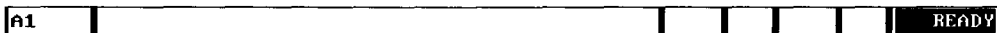
You use special combinations of keys to move the cell pointer. Table 8-2 lists the pointer-movement keys you can use to move around the worksheet.

If you know the exact cell address where you want to move, you can use a shortcut: GOTO.

GOTO (CTRL-F5) Use GOTO (CTRL-F5) to move the cell pointer directly to any cell or named range in the worksheet. When you press GOTO (CTRL-F5), the cursor moves to the cell contents section of the edit panel. Specify the cell address or named range where you want to move, and press ENTER. The cell pointer moves directly to the specified cell address or named range. See "Name" in Chapter 12 for more information on using range names.

Working with Indicators

Lotus-DM displays special messages, called indicators, in the edit panel. An indicator is a highlighted word that provides information about your work in the current worksheet. Lotus-DM has two types of indicators: status indicators and mode indicators.



The four **status indicators** appear on the right side the edit panel. Lotus-DM highlights a status indicator when you use certain Lotus-DM keys or when a particular condition requiring your attention exists. For example, the CALC indicator tells you that the worksheet formulas need to be recalculated.

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The **mode indicator** tells you which of the six **modes**, or states, you are currently working in. The mode indicator shows in the far right side of the edit panel. For example, when you start your Lotus-DM session, the mode indicator displays READY.

Viewing Status Indicators

Lotus-DM highlights a status indicator in the edit panel when you use certain Lotus-DM keys and when a particular condition requiring your attention exists. Table 8-3 describes the four status indicators in the order they appear on the screen.

Table 8-3 Status indicators

Status Indicator	Meaning	Resolution
CIRC	The worksheet contains a circular reference—a formula that refers to itself. (This occurs only when the recalculation order is Natural.)	Select Worksheet Status to find the cell address of a circular reference. See "Working with Formulas" later in this chapter.
MEM	The amount of computer memory available for entering new data has fallen below 4096 bytes. If you continue to enter data without first increasing the amount of available memory, you may get a memory-full error.	Reorganize your worksheet or unload memory-resident programs. See Appendix D, "Memory Management," for more information.
CALC	Formulas in the worksheet need to be recalculated.	Press CALC (CTRL-F9) to recalculate. See "Working with Formulas" later in this chapter.
END	You pressed END. When you are working in the worksheet, END must be used in combination with another pointer-movement key.	Press another pointer-movement key to move the cell pointer to the desired location in the worksheet. See "Moving Around the Worksheet" earlier in this chapter.

END informs you that you have pressed END and you need to press another pointer-movement key to complete the key combination. CALC, CIRC, and MEM alert you to a problem that requires your attention.

CAUTION

If MEM is highlighted in the edit panel, you are in danger of running out of memory, the temporary storage capacity your computer uses to run Lotus-DM. You can lose any unsaved work on the screen if you run out of memory. To protect your work, you should take action as soon as you see MEM highlighted in the edit panel. See Appendix D, "Memory Management," for instructions.

Viewing Mode Indicators

During a Lotus-DM session, the mode indicator is always visible at the far right side of the edit panel. It tells you what mode, or state, you are currently working in. It also tells you the type of information Lotus-DM expects you to enter next. Table 8-4 describes the six Lotus-DM modes.

Table 8-4 Mode indicators

Mode Indicator	Meaning	Read
EDIT	You pressed EDIT (CTRL-F2) to change the current cell contents, or you tried to enter an invalid formula. The cursor is in the edit panel.	"Editing an Entry" later in this chapter.
ERROR	Lotus-DM is displaying an error message. Read the message, and select OK to return to READY or select HELP to display a Help screen that describes the problem.	"Using the Help System" later in this chapter.
LABEL	You are entering a label in the current cell. Lotus-DM reads each cell entry beginning with a letter or a label prefix (' " ^ \) as a label. If you are entering a label that begins with a number, be sure to start with a label prefix. The cell contents show in the edit panel.	"Entering Labels" later in this chapter.
POINT	You need to specify a range. The cell pointer is in the worksheet.	"Specifying Ranges" later in this chapter.
READY	Lotus-DM is waiting for your next instruction. The cell pointer is in the worksheet.	"Beginning a Lotus-DM Session" earlier in this chapter.
VALUE	You are entering a value (a number or formula that evaluates to a number, or a cell or range address or name that contains a value) in the current cell. Lotus-DM reads each cell entry beginning with a number or a numeric symbol + - @ . (\$ as a value. Lotus-DM performs calculations on values. The cell contents show in the edit panel.	"Entering Values" later in this chapter.

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Many Lotus-DM keys work differently in different modes. Read the related sections in this chapter for more information on each mode.

Selecting Commands

The menu bar contains the Lotus-DM commands grouped in pull-down menus, which you use to build a worksheet, graph, or database. You can customize your work with the options available for some commands. In order to use a command or option, you must first **select** the command's pull-down menu. You select additional commands from pull-down menus, and you specify options from dialog boxes.

This section describes how to select commands from menus using a mouse or the keyboard. See "Working with Dialog Boxes" next for instructions on specifying options from dialog boxes.

Using a Mouse

To select a command with a mouse, you must first point to it, then double-click to select it.

Move the mouse across the top of your desk. The arrow on the screen traces your movements with the mouse. **Point** to the command on the menu bar you want to select. You can click once to highlight the command. Double-click to select a command from the menu bar and display its pull-down menu.

When you select a command from a pull-down menu from the menu bar, you see that some of the commands are shadowed, meaning that they are not currently available. Some command names contain a row of dots (...), meaning that the command uses a dialog box.

When you point to the command on the pull-down menu you want to select, **click** the mouse button once to highlight your selection. **Double-click**, click twice rapidly, to select the highlighted command.

NOTE To find the command you want to use, press the mouse button and hold it down while you **drag** the arrow across the main menu bar. You see each pull-down menu as you drag across it.

Using the Keyboard

There are three ways to select a command from the keyboard:

- Highlight your choice and press ENTER.
- Type the first letter of your choice and press ENTER.
- Press a function key or an accelerator key.

You can select pull-down menus only with function keys or accelerator keys. Function keys are the numbered keys beginning with the letter F on your keyboard. They may be located along the top of your keyboard or on the far left side. Accelerator keys are combined keystrokes that invoke a command. To use accelerator keys, hold down the first key while you press the second. Table 8-5 lists the keys you press to select a pull-down menu.

Table 8-5 Function keys and accelerator keys that select pull-down menus

Select	Function Key	Accelerator Keys	To
File	F2	ALT-F	Open, save, and print files.
Edit	F3	ALT-E	Copy data to the DeskMate clipboard and paste clipboard data to the worksheet.
Worksheet	F4	ALT-W	Set the format for the worksheet as a whole or for parts of the worksheet.
Range	F5	ALT-R	Use worksheet data in blocks, or ranges, of cells.
Graph	F6	ALT-G	Create, save, and print graphs.
Data	F7	ALT-D	Enter and sort information in a database table.

When you select a pull-down menu from the menu bar, you see that some commands are shadowed, meaning that they are not currently available. Some command names contain a row of dots (...), meaning that the command uses a dialog box.

When you select File, for example, you see the pull-down menu of File commands.

The simplest way to select a command from a pull-down menu is to use the cursor-movement keys to highlight your choice and press ENTER.

You can also select a command from a pull-down menu by typing the first letter of the command and pressing ENTER. When you type a letter, the highlight automatically moves to the first command on the menu beginning with that letter. If your selection is not the first item on the menu beginning with the designated letter, type the letter repeatedly until you highlight your selection. Press ENTER to select the highlighted command.

Using Key Combinations

Whether you are using a mouse or the keyboard to work in Lotus-DM, you can use combinations of keys to select certain commands and functions without having to pull down a menu.

When the instructions refer to more than one key, the following conventions apply:

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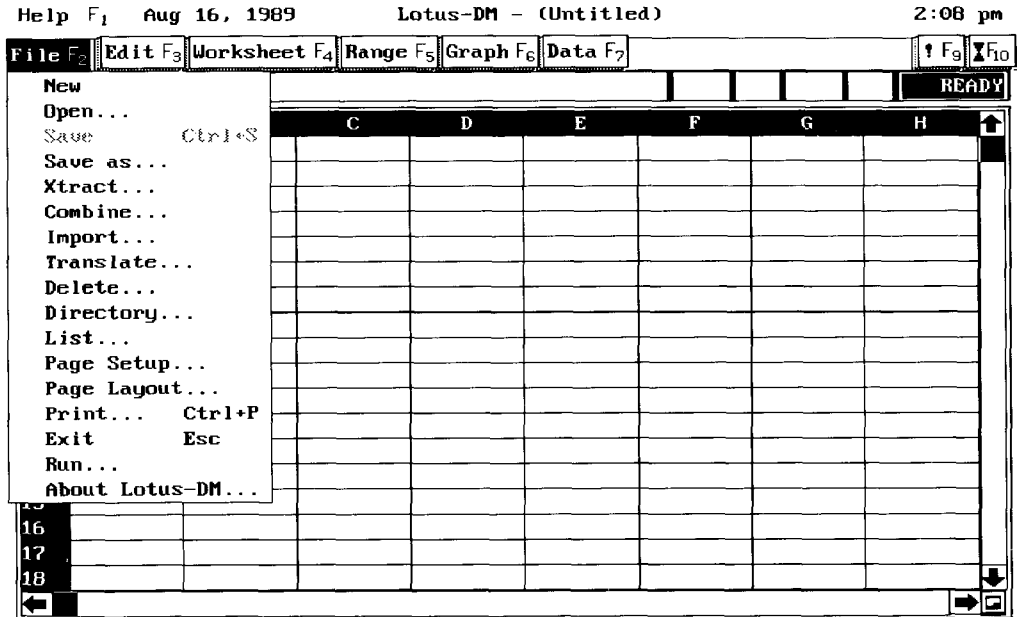


Figure 8-4 File pull-down menu

- When the text shows two keys separated by a hyphen, press and hold down the first key, press the second key, and then release both keys. For example, to use CTRL-F3, press and hold down CTRL, press F3, and then release both keys.
- When the text shows two keys separated by a space, press the first key and release it, then press the second key and release it. For example, to use END HOME, press END and release it, and then press HOME and release it.

Use the key combinations as accelerator keys to bypass a menu or as function keys to invoke a special operation.

Accelerator Keys

You can use accelerator keys to invoke commands directly from the worksheet without selecting them from the pull-down menu. Table 8-6 lists the accelerator keys in the order they appear in the pull-down menus.

Use the accelerator keys to bypass the pull-down menus. Each command is described in full in its relevant chapter in *Reference*.

Table 8-6 Accelerator keys that select pull-down menu commands

Select	Accelerator Key	To
File Save	CTRL-S	Save the current worksheet in a worksheet file.
File Print	CTRL-P	Print a worksheet file.
File Exit	ESC	End your Lotus-DM session.
Edit Cut	SHIFT-DEL	Remove the selected data from the worksheet area and place it in the DeskMate clipboard.
Edit Copy	CTRL-INS	Place the selected data in the DeskMate clipboard without removing the original from the worksheet area.
Edit Clear	DEL	Remove the currently selected cell contents.
Edit Paste	SHIFT-INS	Place the current clipboard data in the worksheet area.
Edit Copy Range	CTRL-C	Place the selected range in the DeskMate clipboard without removing the original from the worksheet area.
Edit Move Range	CTRL-M	Remove the selected range from its current location and place it in a new location.
Worksheet Column	CTRL-W	Set column widths, and hide or redisplay columns.
Worksheet Zero Suppress	CTRL-Z	Suppress the display of zero values in the worksheet.
Worksheet Grid	CTRL-G	Switch the grid lines in the worksheet on and off.
Range Format	CTRL-F	Specify a format for data in the selected range.
Range Name	CTRL-N	Create, use, delete, or reset all of the named ranges.
Graph Type	CTRL-T	Select one of five graph types.
Graph Ranges	CTRL-R	Specify the ranges plotted in a graph.
Graph Name	CTRL-E	Create, use, delete, and reset graph names.
Data Fill	CTRL-D	Enter a series of numbers in a database table.

Function Key Combinations

You can use the function keys on your keyboard in combination with CTRL to activate certain menu commands or perform special operations. Table 8-7 describes the available function key combinations.

When using a function key combination, press the first key and hold it down while you press the second.

Table 8-7 Function key combinations

Press	To
HELP (F1 or CTRL-F1)	Use the Lotus-DM Help system, which provides context-sensitive information while you are working with Lotus-DM. See "Using the Help System" later in this chapter.
EDIT (CTRL-F2)	Make changes to the current cell contents. When you are in the process of editing the current cell contents, press EDIT (CTRL-F2) to identify your entry as a label or a value. See "Editing an Entry" later in this chapter.
NAME (CTRL-F3)	Display the Range Name Use dialog box and prepare the cell pointer to select a range. See "Specifying Ranges" later in this chapter.
ABS (CTRL-F4)	Cycle a cell or range address between relative, absolute, and mixed. See "Working with Formulas" later in this chapter.
GOTO (CTRL-F5)	Move the cell pointer directly to the cell or named range you specify. See "Moving Around the Worksheet" earlier in this chapter.
QUERY (CTRL-F7)	Repeat the last Data Query command you used during the current Lotus-DM session. See "Query" in Chapter 14.
TABLE (CTRL-F8)	Repeat the last Data Table command you used during the current Lotus-DM session. See "Table" in Chapter 14.
CALC (CTRL-F9)	In READY mode, recalculate all of the formulas in a worksheet. When you are entering or editing values, press CALC to convert a formula to its current value. See "Working with Formulas" later in this chapter.
GRAPH VIEW (CTRL-F10)	See the current graph with the current graph settings on the screen. See "View" in Chapter 13.

Canceling a Selection

If you change your mind or have made a mistake, press ESC to cancel the selection. If you want to stop a procedure in progress completely, press CTRL-BREAK.

Working with Dialog Boxes

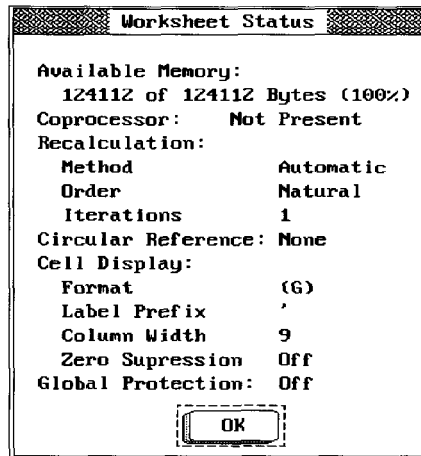
When you select a command followed by a row of dots, you see a dialog box for that command. Dialog boxes accept information you specify or list options that you can select.

You can view information, enter information, or select options in dialog boxes. Any changes you make are implemented when you select OK.

You can press ESC to exit the dialog box at any time without completing changes you made in the dialog box.

Viewing Information Boxes

Information boxes tell you more about Lotus-DM or transmit error messages. For example, if you select Worksheet Status, you see the Worksheet Status information box. After reading the information, select OK to exit the information box.

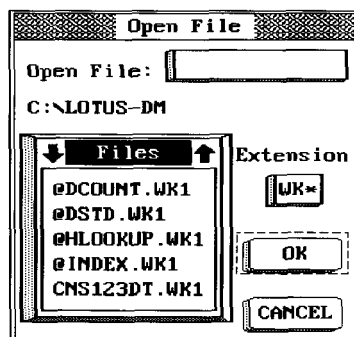


If you encounter a problem, you see an error message. When you have finished reading the message, select OK to exit the message or select HELP to read more about the problem. See "Using the Help System" later in this chapter.

NOTE If the error message does not contain a HELP button, it is a DeskMate error message. See your DeskMate manual for further information.

Entering Information in Dialog Boxes

You can enter information, such as file names, directories, or range names, in certain dialog boxes. For example, if you select Open File, you see the Open File dialog box.



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The Open File dialog box contains the Files list box and the Open File field. You can specify a file either in the list box or in the field. Press TAB to move between list boxes and fields within a dialog box.

List Boxes

List boxes display the available items. If you are using a mouse, point to the item you want to select and click to highlight it. Click the arrows next to the title to scroll through the items in the list. If you are using the keyboard, press ↑ or ↓ to highlight your choice. When you finish, your selection shows in the associated field.

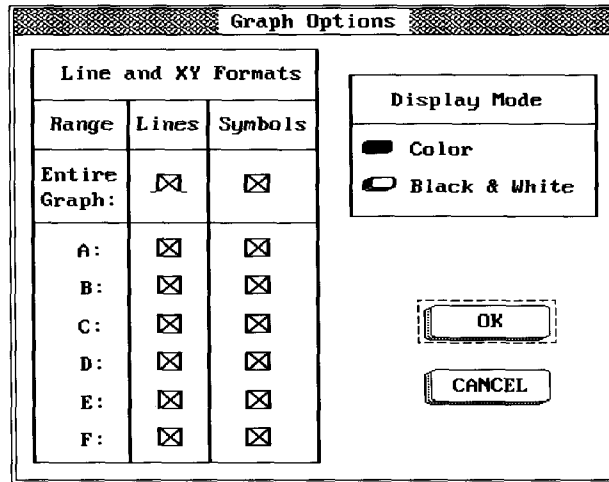
Fields

Fields are areas where you can specify your selections. A field may be open, or empty, or it may contain default data. If you are using a mouse, point to the beginning of the field and click. If you are using the keyboard, move the cursor to the beginning of the field. If necessary, press DEL to erase a default entry. Type in the complete information in the space provided.

If you use a list box to select an item, it shows in the associated field.

Selecting Options in Dialog Boxes

Many dialog boxes contain lists of options next to buttons or check boxes. If you select Graph Options, for example, you see the following dialog box:



The dialog box is titled "Graph Options". It contains two main sections: "Line and XY Formats" and "Display Mode".

Line and XY Formats

Range	Lines	Symbols
Entire Graph:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Display Mode

☒ Color

☐ Black & White

OK

CANCEL

You specify the settings for the Graph Options by selecting one or more options in the dialog box. The Display Mode options contain buttons; the Line and XY Formats options contain check boxes.

Buttons

Buttons are grouped together in a box with a title. You can select only one button in a group. If you are using a mouse, point to the button next to the option you want to select and click. If you are using the keyboard, move the cursor to the button next to the option you want to select and press the space bar. When you select a button, the button is highlighted and appears to be "pushed in."

If you want to change your selection, use the same method to select another option. When you change a selection, the previously selected button is no longer highlighted, and the newly selected button is highlighted and "pushed in."

Check Boxes

Check boxes are also grouped together in a box with a title. You can select any combination of check boxes. In the Graph Options dialog box, for example, you can select any combination of lines and symbols for each range or for the entire graph.

To select a check box using a mouse, point to the check box next to the option you want to select and click. To select a check box using the keyboard, move the cursor to the check box next to the option you want to select and press the space bar. An X shows in the check box, indicating that the option is selected.

Use the same method to deselect an option. The X shows in a check box when the option is selected; the check box is blank when the option is not selected.

Exiting Dialog Boxes

You see one or two large exit buttons in every dialog box. The first exit button is OK. The second exit button is CANCEL or HELP. You must select one of these buttons in order to leave the dialog box. Select OK to accept your selections and exit the dialog box. Select CANCEL to exit the dialog box without accepting your selections. Select HELP to see related information.

If you are using a mouse, point to the exit button and double-click.

If you are using the keyboard, move the cursor to highlight the exit button and press ENTER. As a shortcut, you can select OK by pressing ENTER at any point in the dialog box, except when CANCEL or HELP is highlighted. You can select CANCEL by pressing ESC at any time. You can select HELP by pressing F1 at any time.

NOTE

The Save Changes dialog box contains three exit buttons: YES, NO, and CANCEL. You see the Save Changes dialog box when you open another file or leave Lotus-DM before saving your changes to the current worksheet. Select YES to save the current worksheet and continue. Select NO to continue without saving the changes you have made since you last saved the current worksheet. Select CANCEL to cancel the command and return to the current worksheet without saving changes.

Working with Files

Lotus-DM stores information in files on a disk. To retrieve stored information, you must **open** a file. To store your work on a disk, you must **save** a file.

While you are working in Lotus-DM, your work is stored in **memory**, the temporary storage capacity that your computer uses to run Lotus-DM. You overwrite the work you have stored in memory if you retrieve a file, clear the screen, or exit Lotus-DM.

To keep a permanent record of the work you do during a Lotus-DM session, you must save your worksheet (copy it from memory to a file on the disk). Unless you save a worksheet in a file, your work is preserved only as long as the worksheet remains in memory.

(NOTE) If you select File Exit and haven't saved the worksheet in a file on the disk, Lotus-DM will ask you if you want to do so before you end the session.

Once you save a worksheet file, you can open the file (copy the file from the disk into memory) at any time. When you do, Lotus-DM displays the file exactly as it was when you last saved it.

You can use three types of files in Lotus-DM:

- **Worksheet files**, which store worksheet data.
- **Print files**, which store worksheet data with or without printer codes.
- **Graph files**, which store Lotus-DM graphs for use with PrintGraph and other programs.

(NOTE) You can create a standard ASCII text file (without printer codes) from a worksheet file. See Chapter 9 in *Reference* for more information.

Table 8-8 lists some of the commands you use to work with files in Lotus-DM in the order they appear in the pull-down menus.

Specifying Files

When you want to work with a file in Lotus-DM, you must specify it.

Often, Lotus-DM displays a list box with files in the current directory and an open field where you can type in the name of the file you want to use. You can select a file from a list box, or you can specify the file in the open field.

You need the following information to specify a file:

DRIVE:\DIRECTORY\FILENAME.EXTENSION

This information indicates exactly where the file is located, and is called the **path**. Enter the path in the above order, with the exact punctuation as shown. You can type with uppercase or lowercase letters; your computer will display them all as uppercase.

Table 8-8 Commands used with files

Use	To	Read
File New	Begin a new file.	"New" in Chapter 9.
File Open	Open a worksheet file.	"Open" in Chapter 9.
File Save and File Save As	Save a worksheet file.	"Save" and "Save As" in Chapter 9.
File Translate	Convert a file created in another program, including DeskMate Worksheet (.WKS) files, to Lotus-DM format.	Chapter 16, "Translate Commands"
File Delete	Erase a worksheet, print, graph, or other file.	"Delete" in Chapter 9.
File Directory	Change the current drive or directory for the current Lotus-DM session.	"File Directory" in Chapter 9.
File List	List the available worksheet, print, graph, or other files in the specified directory.	"List" in Chapter 9.
File Print	Print a worksheet file.	"Print" in Chapter 9.
File Print	Print a print file.	"Print" in Chapter 9.
File Print	Print a range.	"Print" in Chapter 9.
Graph Save	Save a graph file.	"Save" in Chapter 13.
Graph PrintGraph	Print a graph.	"File" and "Edit" in Chapter 15.

If you want to work with a file in the current directory, you need to specify only the file name and extension. But if you want to use a file from another directory, you must specify the path as shown above.

Drive

The **drive** names the disk where the file is stored. The drive always consists of a letter followed by a colon, for example, B: or C:.

If the file is located in the current drive, you do not need to specify the drive.

Directory

The **directory** names the group of files that contains the file you want. If the file is in a subdirectory (a directory included in another directory), you include more than one directory name. Use a backslash to separate each directory name from the next and to separate the last directory name from the file name.

NOTE Lotus-DM works best with directories that store no more than 255 files. If you want to work with more than 255 files, separate them into subdirectories. See your DeskMate manual for information on creating subdirectories.

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If the file is located in the current directory, you do not need to specify a directory name.

File Name

Every file in a directory has a unique name, which you assign when you first save the file. It is a good idea to use file names that are descriptive so you can easily remember them.

Use the following general guidelines for assigning file names:

- Do not use more than eight characters to name a file. If you enter more than eight characters, Lotus-DM ignores the extra characters.
- Use any combination of letters, numbers, _ (underscores), and - (hyphens) in a file name.
- Do not include spaces in a file name.
- Type uppercase and lowercase letters; your computer will read them all as uppercase.

When you specify the file name, you can also specify a file extension.

File Extension

A **file extension** is an optional suffix you can add to a file name. It consists of a . (period) followed by three characters. File extensions group files into categories by giving more information about what's in a file. If you don't provide your own extension, Lotus-DM automatically adds an extension to the file name depending on the file type.

Table 8-9 lists extensions Lotus-DM uses for the various types of files.

Table 8-9 File extensions

File Type	Extension	Stores
Worksheet	.WK1	Worksheet data
Print	.PRN	Worksheet data with or without printer codes
Graph	.PIC	Graphs and graph settings

Lotus-DM works with only these types of files. You can also use files created in Lotus 1-2-3 Release 1A, 2, 2.01, and 2.2, or in Lotus Symphony® Release 1, 1.1, 1.2, and 2. If you want to work with a file created in another program, such as a DeskMate Worksheet (.WKS) file, you may be able to translate it to an Lotus-DM file format. See Chapter 16 in *Reference* for more information.

Entering Data

When you enter data in a cell, Lotus-DM classifies every entry as one of two types: labels or values. **Labels** are text entries. **Values** are numbers, formulas that to evaluate numbers, and addresses or names for cells or ranges that contain values.

When you start typing an entry, Lotus-DM determines whether the entry is a label or value based on the first character you type. The mode indicator on the far right side of the edit panel shows LABEL or VALUE accordingly. If the first character you type is a letter or one of the label prefixes ' " ^, the mode indicator is LABEL. If the first character is a number (0 through 9) or one of the numeric symbols + - @ . (\$, the mode indicator is VALUE. As you type an entry, you see it in the edit panel.

You can change an entry as you type it. If you are using a mouse, move the cursor to point to the character you want to change and make your changes. If you are using the keyboard, press ← → HOME or END to move the cursor to the character you want to change and make your changes.

[NOTE] Pressing ← at the first character position, or → at the last character position in the edit panel, completes the entry and moves the cell pointer left or right one column.

Press BACKSPACE to erase the character to the left of the cursor; press DEL to erase the current character. Press ESC to erase all of the characters in the entry.

If you are using the keyboard, some cursor-movement keys work differently when you specify a value. Press ↓ to move from the edit panel to the worksheet while you are entering a formula. You see POINT in the edit panel, and you can move the cell pointer using ↑ ↓ ← or → to specify a range. See "Specifying Ranges" later in this chapter.

To complete an entry, click (if you are using a mouse) or press ENTER, ↑, ↓, PGUP, or PGDN to enter the data in the worksheet. Lotus-DM checks the data before entering it in the worksheet to make sure you typed a valid label or value. If the entry is valid, Lotus-DM enters the data in the current cell. The position of the cell pointer in the worksheet depends on the key you press to enter the data. Table 8-10 lists the keys used to complete an entry.

If the entry is not valid, you must edit it. The entry remains in the edit panel and the mode indicator remains EDIT. See "Editing an Entry" later in this chapter.

The location of the cell pointer after you enter data depends on how you enter the data. If you click with a mouse or if you press ENTER, the cell pointer remains in the same cell. If you use one of the pointer-movement keys, however, Lotus-DM enters the data in the current cell and moves the cell pointer to an adjacent cell. For example, if you press ↓, Lotus-DM enters the data in the current cell and moves the cell pointer down one row.

Table 8-10 Keys used to complete an entry

Press	To
ENTER	Complete the entry and retain the cell pointer in the current cell.
↑	Complete the entry and move the cell pointer up one row.
↓	Complete the entry and move the cell pointer down one row.
←	Complete the entry and move the cell pointer left one column.
PGDN	Complete the entry and move the cell pointer down one screen.
→	Complete the entry and move the cell pointer right one column.
PGUP	Complete the entry and move the cell pointer up one screen.

The way your entries show in a cell depends on the cell format. For details on formatting cells, see "Format" in Chapter 11, "Format" in Chapter 12, and "X Format" in Chapter 13.

Entering Labels

A **label** is a text entry. It can include any combination of characters, including numbers and numeric symbols.

To specify a label, move the cell pointer to the cell where you want to enter the label, and type. If you are using a mouse, click to select the cell, then type. A label begins with a letter or a **label prefix**, a symbol that informs Lotus-DM that the entry is a label and that specifies special instructions. When you type a letter without a label prefix, Lotus-DM automatically assigns an ' (apostrophe) as the label prefix. If you are unsure whether Lotus-DM reads your entry as a label or a value, check the edit panel. LABEL shows if the current cell entry is a label; VALUE shows if the current cell entry is a value.

Label Prefixes

Use label prefixes to enter labels that Lotus-DM would usually recognize as values and to control the way Lotus-DM aligns labels in cells. You can also use a label prefix to determine whether or not Lotus-DM prints a label. Each label prefix produces a different result. Table 8-11 lists the label prefixes and their results.

Table 8-11 Label prefixes

Prefix	Result
'	Aligns the label with the left edge of the cell (default alignment for labels).
"	Aligns the label with the right edge of the cell.
^	Centers the label in the cell.

Start with a label prefix to create a label that begins with a number (0 through 9) or one of the following numeric symbols: + (plus) - (minus) @ (at sign) . (period) ((left parenthesis) or \$ (dollar sign). For example, to enter the label *20 Blueberry Hill Road*, type a label prefix before you type the actual entry. Otherwise, Lotus-DM will assume you are entering a value.

Even if an entry does not begin with a number or numeric symbol, you may want to precede the entry with a label prefix to change the way Lotus-DM positions the label in the cell or to control whether Lotus-DM prints the label.

For example, to center the label January in the current cell, type the label prefix ^ before you type the actual entry. Otherwise, Lotus-DM will automatically use the default label prefix (').

NOTE The label prefix does not display in the worksheet but does show in the edit panel when you highlight the cell.

Long Labels

You can enter a **long label**, a label that is longer than the cell's column width. Lotus-DM displays as much of the label as it can in the cells to the right, as long as the cells are blank. Lotus-DM cuts the label display short when it encounters cells that contain data to the right of the label. The label itself is unchanged; this affects its display in the worksheet only.

Entering Values

A value is a numeric entry, starting with a number (0 through 9) or a numeric symbol (+ - @ . (\$). A value can be a number, a formula that evaluates to a number, or a reference to a cell or range that contains values.

To specify a value, move the cell pointer to the cell where you want to enter the value, and type. If you are using a mouse, click to select the cell, then type. A value begins with a number or a **numeric symbol**, a prefix that informs Lotus-DM that the entry is a value and specifies special instructions. If you are unsure whether Lotus-DM reads your entry as a value or a label, check the edit panel. LABEL shows if the current cell entry is a label; VALUE shows if the current cell entry is a value.

Lotus-DM always aligns values to the right. You cannot change their alignment as you can for labels. You can, however, control the way Lotus-DM displays values by setting the cell format. For details on formatting cells, see "Format" in Chapter 11, "Format" in Chapter 12, and "X Format" in Chapter 13.

You can use two function key combinations in VALUE mode. Table 8-12 lists these key combinations and describes how they work when you are entering a value in the current cell.

Table 8-12 Special keys in VALUE mode

Press	To
CALC (CTRL-F9)	Convert a formula to its current value.
NAME (CTRL-F3)	Display a menu of named ranges in the worksheet, when pressed after typing + - / ^ (* in a formula.

If you are using the keyboard, some pointer-movement keys work differently in VALUE mode. Press ↓ to move from the edit panel to the worksheet while you are entering a formula. You see POINT in the edit panel, and you can move the cell pointer using ↑ ↓ ← or → to specify a range. See "Specifying Ranges" later in this chapter.

Numbers

You can enter any number, up to 240 characters long, from 10^{-99} to 10^{99} . The number of significant digits Lotus-DM displays in a cell depends on the cell format, the column width, and the magnitude of the number. If you enter a number with more digits than the column width can display, Lotus-DM displays asterisks across the cell or displays it in scientific notation, depending on the cell format. However, Lotus-DM stores the actual number that you entered.

When entering values, begin the entry with a number (0 through 9) or one of the numeric symbols + - @ . (\$. If you begin a number with a \$ (dollar sign), Lotus-DM will enter the number but will not display the \$. You must change the format of the cell to include a currency symbol. Do not include spaces, commas, or more than one decimal point in the entry.

(NOTE) It is possible to enter numbers in scientific notation. For example, to enter 602000, you can type 6.02E+05. The correct format for entering a number in scientific notation is to type a positive or negative number followed by an e or E, a + (plus sign), and an exponent from -99 to 99.

Numeric Symbols

Use numeric symbols at the beginning of formulas that you enter as values. Table 8-13 lists the numeric symbols and their meanings.

See "Working with Formulas" later in this chapter for more information on the mathematical calculations that Lotus-DM can perform.

Long Values

You can enter a **long value**, a value that is longer than the cell's column width.

Table 8-13 Numeric symbols

Numeric symbol	Meaning
+	Add this value to another specified value, or treat this value as positive.
-	Subtract this value from another specified value, or treat this value as negative.
@	Perform a special operation, called an @function (at function), with this value.
.	Treat this value as a decimal.
(Separate the operations within this formula.
\$	Treat this value as currency.

Lotus-DM treats long values differently from the way it treats long labels. Unlike long labels, Lotus-DM does not overlap long values into adjacent blank cells, nor does it display only a part of the value when adjacent cells contain data. Instead, Lotus-DM may display the value in scientific notation or display asterisks across the cell instead of the value, depending on the cell format.

If you specify a cell format, the formatted entry that shows in the cell may make the value longer or shorter than what you see in the edit panel.

NOTE You can use Worksheet Column (CTRL-W) to widen the column until it is wide enough for you to see the entire value.

Formulas

A **formula** is an entry that performs a calculation. You can enter several types of formulas in Lotus-DM: numeric formulas, string formulas, and logical formulas. See "Working with Formulas" later in this chapter.

NOTE The number of decimal places Lotus-DM displays for a calculated value depends on the cell format. Regardless of how many decimal places Lotus-DM displays for the value, however, Lotus-DM calculates the value to a precision of 15 decimal places unless you specify a different precision. See "@ROUND" in Chapter 17.

Dates and Times

To enter a date or time in Lotus-DM, you must assign a cell format to the cell(s) where you type a date number or time number.

Dates Lotus-DM assigns an integer to each of the 73,050 days from January 1, 1900 to December 31, 2099, inclusive. These integers (1 through 73050, consecutively) are called **date numbers**. For example, the integer 5 corresponds to January 5, 1900; the integer 32762 corresponds to September 11, 1989.

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You can use the @function @DATE to enter a date number. @DATE calculates the date number for a date you specify. For example, to enter the date number for September 11, 1989, you could enter @DATE(89,9,11) in the worksheet. Lotus-DM calculates the date number automatically, in this case, 32762. See "Date and Time @Functions" in Chapter 17.

To display the date rather than the date number, use Range Format to change the cell's format to one of the five date formats. See "Format" in Chapter 12 for more information.

Times Lotus-DM assigns a **time number**, a decimal number from .0 to .999988, to represent the time of day from midnight to 11:59:59 PM, inclusive. For example, the decimal number .0000 corresponds to 00:00:00 PM (midnight), .5000 corresponds to 12:00:00 (noon), and .999988 corresponds to 11:59:59 PM.

You can use the @function @TIME to enter the time number. @TIME calculates the time number for a time you specify. See "Date and Time @Functions" in Chapter 17.

To display the time rather than the time number, use Range Format to change the cell's format to one of the four time formats. See "Format" in Chapter 12 for more information.

Working with Formulas

A formula is an entry, up to 240 characters long, that performs a calculation using numbers, other formulas, or strings. The calculation can be a simple mathematical operation, such as subtracting one number from another, or a more complicated operation, such as determining the net present value of a series of future cash flows.

When you enter a formula, you see the value that results from the calculation in the cell. For example, if you enter the formula 25+5, you see the value 30 in the cell. When the cell pointer is on the cell, however, Lotus-DM displays 25+5 in the edit panel.

(NOTE) To display formulas in cells instead of their results, use Range Format or Worksheet Format. See "Format" in Chapter 11 and in Chapter 12.

Identifying Types of Formulas

You can enter three types of formulas: numeric, string, and logical. You can also enter **@functions**, which are built-in formulas that perform numeric, string, or logical calculations.

Numeric formulas calculate values, using one or more of the **arithmetic operators** + - * / and @functions. Lotus-DM can calculate any numeric formula whose value

is between 10^{-308} and 10^{308} , but the value must be between 10^{-99} and 10^{99} for Lotus-DM to display it in the worksheet. When a formula's value is less than 10^{-99} or greater than 10^{99} , Lotus-DM displays asterisks across the cell that contains the formula.

Table 8-14 shows the arithmetic operators and the operations they perform.

Table 8-14 Arithmetic operators

Use	To
+	Add
-	Subtract
*	Multiply
/	Divide
^	Raise to an exponent

String formulas perform calculations with literal strings and labels. A **literal string** is a series of characters enclosed in quotation marks that is treated as a label. String formulas use the **string operator** & (ampersand) and/or @functions. You can use string formulas to join literal strings and/or labels. This operation of joining is called **concatenation**.

Logical formulas are statements that return either 1 (meaning the statement is true) or 0 (meaning the statement is false). Logical formulas use the **logical operators** = < > <= >= <> #AND# #OR# #NOT# and/or @functions.

Table 8-15 shows the logical operators and their significance.

Table 8-15 Logical operators

Use	To signify
=	Equal to
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<>	Not equal
#AND#	And (both)
#OR#	Or (either)
#NOT#	Not (the opposite)
&	String concatenation

See Chapter 17 in *Reference* for a complete description of the @functions.

Entering Formulas

A formula can begin with a number or one of the numeric symbols + - @ . (\$ or, for a logical formula, the # (pound symbol). See Table 8-13 for a description of the numeric symbols.

When the first element in a formula is a cell address or range name, begin the formula with + - (or \$. When a string formula starts with a literal string, begin the formula with + or (.

You can use the following types of data in a formula:

- Numbers (for example 450, -92, 7.1E12, date numbers, and time numbers)
- Literal strings (for example, "Budget for" or "TOTAL")
- @Functions (for example, @SUM(A4..A8))
- Cell and range addresses (for example, B12, F23..H35)
- Range names (for example, JANSALLES, BUDGET_90)

A formula cannot contain spaces, except within literal strings in string formulas.

A formula instructs Lotus-DM to perform the specified operations on the specified data. If you enter more than one operation in a formula, Lotus-DM performs them in an order of precedence. The following describes the order of precedence that Lotus-DM uses.

Order of Precedence

If a formula contains more than one operation, Lotus-DM calculates its value by using the operators' **order of precedence** to determine which operator to use first. **Precedence numbers** represent the order in which Lotus-DM performs operations in a formula. The lower the precedence number, the earlier Lotus-DM performs the operation. Operations with the same precedence number are performed sequentially from left to right.

Table 8-16 describes the arithmetic, string, and logical operators you use in formulas and lists their precedence numbers.

You can override the order of precedence by enclosing an operation in parentheses. Lotus-DM performs operations inside parentheses first. Within each set of parentheses, precedence numbers apply. You can nest one set of parentheses inside another set and create as many nesting levels as you want.

Cell and Range References

The primary reason for using formulas in Lotus-DM is to perform calculations with worksheet data. You use Lotus-DM not only to record your worksheet data but also to calculate the results of mathematical operations and generate new information.

Table 8-16 Order of precedence

Operator	Operation	Precedence Number
^	Exponentiation	1
-	Identification of the value as negative	2
+	Identification of the value as positive	2
*	Multiplication	3
/	Division	3
+	Addition	4
-	Subtraction	4
=	Equal-to test	5
< >	Not-equal-to test	5
<	Less-than test	5
>	Greater-than test	5
<=	Less-than-or-equal-to test	5
>=	Greater-than-or-equal-to test	5
#NOT#	Logical-NOT test	6
#AND#	Logical-AND	7
#OR#	Logical OR test	7
&	String concatenation	7

To include a cell or range reference in a formula, type the cell or range address or range name in the formula, or highlight the cell or range while typing the formula. See "Specifying Ranges" next for more information.

To highlight a range while typing a formula using a mouse, move to the first cell of the range you want to highlight in the worksheet. Click and drag to highlight the range you want to include in the formula and then type the next operator (or click or press ENTER to complete the formula). The cell pointer returns to the cell in which you are entering the formula.

To highlight a range while typing a formula using the keyboard, press ↓ to move from the edit panel to the worksheet. You see POINT in the edit panel. This means you can specify a range. Move to the first cell of the range you want to highlight and press SHIFT-ENTER to anchor the cell. Highlight the range you want to include in the formula using ↑ ↓ ← or → and then type the next operator (or click or press ENTER to complete the formula). The cell pointer returns to the cell in which you are entering the formula.

In formulas that use @functions, you can specify multiple ranges using the methods described above. When specifying multiple ranges, separate each range with a , (comma). For example, @SUM(D4..D10,A1..C3,F10..F15).

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NOTE If the specified cell or range in a formula has a range name, Lotus-DM automatically substitutes the name for the address in the formula. If the specified cell or range has more than one range name, Lotus-DM displays the range name that is alphabetically first.

You can use three types of cell and range references in a formula: relative, absolute, and mixed. The type of reference you use determines what happens when you copy the formula with Edit Copy Range. See "Copy Range" in Chapter 10. The following describes each type of reference.

Relative References A **relative reference** is a cell or range reference that Lotus-DM interprets as a location relative to the current cell. The reference can be an address or range name. To create a relative reference in a formula, you type the address or range name.

When you use a relative reference in a formula, Lotus-DM uses the reference to determine the position of the specified cell or range relative to the cell that contains the formula. For example, when you enter the formula `+B1+B2` in cell B4, Lotus-DM interprets the formula as "add the contents of the cell three rows above to the contents of the cell two rows above."

If you copy the formula `+B1+B2` from B4 to C4, Lotus-DM still interprets the formula as "add the contents of the cell three rows above to the contents of the cell two rows above." Therefore, Lotus-DM adjusts the relative cell references so the formula becomes `+C1+C2`. The relative positions of the cells are maintained.

Absolute References You may want Lotus-DM to keep the original cell or range reference when you copy a formula. To keep the original cell or range reference in a formula, regardless of where that formula is copied, use an **absolute reference**.

An absolute reference can be an address or range name. To create an absolute address, type a \$ (dollar sign) in front of both the column letter and row number of the address (for example, `F2` or `A5..B10`). To create an absolute range name, type a \$ in front of the range name (`$RATE`).

Mixed References You may want part of the cell address to stay the same in the copied formula and part of the address to change when you copy a formula that references a cell or range. For example, if you want the column letter to stay the same and the row number to change, use a **mixed reference** in the formula.

You can use mixed references only with addresses, not with range names. To create a mixed reference, precede the part of the address that you want to stay the same with a \$ (dollar sign) and retain the other part of the address as is.

For example, `B5..C7` is a range address containing a mixed reference. B5 is a relative reference, and `C7` is an absolute reference. If you copy this range elsewhere in the worksheet, the relative reference changes but the absolute reference does not.

B\$5 is an example of a cell address with a mixed reference. B is a relative reference, and \$5 is an absolute reference. If you copy this cell to another cell in the worksheet, the relative reference changes but the absolute reference does not.

ABS (CTRL-F4)

When entering or editing a formula, you can change its cell reference by pressing ABS (CTRL-F4) when the cursor is on or immediately to the right of a cell address or range name. Lotus-DM cycles the address through the different reference types.

Table 8-17 shows the series of cell addresses you see when you press ABS (CTRL-F4) next to the cell address C5 in a formula.

Table 8-17 Effect of using ABS (CTRL-F4)

Current cell contents	After pressing ABS (CTRL-F4)
C5	\$C\$5 (absolute address)
\$C\$5	C\$5 (mixed address with absolute row reference)
C\$5	\$C5 (mixed address with absolute column reference)
\$C5	C5 (relative address)

Lotus-DM always cycles through the types of cell address in the same order, regardless of whether the original address type is relative, absolute, or mixed.

Editing an Entry

You can edit your data after you enter it in a cell. To edit a completed entry, move the cell pointer to the cell and press EDIT (CTRL-F2). EDIT shows in the edit panel. The cursor is in the current cell contents section of the edit panel.

If you are using a mouse, move the cursor to point to the character you want to edit. If you are using the keyboard, press ← → HOME or END to move the cursor to the character you want to edit.

NOTE Pressing ← at the first character position, or → at the last character position in the edit panel, completes the entry and moves the cell pointer left or right one column.

Press BACKSPACE to erase the character to the left of the cursor; press DEL to erase the current character.

You can use key combinations when you edit an entry. Table 8-18 lists these keys and how they work.

Table 8-18 Special keys in EDIT mode

Press	To
SHIFT →, ←	Highlight text in the edit panel to be deleted.
CALC (CTRL-F9)	Convert a formula to its current value.
EDIT (CTRL-F2)	Switch between EDIT mode and LABEL mode, if the entry displayed in the edit panel is a label; or switch between EDIT mode and VALUE mode, if the entry displayed in the edit panel is a value.
NAME (CTRL-F3)	Display a menu of named ranges in the worksheet, when pressed after typing + - / ^ (or * in a formula.

To complete an entry, click (if you are using a mouse) or press ENTER ↑ ↓ PGUP or PGDN to enter the edited data in the worksheet. Lotus-DM checks the data before entering it in the worksheet to make sure you typed a valid label or value. If the entry is valid, Lotus-DM enters the data in the current cell. If the entry is not valid, you must edit it again. The entry remains in the edit panel and the mode indicator remains EDIT.

The way your entries show in a cell depends on the cell format. For details on formatting cells, see "Format" in Chapter 11 and Chapter 12, and "X Format" in Chapter 13.

Specifying Ranges

A **range** is a rectangular block of adjacent cells. It can be a single cell, a row, a column, or several adjacent rows and columns. You use ranges in commands and formulas to perform operations on more than one cell at the same time. To use a range in a command or formula, you need to identify, or **specify**, the range.

You can specify a range in one of five ways:

- Type the range address.
- Type the range name.
- Select the range in the worksheet.
- Use NAME (CTRL-F3).
- Use a remembered range.

The method you use depends on the command you select, whether you have named the range you want to use, and whether you have used the same command during this Lotus-DM session. You can specify a range in the worksheet or in a dialog box.

If you are working in the worksheet, you can move the cell pointer to select a range or you can use NAME (CTRL-F3) to open the Range Name Use dialog box and specify a range name. If you are entering a formula in the worksheet, you can specify a range within the formula by highlighting it on the worksheet or typing its name or address.

If you have selected a command that uses a dialog box, you can specify the range in the corresponding dialog box. You can type the range address in the appropriate field or select a named range from the list box. (If the command does not use a dialog box, you must specify the range in the worksheet before you select the command.) You can also press NAME (CTRL-F3) to open the Range Name Use dialog box at any time. If you have already used the same command for the same range during the current session, Lotus-DM "remembers" the range name or range address and provides it for you.

If you specify a range in the worksheet before you select a command, Lotus-DM uses the specified range as the default. Otherwise, Lotus-DM reads the position of the cell pointer as the current range.

See Chapter 12 for more information on using ranges and for descriptions of each range command.

Range Address

You can specify a range by typing its address. The **range address** consists of the cell addresses of the two most distant corner cells in the range, separated by one or two periods. This address tells Lotus-DM where the range begins and ends.

You can use either uppercase or lowercase letters when typing the range address, but Lotus-DM always displays it in uppercase letters.

If the range is a group of adjoining cells in a single column or row, the range address consists of the cell addresses of the two opposite ends of the range.

If the range is a group of adjacent cells that spans several columns or rows, the range address consists of the cell addresses of two diagonally opposite corners of the range. Regardless of which set of corner cells you use and whether you type one or two periods, Lotus-DM displays the range address as the range's upper left and lower right corner cells separated by two periods.

If the range is a single cell, the range address is that cell's address typed twice as both the starting and ending point of the range. To specify a single cell, however, you only need to type the cell address once. For example, to specify the range B3..B3 as a single cell rather than a single-cell range, you type B3.

Range Names

Use Range Name to assign a name to a specified range, creating a **range name** (see "Name" and "Name Labels" in Chapter 12). You can use range names in place of range addresses in commands and formulas.

Selected Range

You can specify a range by selecting it. You must select a range before you select the command you want to use it with. First, move the cell pointer to a cell in one corner of the range you want to select.

If you are using a mouse, click to select the cell. (Double-click to select a single-cell range.) Hold the button down and drag the cell pointer to expand the range around the selected cell. POINT shows in the edit panel. As you move the cell pointer, the range address shows in the current cell contents section of the edit panel. When you have highlighted the entire range, release the button to select the range.

If you are using the keyboard, press SHIFT-ENTER to **anchor** the cell pointer. This cell is now the **anchor cell**. Use the pointer-movement keys to expand the range from the anchor cell. POINT shows in the edit panel. As you move the cell pointer, the range address shows in the current cell contents section of the edit panel.

NOTE You can tell if the cell pointer is anchored by looking at the cell contents section of the edit panel. A single-cell address (such as B3) means the cell pointer is not anchored; a range address (B3..B3) means it is anchored.

You can press . (period) to cycle the anchor cell clockwise from one corner of the highlighted range to the next. For example, if the range C5..F10 is highlighted, and C5 is the anchor cell, press . (period) to make F5 the anchor cell, press it again to make F10 the anchor cell, press it again to make C10 the anchor cell, and press it once more to return to the original anchor cell (C5). When you have highlighted the entire range, press ENTER to select the range.

NOTE If you change your mind and want to highlight a different range, press BACKSPACE to remove highlighting from the range, unanchor the cell pointer, and return the cell pointer to where it was when you began. You can also press ESC to remove highlighting and unanchor the cell pointer without moving it.

Table 8-19 lists the keys you can use to select a range.

When you select a range and then choose a command, the selected range address shows in the appropriate field in the dialog box.

Entire Sheet

You can select the entire active area in the worksheet. If you are using a mouse, move the cursor to the entire-sheet selector icon, located at the intersection of the column and row headings in the upper-left corner of the worksheet area. Click to select the entire active area. If you are using the keyboard, press SHIFT-ENTER to begin selecting a range, then press END-HOME to highlight the entire active area. Press ENTER to select the highlighted range.

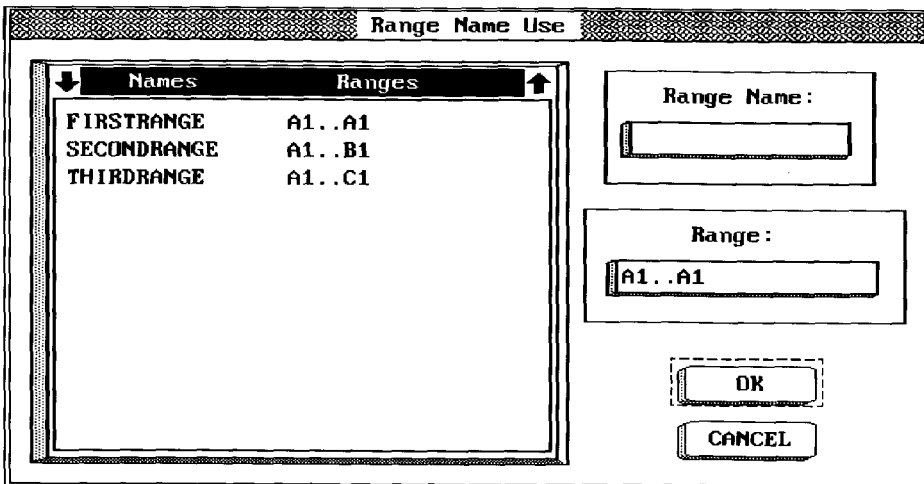
You can also use Edit Select All to select the entire active area. See "Select All" in Chapter 10 for more information.

Table 8-19 Keys used in selecting ranges

Press	Result when the range is unanchored	Result when the range is anchored
SHIFT-ENTER .(period)	Makes the current cell the anchor cell.	Moves the anchor cell clockwise from one corner of the highlighted range to the next.
BACKSPACE	Returns the cell pointer to where it was when you began.	Removes highlighting, unanchors the cell pointer, and returns the cell pointer to where it was when you began.
ESC	If you are using a command, returns you to the previous menu or prompt. If you are entering a formula, returns Lotus-DM to EDIT mode.	Removes highlighting and unanchors cell pointer.

NAME (CTRL-F3)

Whether you are working in the worksheet or in a dialog box, you can select a range from the Range Name Use dialog box at any time. Press NAME (CTRL-F3) when you want to specify a named range. You see the Range Name Use dialog box.



The previously selected range shows as the current range. If you have used the same command before during this Lotus-DM session, Lotus-DM "remembers" the last range you selected for the command and it shows as the current range. See "Remembered Ranges" next for more information.

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Select a range name from the Range Name Use list box or specify a name in the Range Name field. Press OK to use the selected range name. Select CANCEL to return to the worksheet without specifying a range name.

Remembered Ranges

With some commands, Lotus-DM “remembers” the most recent range you specified during the current session. The next time you select a command, Lotus-DM automatically highlights the range you last specified and displays its address in the appropriate field within the dialog box. Press ENTER or double-click to accept that range, or press ESC or BACKSPACE to clear the remembered range and specify a different range using one of the other range-selection methods.

Using the Help System

Lotus-DM provides a system of information that you can view at any time during a Lotus-DM session. When you press HELP (F1), Lotus-DM displays a screen with related information. The Lotus-DM Help system is context-sensitive: it describes what you are currently doing in the program when you press HELP.

Each Help screen includes a menu of additional Help topics. Select the topics you want to see. When you finish using Help, press ESC to return to the worksheet or dialog box in the same place where you left it. Table 8-20 lists the keys used to move through Help topics and to other Help screens.

Help is just one of the resources available to you as you learn to use Lotus-DM. See *Getting Started* for more information on installing and starting Lotus-DM on your computer, and where to call for product support.

Leaving Lotus-DM

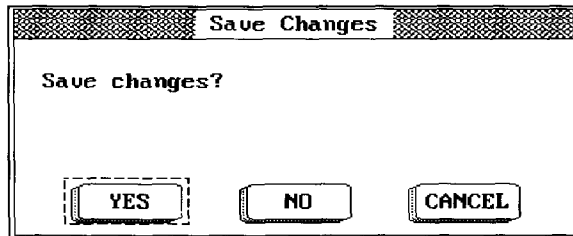
When you finish working with Lotus-DM, you can end your Lotus-DM session and return to the DeskMate desktop in one of two ways:

- Select File Exit.
- Press ESC in READY mode.

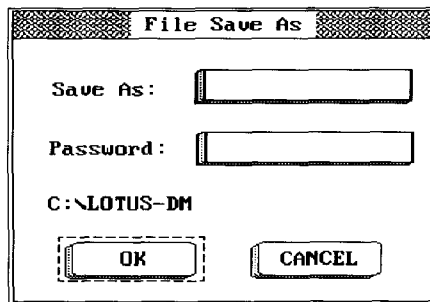
If you have made changes to the current worksheet without saving it to the disk, you see the Save Changes dialog box. Select YES to save the current worksheet; select NO to exit without saving changes; or select CANCEL to return to the current worksheet instead of exiting.

Table 8-20 Keys used in Help

Press	To
↑	Move up one topic.
↓	Move down one topic.
→	Move right one topic.
←	Move left one topic.
HELP (F1)	Display the Help screen you saw when you first pressed HELP.
ENTER	Display the Help screen for the highlighted topic.
BACKSPACE	Display the previous Help screen.
HOME	Move to the first topic.
END	Move to the last topic.



If you want to save your changes and you have not named the current worksheet, you see the File Save dialog box.



Specify the file name in the Save As field. Select OK to save the specified file. Select CANCEL to return to the current worksheet without saving the file.

If you use ESC to exit, you see the Leave Lotus-DM dialog box. Select OK to exit to the DeskMate desktop, or select CANCEL to return to the current worksheet.

When you have finished, you return to the DeskMate desktop. You can continue working with another DeskMate application, or you can exit to DOS.

Using *Reference*

Reference provides a comprehensive overview of the Lotus-DM commands. If you want to know more about a command, read the corresponding *Reference* chapter. If you want to learn how to put commands together to build worksheets, graphs, and databases, see the *User's Guide*. Table 8-21 lists the *Reference* chapters.

Table 8-21 The *Reference* chapters

Read	In	To learn more about
File Commands	Chapter 9	Opening, saving, and printing worksheet files.
Edit Commands	Chapter 10	Copying, cutting, moving, and pasting images between the worksheet area and the DeskMate clipboard.
Worksheet Commands	Chapter 11	Setting the format for data entered in worksheet cells.
Range Commands	Chapter 12	Working with data in blocks, or ranges, of cells.
Graph Commands	Chapter 13	Creating, saving, and printing graphs.
Data Commands	Chapter 14	Creating and sorting information in a database.
PrintGraph Commands	Chapter 15	Printing graphs.
Translate	Chapter 16	Transferring data between Lotus-DM and other programs.
@ Functions	Chapter 17	Using standard formulas in your worksheet.
Running Lotus-DM from DOS	Appendix A	Running Lotus-DM from DOS, without using the DeskMate environment.
Character Sets	Appendix B	Using LICS and ASCII codes.
Task Summary	Appendix C	Listing of how to perform tasks in Lotus-DM versus Lotus 1-2-3 Release 2.01.
Memory Management	Appendix D	Making the best use of your computer's temporary storage capacity.
Sample Applications	Appendix E	Using the sample applications provided with Lotus-DM.

Keep this manual next to your computer so you can refer to it as needed. If you need help while you are working with Lotus-DM, you can also press HELP (F1) to see context-sensitive information on the screen.

Chapter 9

File Commands

The File commands organize and maintain the information you store in files. File commands also manipulate data between files and allow you to print documents.

Use File commands to

- Create, open, or save a file
- Name and save a new file or save a copy of an existing file under a new name
- Import, extract, or combine files
- Translate files from one format to another
- Delete a file
- Change the file directory for the current session
- Obtain a list of files by file type
- Set up page formats and layouts for printing
- Print a file
- Exit Lotus-DM
- Run another application from the Lotus-DM environment

File Names

When you save a file, Lotus-DM prompts you to specify a file name. File names must conform to the standard DOS conventions. A file name can contain up to eight characters and can include uppercase and lowercase letters, numbers, and the underscore character (_). Lotus-DM does not accept space characters in a file name.

File Types and Extensions

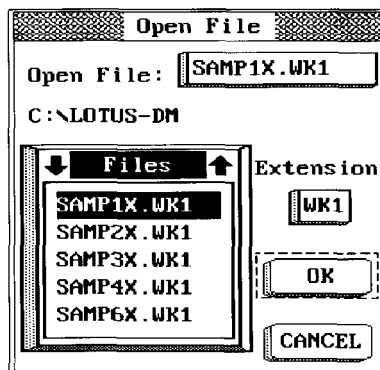
Lotus-DM creates three types of files: worksheet files, print files, and graph files. When you save a file, Lotus-DM distinguishes these file types by adding the following extensions: .WK1 to worksheet files, .PRN to print files, and .PIC to graph files.

You can specify your own file extension when you save a file, as long as it has no more than three characters. A file extension displays as a suffix to a file name. For example, a worksheet file with the file name "SAMPLE" displays as "SAMPLE.WK1".

Files List Boxes

Lotus-DM keeps a list of all Lotus-DM files and all the DOS directories. When you open a file, Lotus-DM displays a list box showing an alphabetized list of the files that reside in the current directory, followed by a list of associated subdirectories, and a list of drives.

Most files list boxes display the first 255 items, including files, directories, and drives. The Open File list box displays 50 files or less, depending on how many drives or directories that exist. To receive a complete listing of files, you should limit directories to 50 files or less. The Open File dialog box illustrates a typical Files list box.



You can scroll the Files list box by pressing ↑, ↓, PGUP, or PGDN. To move to the end of the Files list box, press CTRL-END; to move to the beginning of the Files list box, press CTRL-HOME. When the cursor is on a file in the Files list box, the file displays in the File field in the dialog box. To select a file, select OK when you see the file name in the File field, or overstrike the file name in the field with another file or path.

To display files in a different directory, select the appropriate directory from the Files list box or type the new path in the File field, and press ENTER. When you change directories, the Files list box displays the corresponding files and subdirectories.

To display directories from a different drive, select the appropriate drive from the Files list box or type the new path in the Files field, and press ENTER. When you change drives, the Files list box displays the corresponding list of directories. For more information on moving around files list boxes, see "Entering Information in Dialog Boxes" in Chapter 8.

Lotus-DM displays the current path just above the Files list box. This display changes every time you select a new directory or drive.

File Command Descriptions

The following sections describe the File commands. File command accelerators, if available, appear after the File command name.

Table 9-1 lists the File commands and gives a brief description of each command.

Table 9-1 File commands

Select	To
New	Create a new blank worksheet file in memory, with default settings.
Open	Read a worksheet file into memory. The retrieved file replaces the current file.
Save (CTRL-S)	Save the current, named worksheet file on disk.
Save As	Save the current worksheet file under a new name on disk.
Xtract	Extract a range of data by copying the data from an active file and saving it in a worksheet file on disk.
Combine	Incorporate data from a worksheet file on disk into the current file.
Translate	Translate database and worksheet files to or from other programs.
Import	Read an ASCII file on disk into the current worksheet.
Delete	Delete a file on disk.
Directory	Change the directory (for the current session) that Lotus-DM uses when you save, read, or list files.

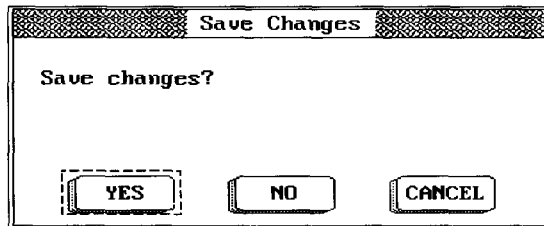
(continued)

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Select	To
List	Display a list of related files.
Page Setup	Set the left margin, printed line width, total lines per page, and printed lines per page options.
Page Layout	Set headers, footers, format, and borders.
Print (CTRL-P)	Print a file to the printer or to a file on disk.
Exit (ESC)	Exit Lotus-DM.
Run	Run another DeskMate application.
About Lotus-DM	View copyright information and release numbers.

New

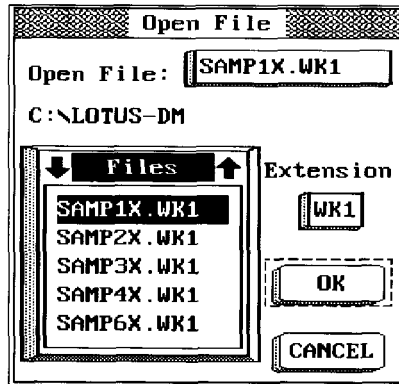
Select New to remove the current worksheet from the screen and replace it with a new, blank worksheet with default settings. If you have not made any changes to the current file, or if you have already saved your changes, a new, blank worksheet displays immediately. If you have made changes to the current file, you see the Save Changes dialog box.



Select YES to save your current worksheet with changes, NO to retain the previous version on disk, or CANCEL to return to the current worksheet.

Open

Select Open to retrieve a worksheet file from disk and read it into memory. The retrieved file replaces the file that was current when you selected Open. Use Open when you want to replace the current file with a different file. If you want to save any changes to the current file, save the file before you select Open. When you select Open, you see the Open File dialog box.



NOTE Help (F1) is unavailable from the File Open dialog box. To use the on-line Help system for this command, press ESC to exit the dialog box. Then press F1. Help is available through the Lotus-DM Help index.

Extension Specify a file extension to display files of a particular type. The default extension is WK*, which lists all files with extensions that begin with .WK. You can enter wild-card characters (* or ?) in this field if the File field is blank. This option is available only on DeskMate Release 3.03 or higher.

Open File Select the file you want to open from the Files list box or specify the file name in the Open File field. If the file you open is password-protected, a dialog box appears prompting you to type the password.

Select OK to open a file or CANCEL to return to your current worksheet.

Opening 1-2-3 and Symphony® Files

Lotus-DM files are formatted in the .WK1 file format; therefore, you can retrieve 1-2-3 Release 2.01 and 2.2 files and Symphony Release 1.1, 1.2, and 2 files by using File Open. These files all have a file extension of .WK1.

You can also retrieve 1-2-3 Release 1A files, which have a .WKS file format, and Symphony Release 1 files, which have a .WRK format, with File Open.

Opening DeskMate Worksheet Files

DeskMate worksheet files have a .WKS file extension. This file format differs from the 1-2-3 Release 1A file format, which also uses the .WKS extension. Therefore, you must first translate DeskMate worksheet files to the .WK1 format by using the Translate utility. See Chapter 16 in *Reference* for more information on the Translate utility.

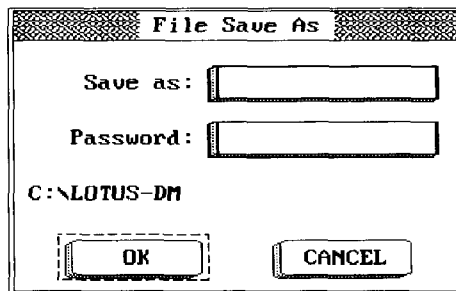
Save

Select **Save** (CTRL-S) to save the current, named worksheet and its settings in a worksheet file on disk. Worksheet files are automatically saved with a .WK1 extension. To name and save a new, untitled worksheet, use **Save As**.

Because Lotus-DM does not automatically save your work, you must use **Save** to make a permanent copy of your work on disk before you remove the worksheet from memory, end the Lotus-DM session, or turn off the computer. Also, you should save your files frequently so you do not lose work in the case of a power failure.

Save As

Select **Save As** to save and name a new worksheet as a worksheet file. You can also use **Save As** to save a copy of an existing file under a different name. When you select **Save As** from the **File** menu, you see the **File Save As** dialog box.



Save As Specify the new file name in the **Save As** field. You can enter a name up to 8 characters. The default file extension is .WK1, but you can specify your own extension as long as it does not exceed the three character limit. If you specify an existing file, the **File Already Exists** dialog box displays. Select **YES** to replace the existing file, **NO** to specify another file name, or **CANCEL** to cancel the command.

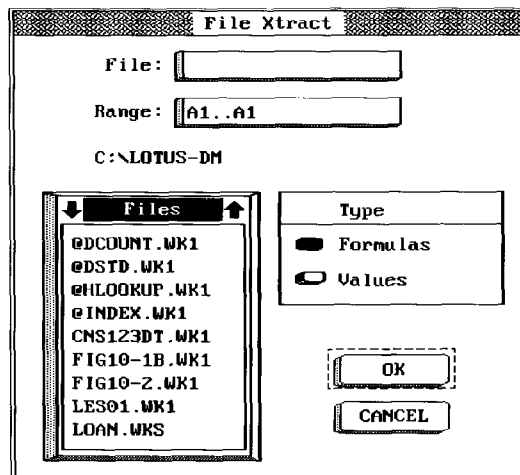
Password Specify a password if you want to prevent another user from reading the file. To change a password for the current file, select **Save As**, enter the existing file name in the **File** field, and then specify the new password in the **Password** field. To delete a password, select **Save As**, enter the existing file name in the **File** field, and leave the **Password** field blank.

CAUTION Remember your password because when you save a file with a password, you can access it again only if you enter the correct password.

Select OK to save the file or CANCEL to return to the current worksheet without saving the file. After you use Save As, the title line displays the new file name.

Xtract

Select Xtract to copy a range of data from the current file into a separate worksheet file. Xtract saves all settings associated with the worksheet in the extracted file. Xtract puts the extracted range in the file you specified beginning in A1. This command does not change the current file in any way. When you select Xtract, you see the File Xtract dialog box.



File Specify a new file that will hold the extracted range or select an existing file from the Files list box. If you specify an existing file, the File Already Exists dialog box displays. Select YES to replace the existing file, NO to specify another file name, or CANCEL to cancel the command.

Range Specify the range containing the data you want to extract in the Range field. If you extract data from a named range, be certain that you extract the entire named range. If you extract only part of a named range, the range name appears in the extracted file but it will no longer refer to the same data.

Formulas Select Formulas to include the formulas with your extracted range. Lotus-DM adjusts the cell references in the formula to reflect their new locations in the file containing the extracted range. Be certain that you extract all the data that is referred to by the formula. If all the data is not in the extracted range, then the formula may not produce the results you expected.

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Values/Labels Select Values/Labels to extract labels and numbers, but not formulas. Lotus-DM converts formulas into numbers.

Select OK to process Xtract or CANCEL to return to the worksheet.

Combine

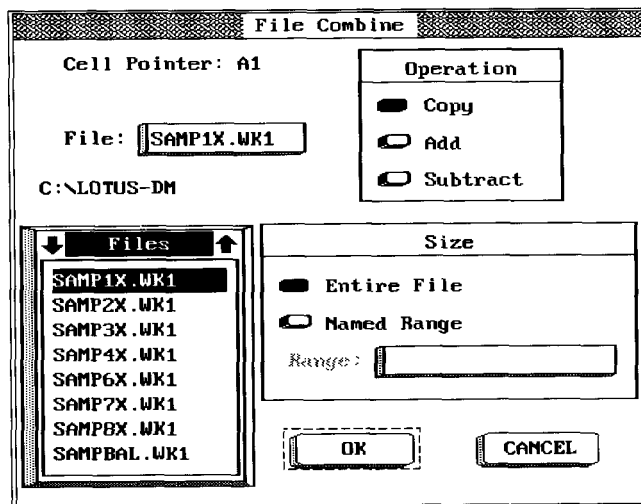
Select Combine to add, subtract, or copy data from another worksheet file into the current file. You can combine a range or an entire worksheet with the current file. Lotus-DM places the incoming data starting at the top left cell indicated by the cell pointer. All other entries fall into corresponding cells to the right and below the cell pointer.

CAUTION Combine changes data in the current file beginning in the current cell. To avoid possible data loss from combining files incorrectly, save the current file before using this command.

Before you use Combine note the following:

- When you use Combine, the data in the current file and the incoming data should be organized in the same way.
- Combine combines only cell entries. No worksheet or print settings are incorporated into the current worksheet.

When you select Combine, you see the File Combine dialog box.



File Select the file you want to combine from the Files list box or specify the file name in the File field.

Cell Pointer The Cell Pointer field indicates the top left cell for the incoming data. All other entries fall into corresponding cells to the right and below the cell pointer. You cannot enter data in this field. If you want to change the cell pointer location, return to the worksheet and move the cell pointer to the location that you want for incoming data.

You can select one of three operations when combining data from an incoming file. The operations are described as follows:

Copy Select Copy to copy data from a worksheet file on disk into the current file, beginning at the cell pointer location. You can use Copy to combine data from several smaller files into one file. For example, you can combine database-table records from several files into one database table. The data can include labels, values, and formulas.

Add Select Add to add values in a worksheet file on disk to numbers or blank cells in the current file. These values include numbers and the results of formulas. Incoming values cannot overlay a label or formula in the current file. Whenever the incoming value would overlay a label or formula in the current file, Lotus-DM discards the incoming value and retains the label or formula.

Subtract Select Subtract to subtract values in a worksheet file on disk from numbers or blank cells in the current file. If the cell in the current worksheet is empty, the incoming value is subtracted from zero. Incoming values cannot overlay a label or formula in the current file. Whenever the incoming value would overlay a label or formula in the current file, Lotus-DM discards the incoming value and retains the label or formula.

You can select one of two Size options:

Entire File Select Entire File to combine data from an entire file to the current worksheet. If you select this option with the Add or Subtract options, all values from the entire file are added to or subtracted from the current worksheet.

Named Range Select Named Range to combine data from a range to the current worksheet. Then specify a range name or address in the Range field.

Select OK to combine the files or CANCEL to return to the current worksheet.

Import

Select Import to read data from a text file or a delimited text file on disk into the current worksheet, beginning at the cell pointer location. A **text file** is a file in ASCII format. A **delimited text file** is a file in ASCII format that contains characters

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(delimiters) to separate data. The delimiters between numbers can be commas, spaces, colons, or semicolons; and the delimiters for labels must be quotation marks. Figure 9-1 illustrates a delimited text file.

```
"This is a delimited text file."◀
"Each number is separated by a comma, space, colon, or semicolon."◀
"Labels are enclosed in quotation marks."◀
8,9,10,11,12,13,14,15◀
8 9 10 11 12 13 14 15◀
8:9:10:11:12:13:14:15◀
8;9;10;11;12;13;14;15◀
"a""b""c""Total Sales"◀
```

Figure 9-1 A delimited text file on disk

Figure 9-2 illustrates the text file after you import it into the current worksheet using the Numbers option.

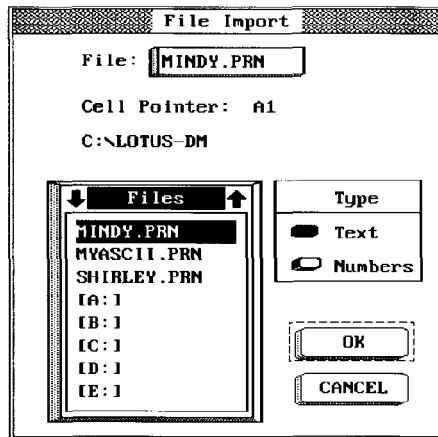
	A	B	C	D	E	F	G	H
1	This is a delimited text file.							
2	Each number is separated by a comma, space, colon, or semicolon.							
3	Labels are enclosed in quotation marks.							
4	8	9	10	11	12	13	14	15
5	8	9	10	11	12	13	14	15
6	8	9	10	11	12	13	14	15
7	8	9	10	11	12	13	14	15
8	a	b	c	Total Sales				
9								

Figure 9-2 A delimited text file imported using File Import Numbers

Before using Import, please note the following:

- Imported files overwrite data in existing cells. To avoid possible data loss from incorrectly importing files, save the current file before using Import or import the file to a blank worksheet file.
- ASCII files with special characters may produce unpredictable results. Be sure the file you are importing is a standard ASCII file so that it is compatible with Lotus-DM.
- If you select Numbers, make sure that the numbers in the text file do not contain commas because commas act as delimiters. For example, Lotus-DM interprets the number 12,345 as two values: 12 and 345.

When you select Import, you see the File Import dialog box.



File Specify the name of the file you want to import in the File field. Lotus-DM displays only files with a .PRN extension. If the file you want to import has another extension, specify the file name and its extension.

Cell Pointer The Cell Pointer field displays the entry point where the imported text will go. To change the current cell-pointer location, return to the worksheet and move the cell pointer to correct location.

Text Select Text to import both text and numbers from a nondelimited text file. Lotus-DM imports each row of characters from a text file as a separate left-aligned label. These labels result in a column of long labels. You can view or print data imported with this option, but you cannot use the numbers in calculations unless you use Data Parse to place the labels and numbers in separate columns in the worksheet. See "Parse Setup" and "Parse" in Chapter 14 for information on Data Parse.

Numbers Select Numbers to import numbers and labels from a delimited text file. Lotus-DM puts each number in a separate cell as a right-aligned value and creates a left-aligned label for each literal string. When a text file is not delimited, Numbers imports only numbers.

Select OK to import the file or CANCEL to return to the worksheet without importing the file.

Translate

Select Translate to translate database and worksheet files from other programs to the Lotus-DM file format or to translate Lotus-DM files to file formats supported by other worksheet and database management programs. See Chapter 16 in *Reference* for information on Translate.

Delete

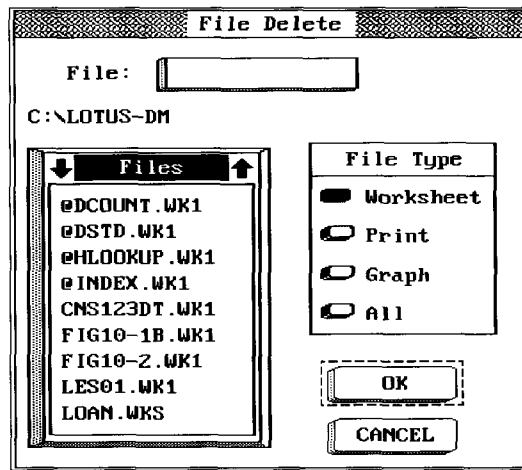
Select Delete to erase a file from disk. If you delete the current worksheet, it remains in memory, but is removed from disk.

CAUTION After you delete a file, you cannot in any way use the data in that file. Therefore, before using Delete, make sure that you no longer need the data in the file you are deleting.

Before using Delete, note the differences between it and File New:

- File Delete erases a file on disk but does not remove the active version of the file from memory.
- File New removes an active file from memory, and replaces it with a blank worksheet. File New does not erase the corresponding file on disk.

When you select File Delete, you see the File Delete dialog box.



File Specify the name of the file you want to delete in the File field.

Lotus-DM groups files according to file type. Select a specific type to view all the files belong to a particular type or select All for a complete listing of all the files in the current directory. The file types are described as follows:

Worksheet Select Worksheet to list all the worksheet files in the current directory. Worksheet files have a .WK1 extension.

Print Select Print to list all the print files in the current directory. Print files have a .PRN extension.

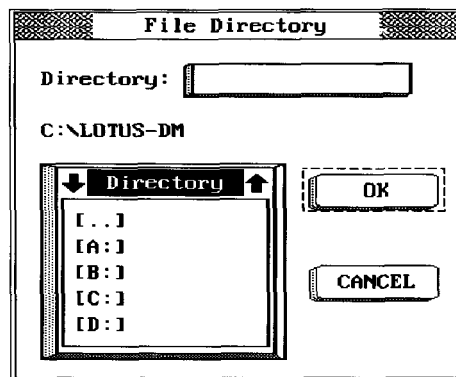
Graph Select Graph to list all the graph files in the current directory. Graph files have a .PIC extension.

All Select All to list all the files in the current directory.

Select OK to erase the file or CANCEL to return to the file without erasing it.

Directory

Select Directory to change the **default directory** for the current session. The default directory is the directory Lotus-DM uses when you save, read, or list files. For example, suppose your default directory is C:\STOCK, but the files you want to use are in C:\EXPENSES. You can use Directory to make C:\EXPENSES the current directory so Lotus-DM automatically uses that directory during the current session. When you select Directory you see the File Directory dialog box.

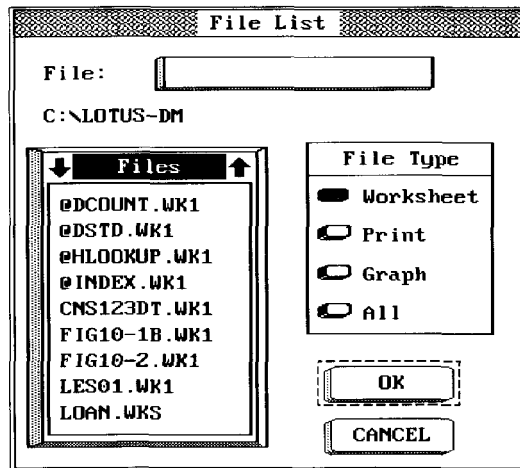


Directory You can select a directory or subdirectory from the Directory list box or specify the directory or subdirectory in the Directory field. The current path name displays just below this field.

List

Select List to display a list of all files of a particular type stored in the current directory. When you select List, you see the File List dialog box.

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File Select a file from the Files list box or specify a file in the File field. To see a list of directories and files for a different drive, select the drive from the Files list box, then select the directory. Lotus-DM also lists any subdirectories. You can select a subdirectory from the Files list box to display a list of files in that subdirectory.

Lotus-DM groups files by file type. You can select a specific type to view all the files that belong to a particular type or you can select All for a complete listing of all the files in the current directory. The file types are described as follows:

Worksheet Select Worksheet to list worksheet files in the directory you specify. Worksheet files have a .WK1 extension.

Print Select Print to list print files. Print files have a .PRN extension.

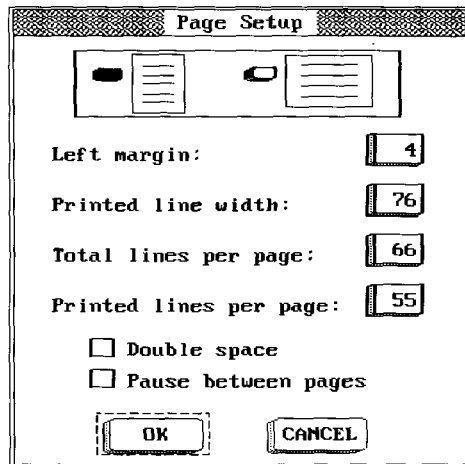
Graph Select Graph to list graph files in the directory you specify. Graph files have a .PIC extension.

All Select All to list all the files in the current directory. To see a list of directories and files for a different drive, select the drive you want from the Files list box. Lotus-DM also lists any existing subdirectories. You can specify a subdirectory to display its files.

Select OK to display a list of files with corresponding information or select CANCEL to return to the worksheet. Press ENTER after you have finished viewing the list.

Page Setup

Select Page Setup to set the physical page format for printing during the current session. You can specify the left margin, the printed line width, the total number of lines you want on a page, and the total number of printed lines per page. You can also tell the printer to print a file with double spacing and/or to pause after it prints each page. To set the global printing format, select Worksheet Page Setup. When you select File Page Setup, you see the Page Setup dialog box with its default settings.



[NOTE] Help (F1) is unavailable from the Page Setup dialog box. To use the on-line Help system for this command, press ESC to exit the dialog box. Then press F1. Help is available through the Lotus-DM Help index.

Page Orientation The two icons showing pages at the top of the dialog box represent the "portrait" (up and down) orientation or the elongated "landscape" (sideways) orientation. Landscape orientation is not available with Page Setup.

Left Margin Specify the number of blank spaces to the left of the leftmost column. For example, enter 10 if you want a one-inch left margin and you are using a font with 10 characters per inch.

Printed Line Width Specify the number of characters you want to print on one line.

Total Lines Per Page Specify the total number of lines the paper you are using can handle. For example, 8.5 by 11-inch paper contains 66 lines at six lines per vertical inch in "portrait" mode.

Printed Lines Per Page Specify the total number of lines you want to print on one page. The total number of printed lines will be centered vertically on the page.

Double Space Select this option to print with double spacing.

Pause Between Pages Select this option to direct the printer to pause after printing each page so you can insert a new sheet of paper. This is the opposite of continuous-form printing.

Page Layout

Page Layout lets you assign headers, footers, and borders to your printed document in the format that you want. When you select Page Layout you see the Page Layout dialog box.

The image shows a dialog box titled "File Page Layout". It has two text input fields at the top: "Header:" and "Footer:". Below these are two main sections: "Format" and "Border". The "Format" section contains two radio buttons: "As-Displayed" (which is selected) and "Cell Formulas". Below these are two more radio buttons: "Formatted" and "Unformatted". The "Border" section contains two text input fields: "Column Range:" and "Row Range:". At the bottom of the dialog box are two buttons: "OK" and "CANCEL".

Header Specify a header in this field. Headers print as a line of text just above the top margin of every page. Use a number sign (#) to generate sequential page numbers starting with 1. Use an at sign (@) to produce the current date.

Footer Specify a footer in this field. Footers print as a line of text just above the bottom margin of every page. Use a number sign (#) to generate sequential page numbers starting with 1. Use an at sign (@) to produce the current date.

You can print the file as it is displayed on the screen or you can print the contents of each cell with related information, such as the cell address, format, formula, and protection status. These options are described as follows:

As Displayed Select this option to print the data as it appears on your screen. This means that results of formulas are printed as they are displayed on the screen, as are cell formats and column widths. Use As Displayed to restore standard printing after you have selected Cell Formulas. As Displayed is the initial setting.

Cell Formulas Select this option to print the contents of each nonblank cell in the print range, one cell per line. Each line contains the cell address, the cell format, the protection status (P or U), and the cell contents (number, formula, or label).

You can print a file in one of the two formats described as follows:

Formatted Select this option to print using the options selected in Page Layout and Page Setup. You can also use this option to restore standard printing after you have selected Unformatted. Formatted is the initial setting.

Unformatted Select this option to print without page breaks, headers, footers, and top and bottom margins. Use this option if you are printing to a text file and do not want to leave space in the file for page breaks.

Select a Border option to print specified rows or columns from a worksheet on every page. Lotus-DM prints the border above or to the left of the range you are printing, depending on whether you select rows or columns. Lotus-DM prints borders as wide or as long as the rows or columns in the print range. For example, if you specify D3..D15 as the print range and specify column A as the border, Lotus-DM prints the entries in cells A3 through A15 as the border. If you have previously specified borders, Lotus-DM highlights this range.

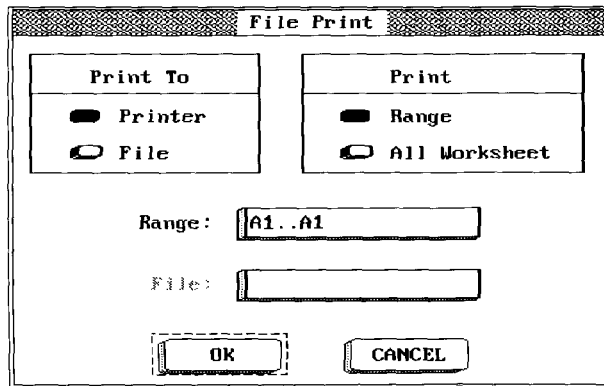
Column Range Specify a range that includes at least one cell in each of the columns you want Lotus-DM to print on each page. For example, to define columns A, B, and C as the border columns, specify the range as A1..C1. This option creates vertical headings that are repeated on the left side of each printed page. Use this option when the print range contains more columns of data than will fit across one page and you have labels or other information in a column or columns that will help identify data printed on subsequent pages.

Row Range Specify a range that includes at least one cell in each of the rows you want Lotus-DM to print on each page. For example, to define rows 1 and 2 as the border rows, specify the range as A1..A2. This option creates horizontal headings that are repeated across the top of each printed page. Use this option when the print range contains more rows of data than will fit down one page and you have labels or other information in a row or rows that will help identify data printed on subsequent pages.

Print

Print (CTRL-P) to produce a printed copy of the current worksheet file. You can print a worksheet file to a printer or to a print file on disk. Lotus-DM prints the worksheet according to the configuration determined by DeskMate Setup (F10). Use Page Setup and Page Layout to specify a format before printing. When you select Print, you see the Print Worksheet dialog box.

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You can print to either a printer or to a file.

Printer This option prints the current file to the printer specified in DeskMate Setup (F10). If you are using a laser printer, you are restricted to 130 columns. Daisy wheel printers with 10-point type are restricted to 80 columns. If the number of columns in the current worksheet exceeds the limit set by your printer, use File Xtract to divide your worksheet file into smaller files, then print them as separate files.

(NOTE) When you print a file to a printer, worksheet grid lines do not print.

File This option prints the current file to a print file on disk, giving it a .PRN extension. A **print** file differs from an ASCII file in that it contains embedded printer codes. You can then use a DOS command to print the file from another application.

When you select File, the File field becomes available and you can then specify the name of the print file in this field. If you specify an existing file, the File Already Exists dialog box displays. Select YES to replace the existing file, NO to specify another file name, or CANCEL to cancel the command.

You can create a standard ASCII text file (without printer codes) from a worksheet file if you precede this option with the following steps: select DeskMate Setup (F10); select the Printer option on the Options menu; select ASCII as the printer type; then turn Line feed feeder off by removing the x from the box.

Select either Range or All Worksheet. Range prints part of a worksheet and All Worksheet prints an entire worksheet.

Range Select this option to print a range. Then specify the range you want to print in the Range field.

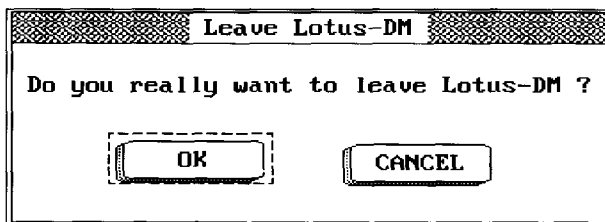
All Worksheet Select this option to print an entire worksheet.

Select OK to print the file or CANCEL to return to the worksheet without printing.

Exit

Select Exit (ESC) to exit Lotus-DM and return to either the DeskMate desktop or DOS, depending on where you started Lotus-DM. If you have made changes to the current worksheet, the Save Changes dialog box prompts you to save your changes. Select YES to save your current worksheet with changes, NO to retain the previous version on disk, or CANCEL to return to the current worksheet.

If you have not made any changes to the current worksheet you see the Leave Lotus-DM dialog box.



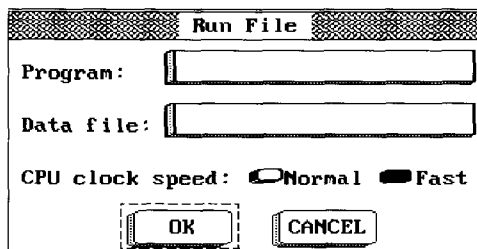
Select OK to exit Lotus-DM or CANCEL to return to the current worksheet.

If you are exiting a new, untitled file, the Save As dialog box displays, prompting you to assign a file name and an optional password to the file.

Run

Select Run to activate another DeskMate application directly from Lotus-DM, bypassing the DeskMate desktop.

If you have made changes to the current worksheet, the Save Changes dialog box displays, prompting you to save the current worksheet file before you exit Lotus-DM. If the worksheet is untitled, the File Save As dialog box displays, prompting you to enter a file name and an optional password. Select OK to see the Run File dialog box.



9-20 File Commands

Program Specify the name of the application you want to run in the Program field.

Data File If the application requires a **data file** (a file that the program manipulates), specify the name of the data file in the Data file field. Otherwise, DeskMate starts the application without loading a data file.

You can select one of two CPU clock speeds.

Normal Select this speed to run the program at the normal CPU speed.

Fast Select this speed to run the program at a higher CPU speed. The DeskMate default is Fast.

To return to Lotus-DM after running another DeskMate application, select File Run and specify Lotus-DM in the Program field. To return to a particular worksheet, specify the worksheet file name in the Data file field. Select OK to return to Lotus-DM or CANCEL to remain in the DeskMate application.

About Lotus-DM

Select About Lotus-DM to receive the following information about Lotus-DM:

- Product name
- Release number and date
- Copyright information

After viewing the information, select OK to return to the current worksheet.

Chapter 10

Edit Commands

The Edit pull-down menu contains both DeskMate options and Lotus-DM commands. The DeskMate options are Edit Cut, Edit Copy, Edit Clear, Edit Paste, and Edit Select all. The Lotus-DM commands are Edit Copy Range and Edit Move Range. All DeskMate options treat values from Lotus-DM worksheets as labels. Lotus-DM commands, on the other hand, treat labels as labels and values as values.

Edit Cut, Edit Copy, and Edit Paste allow you to cut or copy data from a Lotus-DM worksheet file to the DeskMate clipboard. You can then paste these labels into another DeskMate application. Edit Clear allows you to erase a selected range of data; Edit Select all allows you to select all the cell entries in a worksheet. Edit Copy Range and Edit Move Range allow you to copy or move data, including labels, values, and formulas within a worksheet. Table 10-1 lists the Edit commands.

Table 10-1 Edit Commands

Select	To
Cut	Remove data, excluding graphs, and place it on the DeskMate clipboard.
Copy	Copy data, including graphs, and place it on the DeskMate clipboard.
Paste	Retrieve data from the DeskMate clipboard and place it in a worksheet.
Clear	Permanently delete a selected range on a worksheet.
Select all	Select all the cells in a worksheet.
Copy Range	Copy data, including labels, values, and formulas, within a worksheet.
Move Range	Move data, including labels, values, and formulas, within a worksheet.

Cut

Select Cut (SHIFT-DEL) to remove data, excluding graphs, from a worksheet file and place it on the DeskMate clipboard as a label. You can then use Paste to put the contents of the clipboard into another DeskMate application.

The clipboard stores only the data from the last Cut or Edit Copy. Each time you use Cut or Edit Copy, the new data that you cut or copy replaces the previous contents of the clipboard. When you exit a worksheet, the clipboard retains its contents. You can then activate another DeskMate application and paste the contents of the clipboard into that application. When you turn off the computer, the clipboard contents are lost.

When you cut data from the worksheet, the remaining cells retain their current format, and cell addresses adjust accordingly, unless you specify otherwise.

Before using Cut, note the following restrictions:

- You cannot use Cut to move formulas or values. To move formulas or values within a worksheet, use Move Range. To move formulas or values to a separate Lotus-DM worksheet, use File Xtract.
- You cannot cut protected cells.
- You cannot cut entire rows or columns. To remove rows or columns from your worksheet, use Worksheet Insert/Delete.
- You cannot cut graphs.

Copy

Select Copy (CTRL-INS) to copy data or graphs from a worksheet file to the DeskMate clipboard. You can then use Edit Paste to retrieve data from the clipboard and paste it into another location within any DeskMate application. You can also use Edit Paste to retrieve a graph from the DeskMate clipboard into another DeskMate application, such as Draw.

The clipboard stores the data or graphs only from the last Edit Cut or Copy. Each time you use Edit Cut or Copy, the new data or graph that you cut or copy replaces the previous contents of the clipboard. When you exit a worksheet, the clipboard retains its contents. You can then activate another DeskMate application and paste the contents of the clipboard into that application. When you turn off the computer, the clipboard contents are lost.

NOTE You cannot copy formulas or values with Copy. To copy formulas or values within a worksheet, use Edit Copy Range. To copy formulas or values to a separate Lotus-DM worksheet, use File Xtract.

Paste

Select Paste (SHIFT-INS) to retrieve data from the clipboard and put it into another location or into another DeskMate application. The clipboard data is pasted as labels. Paste overwrites any existing data it overlaps in the worksheet area. You can select Paste only if you have data stored on the clipboard. If the clipboard is empty, the Paste command is unavailable and you cannot select it.

NOTE See your DeskMate manual for instructions on how to paste data from the clipboard into a particular DeskMate application.

The DeskMate clipboard stores only the most recent data from Edit Cut or Edit Copy. Each time you use Edit Cut or Edit Copy, the new data or graph that you cut or copy replaces the previous contents of the clipboard. For example, if you select Edit Cut while the cell pointer is on A1 and then you move the cell pointer to A3 and select Edit Cut, only the contents from A3 will be pasted the next time you select Edit Paste.

When you exit a worksheet, the clipboard retains its contents. You can then activate another DeskMate application and paste the contents of the clipboard into that application. When you turn off the computer, the clipboard contents are lost.

NOTE You cannot paste formulas or values with Paste. To cut and paste formulas or values within a worksheet, use Edit Copy Range. To cut and paste formulas or values to a separate Lotus-DM worksheet, use File Xtract.

Pasting Graphs To Other Applications

Use Edit Copy and Edit Paste to copy a Lotus-DM graph to another DeskMate application. Select Edit Copy to copy the graph to the DeskMate clipboard; then exit Lotus-DM and start the other application, or select File Run to bypass the DeskMate desktop and run the other application directly. You can then select Paste to retrieve the graph from the DeskMate clipboard and insert it into the file.

You can also paste graphs from other applications to Lotus-DM by using PrintGraph. See Chapter 15 in *Reference* for information on PrintGraph.

NOTE You cannot paste a Lotus-DM graph to another Lotus-DM file.

Clear

Select Clear (DEL) to delete a selected range of data permanently from a worksheet. You can use Clear to erase part of a worksheet, or if you precede Clear with Edit Select all, you can delete an entire worksheet. Use caution with this command; after you select Edit Clear, you cannot paste the data back into your worksheet.

Select All

Select Select all to highlight an entire worksheet. You can use Select all with Edit Clear to delete the entire contents of a worksheet. Select all is not available when a graph is displayed.

Copy Range

Select Copy Range (CTRL-C) to copy a range of data, including values and formulas, to another location within a worksheet. Copy Range copies single cell entries to other cells or ranges, ranges to other ranges, and formulas to other cells or ranges.

When you select Copy Range, you see the Copy From range and the To range in the edit panel. The current range displays in both fields.

You can erase each specified range in turn or cancel the procedure by pressing ESC. Press ESC to erase the To range. Then press ESC to move the cursor to the Copy From field. Press ESC again to erase the Copy From range. Press ESC a fourth time to cancel the procedure and return to the worksheet.

You can move the cursor between fields without erasing the specified ranges by pressing ← or →. Press ← to move the cursor from the first character in one field to the last character in the other. Press → to move the cursor from the last character in one field to the first character in the other.

Specify the Copy From or To range by one of the following methods.

- Type the range address in the Copy From or To field.
- Press ↓ and select a range in the worksheet.

When you see the full range addresses in both fields in the edit panel, press ENTER to copy the range.

CAUTION If you copy data to an area of the worksheet that already contains data, Lotus-DM replaces any data it overlaps with the copied data. Unless you want to replace the existing data, choose an empty area of the worksheet for the copy of the data.

Copying Formulas

When you copy formulas, Lotus-DM may or may not adjust cell addresses in the formulas, depending on the type of cell addresses. Lotus-DM recognizes three types of cell addresses: **relative cell addresses**, **absolute cell addresses**, and **mixed cell addresses**. Before you start copying formulas, be sure you understand the differences among these three.

Relative Cell Addresses

A cell address that has a positional meaning is a relative cell address. When you enter a cell address such as A6 or B45 in a formula, Lotus-DM does not record the address of the cell. Instead, it records the position of the cell in relation to the cell containing the formula. For example, in Figure 10-1, if the formula in cell B8 is +B4+B5+B6, Lotus-DM interprets this as "add the contents of the cell four rows up to the contents of the cell three rows up to the contents of the cell two rows up." If you copy the formula in Figure 10-1 from B8 to E8, the formula in E8 becomes +E4+E5+E6. The relative positions of the cells are maintained.

Before copying formula

B8		[C0] +B4+B5+B6										READY
		A	B	C	D	E	F	G	H			
1		APRIL EXPENSES				MAY EXPENSES						
2		=====										
3		RENT	\$400		RENT	\$400						
4		FOOD	\$260		FOOD	\$225						
5		AUTO	\$130		AUTO	\$85						
6		=====										
7			\$790									
8												
9												

After copying formula

E8		[C0] +E4+E5+E6										READY
		A	B	C	D	E	F	G	H			
1		APRIL EXPENSES				MAY EXPENSES						
2		=====										
3		RENT	\$400		RENT	\$400						
4		FOOD	\$260		FOOD	\$225						
5		AUTO	\$130		AUTO	\$85						
6		=====										
7			\$790									
8						\$710						
9												

Figure 10-1 Copying a relative cell address

Absolute Cell Addresses

A cell address that always refers to the same cell, even if you copy the formula that contains the cell address, is an absolute cell address. Suppose you want to copy the interest rate in F23 of Figure 10-2. If the formula in cell F26 is +D26*F23 and you copied the formula to F27, the copied formula would be +D27*F24. The result is that F24 does not contain the interest rate you need. To maintain the reference to a specific cell when copying formulas, you must use an absolute cell address. An absolute cell address includes a \$ before both the column letter and row number (\$F\$23). Figure 10-2 shows an absolute reference to the value of column F and row 23 of the worksheet. To make a range name absolute, precede it with a dollar sign (\$RATE).

Mixed Cell Addresses

An address that is part relative and part absolute is a mixed cell address. A dollar sign precedes the part of the address that is absolute—column letter or row number. For example, if the formula in B2 contains the cell address A\$1, and you copy the formula to cell G8, the cell address becomes F\$1.

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F26	+D26*\$F\$23							READY
	A	B	C	D	E	F	G	H
23				RATE:		14%		
24								
25				PRINCIPAL		INTEREST		
26				1000		140		
27				2000		280		
28				3000				
29				4000				
30								

Figure 10-2 Copying an Absolute Cell Address

Move Range

Select Move Range (CTRL-M) to transfer data, including values and formulas, to another location within a worksheet. You can use Move Range to rearrange data in a worksheet while maintaining all the functional relationships among the cells containing the data. Lotus-DM automatically adjusts formulas in the worksheet to account for moved data. If you move a cell containing a formula, the formula stays the same. If you move the contents of a cell that a formula references, Lotus-DM changes the formula to reflect the new cell location.

When you select Move Range, you see the Move From range and the To range in the edit panel. The current range displays in both fields. You can erase each specified range in turn or cancel the procedure by pressing ESC. Press ESC to erase the To range. Then press ESC to move the cursor to the Move From field. Press ESC again to erase the Move From range. Press ESC a fourth time to cancel the procedure and return to the worksheet.

You can move the cursor between fields without erasing the specified ranges by pressing ← or →. Press ← to move the cursor from the first character in one field to the last character in the other. Press → to move the cursor from the last character in one field to the first character in the other.

Specify the Move From or To range by one of the following methods.

- Type the range address in the Move From or To field.
- Press ↓ and select a range in the worksheet.

When you see the full range addresses in both fields in the edit panel, press ENTER to move the range.

CAUTION

If you move data to an area of the worksheet that already contains data, Lotus-DM replaces any data it overlaps with the moved data. Unless you want to replace the existing data, move your data to an empty area of the worksheet.

Chapter 11 ---

Worksheet Commands

The Worksheet commands control the display and organization of your work. They also change the Lotus-DM **global settings**, which Lotus-DM uses for the entire worksheet. The Worksheet commands perform the following tasks listed in Table 11-1.

Table 11-1 Worksheet commands

Select	To
Format	Set the way numeric values appear for the entire worksheet.
Label-Prefix	Set the alignment of labels for the entire worksheet.
Column	Set the global column width, set the width of a range of columns, reset columns to the global column width, and hide and redisplay columns.
Recalc	Control when, in what order, and how many times formulas in the worksheet are recalculated.
Insert/Delete	Insert or delete columns or rows.
Suppress Zero	Prevent the display of zero values in a worksheet.
Page Break	Create a page break in a worksheet.
Titles	Freeze rows and columns along the top and left edges of the worksheet so those rows and columns remain in view as you scroll through the worksheet.
Protection	Prevent changes from being made to particular cells.
Show Columns	Display an asterisk next to the column letter of a hidden column, displaying the data in the column.

(continued)

11-2 Worksheet Commands

Select	To
Grid	Display or hide the grid that defines cell boundaries for the entire worksheet.
Page Setup	Set the default printing formats, such as the left margin.
International	Set non-USA display formats for numeric punctuation, currency, date, and time.
Directory	Specify the directory that Lotus-DM automatically searches when you retrieve or save a file.
Update	Save the current global settings in the configuration file.
Status	Display information about memory use, global settings, circular references, and hardware configuration.

Worksheet Default Commands

Some Worksheet commands allow you to specify certain global settings that Lotus-DM uses when it starts the program. These settings are stored in the Lotus-DM configuration file, which is called LOTUS-DM.CNF. The commands that set these defaults for Lotus-DM are

- Grid
- Page Setup
- International
- Directory

You can establish your own defaults by selecting Worksheet Update after changing the settings of these commands. To view the current defaults, select Worksheet Status.

Format

Select Format to set the **global cell format** for the worksheet. This setting determines the way Lotus-DM displays values in the entire worksheet. Format does not affect cells formatted with Range Format. Lotus-DM initially displays values in the General format, which displays numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point.

Changing a cell's format changes the way Lotus-DM displays data in the cell, but it does not change the data itself. You can, for example, select a cell format that displays 45.123 as \$45, but Lotus-DM still stores the value as 45.123 and uses the decimal places in all calculations.

If a column is not wide enough to display the cell's formatted value, Lotus-DM fills the cell with asterisks. To remove the asterisks and display the number, widen the column with Worksheet Column. The column must be one character wider than the actual width of a formatted value.

When you select Format, you see the Worksheet Format dialog box.

The dialog box is titled "Worksheet Format". It contains several sections for selecting a format:

- Type**: A list of radio buttons for selecting a format type:
 - ☐ Fixed
 - ☐ Scientific
 - ☐ Currency
 - ☐ Percent
 - ☐ , (comma)
 - ☐ +/-
 - ☒ General
 - ☐ Date
 - ☐ Time
 - ☐ Text
 - ☐ Hidden
- Date**: A list of radio buttons for selecting a date format:
 - (D1) ☐ DD-MMM-YY
 - (D2) ☐ DD-MMM
 - (D3) ☐ MMM-YY
 - (D4) ☐ MM/DD/YY
 - (D5) ☐ MM/DD
- Time**: A list of radio buttons for selecting a time format:
 - (D6) ☐ HH:MM:SS AM/PM
 - (D7) ☐ HH:MM AM/PM
 - (D8) ☐ HH:MM:SS 24hr
 - (D9) ☐ HH:MM 24hr
- Decimal Places (0-15)**: A numeric input field with a spinner, currently set to 0.
- Buttons**: "OK" and "CANCEL" buttons at the bottom right.

The Date and Time options become available when you select either Date or Time. When you select Date or Time, the corresponding options box becomes available and you can specify a Date or Time format.

The Decimal Places field is unavailable until you select either Fixed, Scientific, Currency, , (comma), or Percent. If you select any one of these formats, you can then specify the number of decimal places you want. Fixed, Scientific, , (comma), and Percent have a default setting of 0; Currency has a default setting of 2.

The worksheet format options are described as follows:

Fixed Select Fixed to display numbers with up to 15 decimal places, a minus sign for negatives, and a leading zero for decimal values. For example, 12.389 displays as 12 in a Fixed format when you specify 0 decimal places.

11-4 Worksheet Commands

Scientific Select Scientific to display numbers in scientific (exponential) notation, with up to 15 decimal places in the mantissa and an exponent from -99 to +99. For example, 12.245 displays as 1.2E+01 in Scientific format with 1 decimal place. The value 124500000000 displays as 1.25E+11 when you specify 2 decimal places.

Currency Select Currency to display numbers with a currency symbol, thousands separators, up to 15 decimal places, parentheses for negatives, and a leading zero for decimal values. The currency symbol and thousands separators Lotus-DM uses depends on the symbol specified in the Currency Symbol field of Worksheet International. The initial Currency Symbol setting is \$. For example, -.256 displays as (\$0.3) when you specify 1 decimal place. The value 12 displays as \$12.00 when you specify 2 decimal places.

, (comma) Select , (comma) to display numbers with thousands separators. The default thousands separator is a comma (.). You can change the thousands separator by selecting Worksheet International. This option displays up to 15 decimal places, parentheses or a minus sign for negatives, and a leading zero for decimal values. For example, 8999 displays as 8,999.00 when you specify 2 decimal places and .532765 displays as 0.5 when you specify 1 decimal place.

General Select General to display numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point. For example, 1650.00 displays as 1650, and -12.42700 displays as -12.427. When the number of digits to the left of the decimal point exceeds the column width minus one, the number displays in scientific notation. For example, 130000000 displays as 1.3E+08. When the number of digits to the right of the decimal point exceeds the column width, the decimal number is truncated. For example, 123.456789 displays as 123.4567 (when the column width is 9). General is the initial global cell format for Lotus-DM worksheets.

+/- Select +/- to display a series of plus or minus signs or a period. The number of plus or minus signs equals the integer value of the entry. Plus signs indicate a positive value, minus signs indicate a negative value, and a period indicates a number between -1 and 1. (If the integer value of the entry exceeds the column width, Lotus-DM displays asterisks.) For example, 5.9 displays as +++++.

Percent Select Percent to display numbers as percentages (that is, multiplied by 100 and shown with a percent sign), with up to 15 decimal places. For example, 12.42738 displays as 1242.7% and -.0425 displays as -4.25%.

Date Select Date to display the date format that you want. The Date options you see depend on your Worksheet International settings. See "International" later in this chapter. Lotus-DM assigns a number for each date from January 1, 1900 (1) to December 31, 2099 (73050). Lotus-DM looks only at integers and ignores decimals. The date displays according to one of the five Date formats (D1 through D5): DD-MMM-YY, DD-MMM, MMM-YY, International long, and International short. Table 11-2 illustrates examples of the five Date formats and how they display.

Table 11-2 Date formats

Date Format	Cell Value	Displays as:
(D1) DD-MMM-YY	32734.11	14-Aug-89
(D2) DD-MMM	32734.99	14-Aug
(D3) MMM-YY	@DATE(89,8,14)	Aug-89
(D4) Intn'l long	@NOW	08/14/89 (if today is 8/14/89)
(D5) Intn'l short	@NOW	08/14 (if today is 8/14)

Time Select Time to display numbers in the Time format you select. The Time options you see depend on your Worksheet International settings. See "International" later in this chapter. Lotus-DM represents the time of day in decimal format: .000 = midnight, .5 = noon, .999988 = 11:59:59 PM. You can also enter the time in fraction format, based on a 24-hour clock. For example, 15/24 = 03:00 PM, and so on.

For positive numbers, Lotus-DM calculates the time number by adding the decimal part of the number to zero. For negative numbers, Lotus-DM calculates the time number by subtracting the decimal part of the number from one. The four Time formats (D6 through D9) are: HH:MM:SS (AM:PM), HH:MM (AM:PM), International long (24 hour), and International short (24 hour). Table 11-3 illustrates examples of the four time formats and how they display.

Table 11-3 Time formats

Time Format	Cell Value	Displays as:
(D6) HH:MM:SS	.5855	02:03:07 PM
(D7) HH:MM	-.5855	09:56 AM
(D8) Intn'l long	@TIME(14,3,7)	14:03:07
(D9) Intn'l short	@NOW	14:03 (if it is 2:03 PM)

Text Select Text to display formulas as you enter them, rather than as their result. Numbers in formulas display in General format.

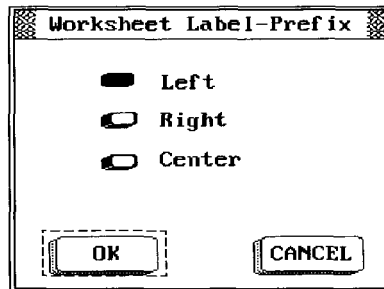
Hidden Select Hidden to make worksheet data invisible, though the data still exists. The data appears in the control panel unless the cells are protected. When you select Hidden, you can avoid accidentally writing over hidden data by protecting the worksheet with Worksheet Protection. If you need to enter data in the protected worksheet, you can then unprotect specific cells by turning off Range Protection. See "Protect" in Chapter 12 for information on range protection.

To see the current Worksheet Format settings for the current worksheet, select Worksheet Status.

Label-Prefix

Select Label-Prefix to left align, right align, or center labels for the entire worksheet. This command affects future entries only; it does not change the alignment of existing labels.

When you select Label-Prefix, you see the Worksheet Label-Prefix dialog box.



Labels that exceed the width of a column always appear left-aligned regardless of the global label alignment. When you increase the column width so that the entire label fits within the cell, the label appears aligned as specified by the label prefix.

You can override the global label alignment either by typing a label prefix when you enter or edit a label (' for left-aligned, ^ for centered, or " for right-aligned) or by using Range Label after you enter a label. See "Label" in Chapter 12 for information on Range Label.

To enter a label that begins with a number or another character that Lotus-DM treats as a value, precede the entry with a label prefix. For example, to enter the label 100 Main Street, type '100 Main Street.

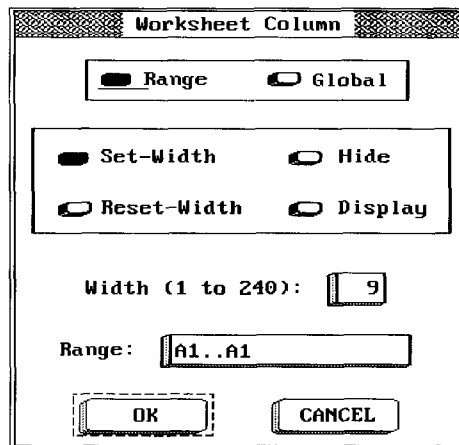
To view the global label prefix setting, select Worksheet Status.

Column

Select Column (CTRL-W) to adjust the global column width or the width of a range of columns, to reset columns to the global column width, and to hide and redisplay columns.

If a column is not wide enough to display the cell's formatted value, asterisks appear across the cell. To remove the asterisks and display the number, you must widen the column. A column must be one character wider than the actual width of a formatted value. The initial global column width is 9.

When you select Column, you see the Worksheet Column dialog box.



The dialog box is titled "Worksheet Column". It contains two rows of radio buttons. The first row has "Range" (selected) and "Global". The second row has "Set-Width" (selected), "Hide", "Reset-Width", and "Display". Below these is a text field labeled "Width (1 to 240):" with the value "9" entered. Below that is a text field labeled "Range:" with the value "A1..A1" entered. At the bottom are "OK" and "CANCEL" buttons.

Range Select Range to set the width of one or more columns in a worksheet, or to hide or display one or more columns in a worksheet. Then specify a range name or coordinates in the Range field.

Global Select Global to set the width for all the columns in the worksheet. Global does not override any columns previously set with the Worksheet Column Range option.

Set-Width Select Set-Width to adjust the width of the specified column(s). Specify the width of the column, an integer from 1 to 240, in Column Width. After you set the width of a column, Lotus-DM displays the width in brackets in the edit panel whenever the cell pointer is in that column.

Reset-Width Select Reset-Width to reset the adjusted column back to the global column width.

Hide Select Hide to prevent one or more columns from being displayed or printed. The column still exists, but does not display. For example, if you have data in columns A through F and you want to hide column D, the column letters will display as A, B, C, E, and F. You can temporarily display hidden columns by selecting Worksheet Show Columns.

Display Select Display to redisplay one or more hidden columns. This option removes the Hide attribute from the range of columns that you specify in the Range field.

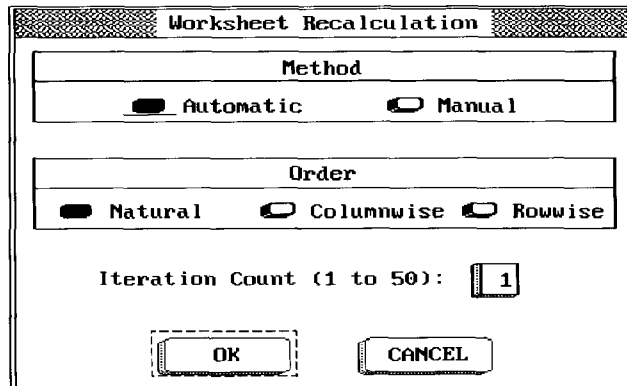
Width Specify an integer from 1 to 240 as the new column width.

Select OK to adjust the column width or CANCEL to return to the worksheet.

Recalc

Select Recalc to control when, in what order, and how many times Lotus-DM recalculates worksheet formulas. You can view the current Recalc settings by selecting Worksheet Status.

When you select Recalc, you see the Worksheet Recalculation dialog box.



The recalculation option you select remains in effect until you end the Lotus-DM session or retrieve another file with a different recalculation setting.

Select a method Lotus-DM uses when it recalculates formulas. Automatic is the initial setting.

Automatic Select Automatic to recalculate any formulas affected by a change to a cell's contents automatically. The CALC status indicator displays when Lotus-DM performs calculations. Automatic recalculation occurs in the background, so you can continue to work while Lotus-DM performs the recalculation.

Manual Select Manual to recalculate formulas only when you press CALC (CTRL-F9), the function key for calculation. If you select Manual, Lotus-DM displays the CALC status indicator on the edit panel if any entries have changed since the last recalculation. Manual recalculation occurs in the foreground, so you must wait for Lotus-DM to complete it before you can continue with your work.

Select the order in which Lotus-DM recalculates formulas, whether the method is Manual or Automatic. Natural is the initial setting.

Natural Select Natural to recalculate all values on which a particular formula depends before calculating the particular formula. For example, if the formula in cell B7 depends on the formula in cell C28, Lotus-DM recalculates the formula in C28 before it calculates the formula in B7.

Columnwise Select Columnwise to control the recalculation order of columns. Columnwise starts recalculating at the top of column A and proceeds to the bottom of the column A. Then it recalculate columns B, C, and so on.

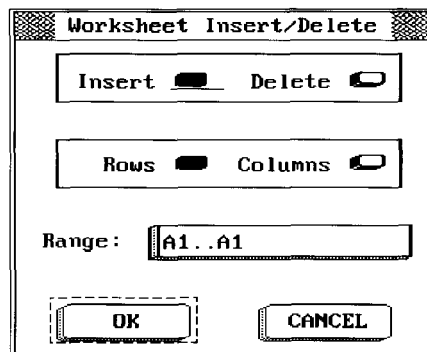
Rowwise Select Rowwise to control the recalculation order of rows. Rowwise starts recalculating at the beginning of row 1 and proceeds to the end of the row 1. Then it recalculates rows 2, 3, and so on.

Iteration Count Specify a number from 1 to 50 to indicate the number of calculation passes. The initial setting is 1. Lotus-DM uses the iteration count setting only in two instances: when the recalculation order is Columnwise or Rowwise, or when the recalculation order is Natural and a circular reference exists.

Insert/Delete

Select Insert/Delete to insert blank columns or rows, or to remove existing rows or columns in your worksheet. The existing column letters and row numbers are adjusted accordingly. When a column or row insertion or deletion moves a cell used in a formula, Lotus-DM adjusts the cell address in the formula. For example, if you enter the formula $+E6*100$ and then insert two columns to the left of column E, Lotus-DM changes the formula to $+G6*100$. When an inserted column or row moves the first or last cell of a named range, Lotus-DM redefines the named range accordingly.

When you select Insert/Delete, you see the Worksheet Insert/Delete dialog box.



Insert Select Insert to insert one or more blank columns or rows to the worksheet. Lotus-DM inserts columns or rows at the location of the cell pointer.

Delete Select Delete to remove one or more columns or rows from the worksheet. To erase only the data in a range, see "Erase" in Chapter 12.

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Columns Select Columns to insert or delete the columns in the worksheet. For example, if you select Delete Columns and specify B3..B5 for Range, column B will be deleted from the entire worksheet.

Rows Select Rows to insert or delete rows in the worksheet. For example, if you select Insert Row and specify A5..A6 for Range, two rows will be inserted at row 5 and row 5 becomes row 7.

Range Specify a range that indicates at least one cell in each of the columns or rows you want to insert or delete. The first cell address in the range marks the insertion or deletion point for a row or column. Range displays the current range address of the cell pointer. You can overstrike this range with a range of your choice.

Please note the following restrictions regarding the range you specify:

- If you delete an entire range whose address is used in a formula, Lotus-DM replaces the address in the formula with the value ERR. If you delete an entire named range whose name is used in a formula, Lotus-DM retains the range name in the formula; therefore, the formula evaluates to ERR until you redefine the range name.
- The range must not include more columns or rows than the number of blank, unformatted columns or rows at the right or bottom edge of the worksheet.
- Before you use Insert/Delete to delete columns or rows, be sure those columns or rows do not contain important data. It is a good idea to save the worksheet before deleting columns or rows, in case of error.

Suppress Zero

Select Suppress Zero (CTRL-Z) to prevent the display of zero values in a worksheet. This command also affects cells with formulas and @functions that evaluate to zero. When you select Suppress Zero, Lotus-DM immediately suppresses all zero values.

When Suppress Zero is activated, Lotus-DM displays a checkmark beside the Suppress Zero option on the Worksheet pull-down menu. To redisplay zero values, select Suppress Zero again.

Page Break

Select Page Break to create a page break into a worksheet. Lotus-DM inserts the page break before the row containing the current cell. When you print the worksheet, a new page begins at the page break.

To insert a page break, position the cell pointer in the first column of the range you want to print on a new page. For example, if the print range is C3..N28 and you want the new page to start at row 16, position the cell pointer in C16. Then select Page Break.

Lotus-DM inserts a row that contains the page break symbol, a double colon (::), in the current cell, and adjusts the cell and range addresses in formulas and redefines named ranges.

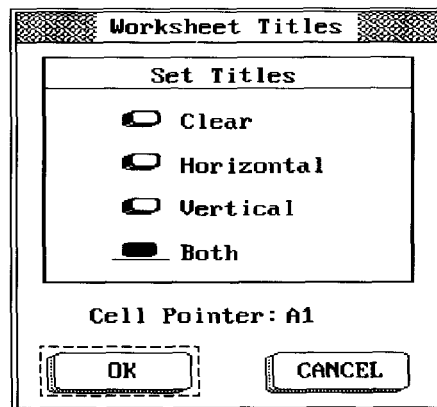
Do not enter any data in the same row as the page-break symbol. Except for the page-break symbol, Lotus-DM ignores this row when printing.

To remove a page break symbol, either use Range Erase or replace the symbol with another entry.

Titles

Select Titles to freeze one or more rows or columns as titles along the top and left edges of the worksheet. The titles remain in view as you move to another part of the worksheet. Before you select Titles, position the cell pointer one row below the rows you want to freeze, and one column to the right of the columns you want to freeze.

When you select Titles, you see the Worksheet Titles dialog box.



Clear Select Clear to unfreeze all existing titles.

Horizontal Select Horizontal to freeze only the rows above the cell pointer.

Vertical Select Vertical to freeze only the columns to the left of the cell pointer.

Both Select Both to freeze the rows above the cell pointer and the columns to the left of the cell pointer.

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Cell Pointer The Cell Pointer field identifies the cell pointer's location. Lotus-DM freezes cells in columns to the left and above the cell pointer's location.

(NOTE) See Figure 17-10 in Chapter 17 for an example of Titles.

You cannot use the pointer-movement keys to move the cell pointer into the area you indicated as a title.

Protection

Select Protection to turn global protection on or off. When Protection is on you cannot enter or edit data, insert or delete rows and columns, or use Range Justify. Lotus-DM indicates Protection with a check mark beside Protection on the Worksheet pull-down menu. You can override Protection for specific ranges by turning Range Protection off. See "Protect" in Chapter 12 for more information.

The initial Protection setting is off, which means you can enter or edit data in any cell in the worksheet. When the cell pointer is on a protected cell, Lotus-DM displays PR in the edit panel.

To see the Protection setting for the entire worksheet, select Worksheet Status.

Show Columns

Select Show Columns to temporarily display all hidden columns. Hidden columns display with an asterisk preceding their respective column letters. Select Show Columns again to restore the displayed columns to their hidden state. Lotus-DM indicates that hidden columns are being displayed by displaying a check mark beside Show Columns on the Worksheet pull-down menu. Select Worksheet Column, then select Display to show columns.

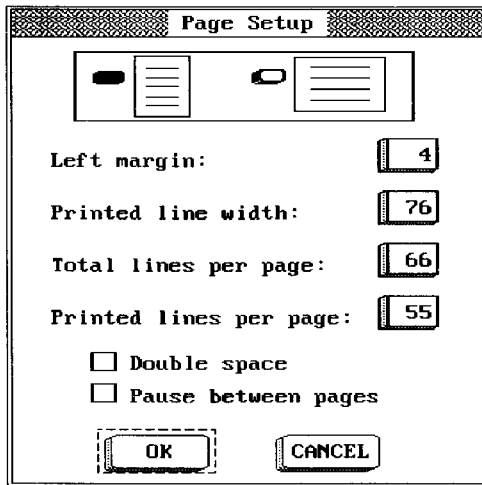
Grid

Select Grid (CTRL-G) to remove the grid lines that define cell boundaries on the screen. Lotus-DM indicates that Grid is selected by displaying a check mark beside Grid on the Worksheet pull-down menu. To redisplay the grid lines, select Grid again. The grid lines do not show when you print a worksheet file.

Page Setup

Select Page Setup to set global options that determine the physical page layout of files for printing. Page Setup allows you to set the left margin, printed line width, total lines per page, and printed lines per page. You can also tell the printer to print the file with double spacing and/or to pause after it prints each page. To specify one of these options for the current session only, use File Page Setup.

When you select Page Setup, you see the Page Setup dialog box.



NOTE Help (F1) is unavailable from the Page Setup dialog box. To use the on-line Help system for this command, press ESC to exit the dialog box. Then press F1. Help is available through the Lotus-DM Help index.

Page Orientation The two icons showing pages at the top of the dialog box represent the "portrait" (up and down) orientation or the elongated "landscape" (sideways) orientation. Landscape orientation is not available with Page Setup.

Left Margin Specify the number of blank spaces to the left of the leftmost column in the Left margin field. For example, enter 10 if you want a one-inch left margin and you are using a font that prints 10 characters per inch.

Printed Line Width Specify the number of characters you want to print across a line.

Total Lines Per Page Specify the total number of lines the paper you are using can handle. For example, 8-1/2 by 11-inch paper contains 66 lines at 6 lines per vertical inch in "portrait" mode.

Printed Lines Per Page Specify the total number of lines you want to print on one page. The total number of printed lines will be centered vertically on the page.

Double Space Select this option to print with double spacing.

Pause Between Pages Select this option to direct the printer to pause after printing each page so you can insert a new sheet of paper. Pause between pages is the opposite of continuous-form printing.

To establish new default page settings, you can update the Lotus-DM configuration file (LOTUS-DM.CNF) by selecting Worksheet Update.

International

Select International to set non-USA display formats for numeric punctuation, currency, date, and time. This setting determines the way Lotus-DM displays formats in the Worksheet Format dialog box. For example, if you select DD.MM.YY as the International Date Display, the long and short versions of DD.MM.YY appear in the Date options box of Worksheet Format. If you selected DD/MM/YY as the International Date Display, the long and short versions of DD/MM/YY display in Worksheet Format.

When you select International, Lotus-DM displays the Worksheet International Settings dialog box.

Worksheet International Settings							
Punctuation for Separators (Decimal Arguments Thousands)							
<input checked="" type="radio"/> (.,.)	<input type="radio"/> (.,)	<input type="radio"/> (.,.)	<input type="radio"/> (.,)				
<input type="radio"/> (.,.)	<input type="radio"/> (.,)	<input type="radio"/> (.,.)	<input type="radio"/> (.,)				
Currency Symbol: <input type="text" value="\$"/>		<input checked="" type="radio"/> Prefix <input type="radio"/> Suffix					
International Date Display				International Time Display			
long		short		long		short	
<input checked="" type="radio"/> MM/DD/YY		<input type="radio"/> MM/DD		<input checked="" type="radio"/> HH:MM:SS	24hr	<input type="radio"/> HH:MM	24hr
<input type="radio"/> DD/MM/YY		<input type="radio"/> DD/MM		<input type="radio"/> HH.MM.SS	24hr	<input type="radio"/> HH.MM	24hr
<input type="radio"/> DD.MM.YY		<input type="radio"/> DD.MM		<input type="radio"/> HH,MM,SS	24hr	<input type="radio"/> HH,MM	24hr
<input type="radio"/> YY-MM-DD		<input type="radio"/> MM-DD		<input type="radio"/> HHhMMmSSs	24hr	<input type="radio"/> HHhMMm	24hr
<input type="button" value="OK"/>				<input type="button" value="CANCEL"/>			

Punctuation for Separators Select an option to specify the characters Lotus-DM uses as the decimal point and thousands separator for numbers, and the argument separator for @functions. You can choose from eight combinations, listed in order of decimal point, argument separator, and thousands separator. The initial setting is (.,,).

International Currency Symbol Specify the currency symbol you want Lotus-DM to display in cells formatted as Currency. The currency symbol can contain up to 15 characters, including any character that is common to both the LICS and ASCII (Code Page 437) character sets. See your DOS manual for more information on code pages; see Appendix B for more information on character sets. The initial setting is \$.

Prefix Select Prefix if you want the currency symbol to precede the value. Prefix is the initial setting.

Suffix Select Suffix if you want the currency symbol to display after the value.

International Date Display Select an option to set the International Date format Lotus-DM uses for cells formatted as D4 (Long International) or D5 (Short International). Long International displays month, day, and year; Short International displays only month and day.

The option you select determines how Date settings D4 (Intn'l long) and D5 (Intn'l short) in the Worksheet Format and Range Format dialog boxes display. See "Format" earlier in this chapter and in Chapter 12 for more information on Date formats.

The option you select also affects how you enter the argument for @DATEVALUE. If you use this @function with either of the international formats, you must use the form specified here. See "@DATEVALUE" in Chapter 17 for more information.

International Time Display Select an option to set the International Time format Lotus-DM uses for cells formatted as D8 (Long International) or D9 (Short International). Long International displays hours, minutes, and seconds; Short International displays only hours and minutes.

The option you select determines how Time settings D8 (Intn'l long) and D9 (Intn'l short) in the Worksheet Format and Range Format dialog boxes display. See "Format" earlier in this chapter and in Chapter 12 for more information on Time formats.

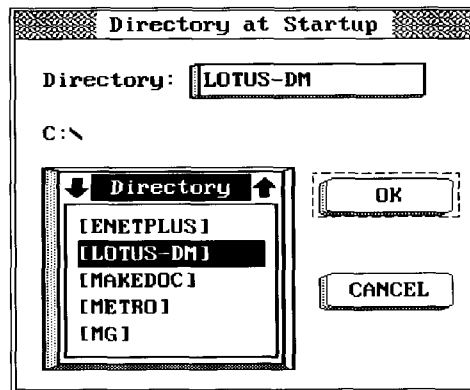
The option you select also affects how you enter the argument for @TIMEVALUE. If you use either of the international formats, you must use the form specified here. See "@TIMEVALUE" in Chapter 17 for more information.

To establish these International settings as the default settings, update the Lotus-DM configuration file (LOTUS-DM.CNF) by selecting Worksheet Update.

Directory

Select Directory to change the Lotus-DM default directory. Lotus-DM uses this directory every time you save, read, or list files. You can always override the directory by typing a different directory path when specifying a file with the File commands. To change the directory for the current session only, use File Directory.

When you select Directory, you see the Directory at Startup dialog box.



Directory You can select a directory or subdirectory from the Directory list box or specify the directory or subdirectory in the Directory field. The current path name displays just below this field.

Select OK to change the directory or CANCEL to retain the current directory and return to the current worksheet. When you finish, select OK to return to the current worksheet or CANCEL to retain the current directory and return to the current worksheet.

To update the Lotus-DM configuration file (LOTUS-DM.CNF) so Lotus-DM uses the new default directory setting in future sessions, use Worksheet Update.

Update

Select Update to update the Lotus-DM configuration file (LOTUS-DM.CNF) with the settings you established with worksheet default commands. These commands determine default settings that are loaded when you start Lotus-DM. The Worksheet default commands are:

- Grid
- Page Setup
- International
- Directory

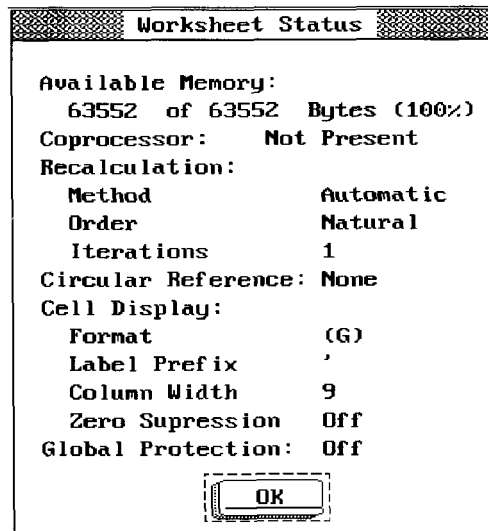
The LOTUS-DM.CNF file resides in the directory that contains the Lotus-DM program files. Lotus-DM will now use these settings automatically, until you change them by selecting Worksheet Update again.

NOTE After starting Lotus-DM from a removable disk, make sure that the disk containing LOTUS-DM.CNF is in the drive before you execute the Update command and that you remove the disk's write-protect tab. If Lotus-DM cannot find the configuration file in the drive from which it was started, it creates a new file on the disk currently in that drive.

Status

Select Status to check the current worksheet's global settings, to track down circular references, and to check available memory before using File Combine or when the MEM indicator is displayed.

When you select Status, you see the Worksheet Status dialog box.



When you finish viewing the status, select OK to return to the worksheet.

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NOTE

The status box displays only one circular reference at a time. If you correct the displayed circular reference and the CIRC indicator still appears in the status line, select Status again to locate the next circular reference.

Chapter 12 ---

Range Commands

The Range commands let you work with ranges. A **range** is any rectangular block of cells—a single cell, a row or column, parts of several rows and columns, or the entire worksheet. Table 12-1 lists the Range commands.

Table 12-1 Range commands

Select	To
Format	Change the display of data in a range without affecting the data's values.
Label	Left-align, right-align, or center labels in a range.
Erase	Erase data in a range.
Value	Copy a range of data, replacing any copied formulas with their current values.
Justify	Rearrange a column of labels so the labels fit within a specified width.
Name	Create, delete, and undefine range names.
Name Labels	Assign range names to single-cell ranges, using the labels in adjacent cells as the range names.
Transpose	Copy a range of data, transposing the layout of the copied data.
Protect/Unprotect	Prevent or permit changes to cells in a range when the worksheet the range occupies is globally protected.

Format

Select Format (CTRL-F) to redefine the **format**, or the way Lotus-DM displays values, for a specific range of cells. Format allows you to override the global format settings defined with Worksheet Format, which affect the entire worksheet. Lotus-DM initially displays data in the General format, which displays numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point.

Changing a cell's format changes the way Lotus-DM displays a value in the cell, but it does not change the value itself. You can, for example, choose a cell format to display 45.123 as \$45; Lotus-DM still stores the cell's value as 45.123 and uses the entire number in all calculations.

Lotus-DM displays a format indicator in the edit panel to describe the format of a selected cell. Table 12-2 displays these cell format indicators.

Table 12-2 Cell format indicators

Indicator	Format
C0 to C15	Currency, 0 to 15 decimal places
F0 to F15	Fixed, 0 to 15 decimal places
G	General, a label or a blank cell
P0 to P15	Percent, 0 to 15 decimal places
S0 to S1	Scientific, 0 to 15 places
,0 to ,15	, (comma), 0 to 15 decimal places
+/-	+ for positive values, - for negative values
D1	DD-MMM-YY
D2	DD-MMM
D3	MMM-YY
D4	MM/DD/YY, DD/MM/YY, DD.MM.YY, or YY-MM-DD
D5	MM/DD, DD/MM, DD.MM, or MM-DD
D6	HH:MM:SS AM/PM
D7	HH:MM AM/PM
D8	HH:MM:SS (24 hour), HH.MM.SS (24 hour), HH,MM,SS (24 hour), or HHhMMmSSs (display varies according to the Worksheet International Time setting)
D9	HH:MM (24 hour), HH.MM (24 hour), HH,MM, or HHhMMm (display varies according to the Worksheet International Date setting)
T	Text format
H	Hidden format

Using Formatted Ranges

When changing the format of a cell or range containing numbers, keep these guidelines in mind:

- If a cell is too narrow to display a cell's formatted value, Lotus-DM either displays the value in scientific notation, rounds the value, or fills the cell with asterisks, depending on the cell format. The column must be one character wider than the width of the formatted value to display fully.
- Whether Lotus-DM displays a number in scientific notation, rounds it, or represents it as asterisks in a cell, Lotus-DM always stores the full value of the cell and uses the full value in all relevant calculations.
- When you move data from a formatted range, Lotus-DM moves the format with the data. The original range reverts to the default cell format. When you copy data in a formatted range, Lotus-DM copies the cell format with the data.

Selecting Format

When you select Format, you see the Range Format dialog box.

The Range Format dialog box is titled "Range Format". It contains several sections for selecting a format:

- Type:** A list of radio buttons for selecting a number format: Fixed, Scientific, Currency, Percent, , (comma), +/-, General, Date, Time, Text, Hidden, and Default. The "Default" option is currently selected.
- Date:** A list of radio buttons for selecting a date format: (D1) DD-MMM-YY, (D2) DD-MMM, (D3) MMM-YY, (D4) MM/DD/YY, and (D5) MM/DD. The (D1) option is currently selected.
- Time:** A list of radio buttons for selecting a time format: (D6) HH:MM:SS AM/PM, (D7) HH:MM AM/PM, (D8) HH:MM:SS AM:PM, and (D9) HH:MM AM:PM. The (D6) option is currently selected.
- Decimal Places (0-15):** A numeric input field showing the value 0.
- Range:** A text input field showing the range "a1..n8".
- Buttons:** "OK" and "CANCEL" buttons at the bottom right.

The Date and Time options become available when you select either Date or Time. When you select Date or Time, the corresponding options box becomes available and you can specify a Date or Time format.

12-4 Range Commands

The Decimal Places field becomes available when you select either Fixed, Scientific, Currency, , (comma), or Percent. When you select any one of these formats, you can specify the number of decimal places you want. The default setting is 0, except for Currency, which has a default decimal setting of 2.

The format options are described as follows.

Fixed Select Fixed to display numbers with up to 15 decimal places, a minus sign for negatives, and a leading zero for decimal values. For example, 12.389 displays as 12 in Fixed format when you specify 0 decimal places.

Scientific Select Scientific to display numbers in scientific (exponential) notation, with up to 15 decimal places in the mantissa and an exponent from -99 to +99. For example, 12.245 displays as 1.2E+01 in Scientific format with 1 decimal place. The value 124500000000 displays as 1.25E+11 when you specify 2 decimal places.

Currency Select Currency to display numbers with a currency symbol, thousands separators, up to 15 decimal places, parentheses or a minus sign for negatives, and a leading zero for decimal values. The currency symbol and thousands separators Lotus-DM uses depends on the symbol specified in the Currency Symbol field of Worksheet International. The initial Currency Symbol setting is \$. For example, -.256 displays as (\$0.3) when you specify 1 decimal place. The value 12 displays as \$12.00 when you specify 2 decimal places.

, (comma) Select , (comma) to display numbers with thousands separators, up to 15 decimal places, parentheses or a minus sign for negatives, and a leading zero for decimal values. For example, 8999 displays as 8,999.00 when you specify 2 decimal places and use a comma (the default) for the thousands separator. See "International" in Chapter 11 for information on setting the default thousands separator.

General Select General to display numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point. For example, 1650.00 displays as 1650, and -12.42700 displays as -12.427. When the number of digits to the left of the decimal point exceeds the column width minus one, the number displays in scientific notation. For example, 130000000 displays as 1.3E+11 (when the column width is 12). When the number of digits to the right of the decimal point exceeds the column width, the decimal number is truncated. For example, 123.456789 displays as 123.4567 (when the column width is 9). General is the initial global cell format for Lotus-DM worksheets.

+/- Select +/- to display a series of plus or minus signs or a period. The number of plus or minus signs equals the integer value of the entry. Plus signs indicate a positive value, minus signs indicate a negative value, and a period indicates a number between -1 and 1. (If the integer value of the entry exceeds the column width, Lotus-DM displays asterisks.) For example, 5.9 displays as +++++.

Percent Select Percent to display numbers as percentages (that is, multiplied by 100 and shown with a percent sign), with up to 15 decimal places. For example, 12.42738 displays as 1242.7% and -.0425 displays as -4.25%.

Date Select Date to display the date format that you want. The Date options you see depend on your Worksheet International settings. See "International" in Chapter 11 for more information. Lotus-DM assigns a number for each date from January 1, 1900 (1) to December 31, 2099 (73050). Lotus-DM looks only at integers and ignores decimals. The date displays according to one of the five Date formats (D1 through D5): DD-MMM-YY, DD-MMM, MMM-YY, International long, and International short. Table 12-3 illustrates examples of the five date formats and how they display.

Table 12-3 Date formats

Date format	Edit panel display	Cell display
(D1) DD-MMM-YY	(D1) 32734.11	14-Aug-89
(D2) DD-MMM	(D2) 32734.99	14-Aug
(D3) MMM-YY	(D3) @DATE(89,8,14)	Aug-89
(D4) Intn'l long	(D4) @NOW	08/14/89 (if today is 8/14/89)
(D5) Intn'l short	(D5) @NOW	08/14 (if today is 8/14)

Time Select Time to display numbers in the Time format you select. The Time options you see depend on your Worksheet International settings. See "International" in Chapter 11 for more information. Lotus-DM represents the time of day in decimal format: .000 = midnight, .5 = noon, .99988 = 11:59 PM. You can also enter a time in fraction format, based on a 24-hour clock. For example, 15/24 = 03:00 PM, and so on.

For positive numbers, Lotus-DM calculates the time number by adding the decimal part of the number to zero. For negative numbers, Lotus-DM calculates the time number by subtracting the decimal part of the number from one. The four Time formats (D6 through D9) are: HH:MM:SS (AM/PM), HH:MM (AM/PM), International long (24 hour), and International short (24 hour). Table 12-4 illustrates examples of the four time formats and how they display.

Table 12-4 Time formats

Time format	Edit panel display	Cell display
(D6) HH:MM:SS	(D6) .5855	02:03:07 PM
(D7) HH:MM	(D7) -.5855	09:56 AM
(D8) Intn'l long	(D8) @TIME(14,3,7)	14:03:07
(D9) Intn'l short	(D9) @NOW	14:03 (if it is 2:03 PM)

Text Select Text to display formulas as you enter them, rather than as their result. Numbers in formulas display in General format. For example, 165.00 displays as 165 and +FIRST&LAST displays as +FIRST&LAST.

12-6 Range Commands

Hidden Select Hidden to make worksheet data invisible, though the data still exists. The data appears in the control panel unless the cells are protected. When you select Hidden, you can avoid accidentally writing over hidden data by protecting the worksheet with Worksheet Protection. If you need to enter data in the protected worksheet, you can then unprotect specific cells by turning off Range Protection. See "Protect" later in this chapter for information on range protection.

Default Select Default to restore the default format specified in Worksheet Format to a specified range. Default redisplay all or part of a Hidden range of cells.

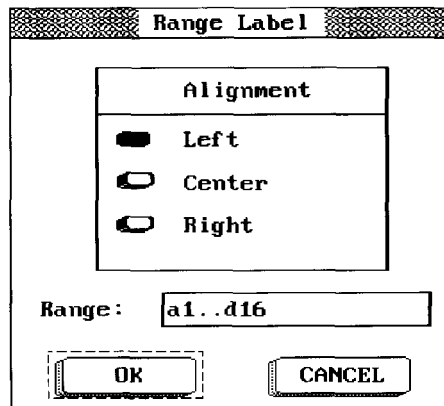
Select OK to format the range. Select CANCEL to return to the worksheet.

Label

Select Label to change the alignment of labels in a range. When you change a label's alignment, you also change its label prefix (' for left-aligned, " for right-aligned, or ^ for centered).

Labels that exceed the width of a column appear left-aligned no matter what label prefix they have. However, Label has no effect on values, which are always right-aligned.

When you select Label, you see the Range Label dialog box.



Select Left, Center, or Right. Specify the address of the range containing the labels you want to justify in the Range field.

Select OK to change the alignment of labels in a range, or CANCEL to return to the worksheet without setting an alignment.

Erase

Select Erase to remove data permanently from the current range but leave the format(s) and protection status for the range intact.

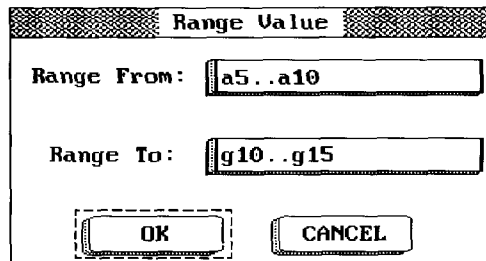
To erase the contents of protected cells you must first change their protection status, either globally with Worksheet Protection or individually with Range Unprotect.

CAUTION Erase removes data instantaneously and permanently. Make sure you have selected the correct range whose contents you want to delete before you select Erase.

Value

Select Value to copy a source range of data to a destination range. Value differs from Edit Copy Range in that Value copies the current value of a formula, not the formula itself, to the destination range. For example, if a cell in the source range contains the formula $+A5*B6$, which evaluates to 34, Value copies 34, not the formula $+A5*B6$ to the destination range. Each cell in the destination range (the To range) takes on the cell format and protection status of its source range (the From) range.

When you select Value, you see the Range Value dialog box.



Specify the source range, or the range containing the values you want to copy, in the Range From field. Specify the destination range, or the range to where you want to copy the values, in the Range To field.

CAUTION If you specify a Range To address that already contains data, Lotus-DM writes over the existing data. Formulas that acted on the previous contents of the Range To address now act on the new data.

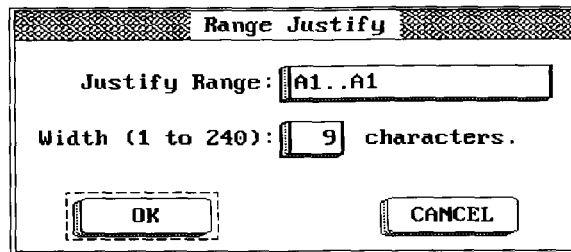
Select OK to copy the range, or CANCEL to return to the worksheet without copying the range.

Justify

Select Justify to rearrange (justify) a column of long labels so the labels fit within a width you specify. Use Justify to equalize the length of a series of long labels, to fit text into a specific width for viewing or printing, to create a paragraph in a worksheet, or to rejustify an edited paragraph. Lotus-DM left-aligns long labels and assigns the entire column of justified labels the format and protection status of the first cell in the column. Justify justifies only one column of labels at a time.

To use this command, global protection must be off.

When you select Justify, you see the Range Justify dialog box.



Justify Range Specify a one-column justify range in the Justify Range field. The **justify range** is the range that will contain the justified labels. The top cell in the justify range must be the same cell as the top cell of the original column of labels. The justify range must contain only one column, and as many rows as you want for the length of the justified labels.

When Lotus-DM justifies, it wraps text into the next row of the column when the label exceeds the width of the cell, and uses as many rows as necessary to accommodate the justified labels. If you specify fewer rows than necessary in the justify range, Lotus-DM justifies as many long labels as fit, then truncates the rest.

If you do not know how many rows Lotus-DM needs to accommodate the justified labels, specify a single-cell range. If the justified labels occupy more rows than the original labels, Lotus-DM moves subsequent data in the column (data below the justified labels) down. If the justified labels occupy fewer rows than the original labels, Lotus-DM moves subsequent data in the column (data below the justified labels) up. Use a single-cell range as a justify range only if cells below the labels you are justifying are blank or if movement of data below the labels is acceptable.

Width Specify the width of the justify range column in the Width field, up to a maximum of 240 characters. If you specified a single-cell justify range, specify a wide column to have fewer rows of justified labels or specify a narrow column to have more rows of justified labels.

Select OK to justify the column of long labels according to your specifications, or CANCEL to return to the worksheet without justifying.

Name

Select Name (CTRL-N) to create or delete a named range, view a listing of all existing named ranges, or create a table that maintains a list of all current named ranges.

Range names are names up to 15 characters long that you use instead of cell or range addresses in commands and formulas. For example, if you assign the name SALES to A5..D9, you can total the numbers in A5..D9 with the formula @SUM(SALES). Range names are generally easier to remember and can be typed more quickly than the addresses to which they correspond.

Using Named Ranges in Formulas

When you copy formulas that contain range names, Lotus-DM treats the range names as relative references and replaces the old addresses in the copied formulas with the new addresses. For example, suppose you enter the formula @SUM(TOTALS) in A10, where TOTALS is the name for A1..A5, and then copy the formula to C10. The copied formula in C10 reads @SUM(C1..C5). To have Lotus-DM treat a range name in a formula as an absolute reference, precede the range name with a \$ (dollar sign). For example, if you enter @SUM(\$TOTALS) in A10 and then copy it to C10, the formula in C10 reads @SUM(\$TOTALS), where TOTALS still refers to A1..A5.

Lotus-DM automatically replaces a range address in a formula that refers to the range you named with the range name. For example, suppose the formula @SUM(A1..A5) exists when you assign the name TOTALS to A1..A5. Lotus-DM automatically changes @SUM(A1..A5) to @SUM(TOTALS).

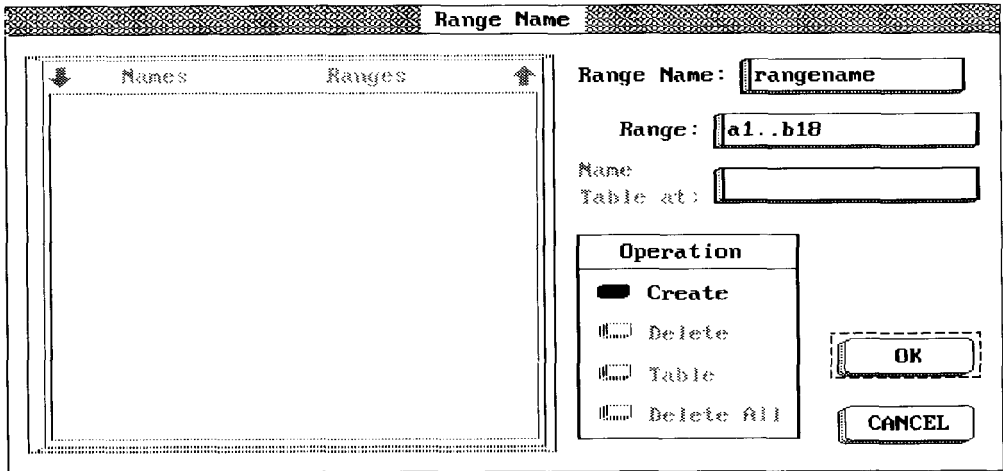
If you move data into the first (top left) or last (bottom right) cell only of a named range with Edit Move Range, the range name is no longer defined. A **defined range** is one that is associated with a range address. Formulas that use that range evaluate to ERR. You can move data into cells other than the first or last cells in a named range and maintain the range name's definition.

Selecting Name

When you select Name, you see the Range Name dialog box.

Range Name Specify a range name up to 15 characters long in the Range Name field. Lotus-DM does not distinguish between uppercase and lowercase letters in range names, and converts lowercase to uppercase when you select OK.

12-10 Range Commands



(NOTE) Follow these guidelines when you create range names:

- Do not include spaces, commas, semicolons, periods, or the characters + * - / & > < @ # in range names.
- Do not use names that look like cell addresses, such as P12 or EX100.
- Do not use @function names or Lotus-DM key names as range names.
- Do not create range names that begin with a number, such as 20DEC, or consist entirely of numbers, such as 1989. You cannot include such range names in a formula.

Range Specify the range address to which the range name should refer.

Select one Operation option.

Create Select Create to assign a name to a range. You can also use Create to redefine the range to which an existing range name refers. To avoid creating a range name that is already being used, refer to the Names Ranges list box before you specify a new range name. The number of range names you can create is limited only by available memory.

When you move the first or last cell of a named range using Edit Move Range, Worksheet Delete, Worksheet Insert, or Worksheet Page Break, Lotus-DM adjusts the range name's address.

Delete Select Delete to remove a range name but leave the data in the range unchanged. In any formulas that use the deleted range name, Lotus-DM replaces the range name with the corresponding range address.

Table Select Table to create a two-column table that lists the defined range names in alphabetical order and their corresponding addresses. Note that the contents of this table is identical to the contents of the Names Ranges list box at the time the table is created.

To use Table, decide on a location for the range name table. The table will occupy two columns and as many rows as there are range names, plus one blank row. You need to specify the address of only the top left cell of the table's location.

[CAUTION] Make sure the table location is blank or contains unimportant data because Lotus-DM writes over existing data when it creates the table.

Delete All Select Delete All to delete all range names in the worksheet but leave data in the named ranges unchanged. In formulas that use any of the deleted range names, Lotus-DM replaces the range names with the corresponding range addresses.

Select OK to create or delete a named range or create a table that lists existing named ranges. Select CANCEL to return to the worksheet.

Name Labels

Select Name Labels to assign an existing label as the range name for the cell immediately above, below, to the right, or to the left of the label. Because labels typically describe the contents of a range, this range command lets you use this label as a range name as well.

	A	B	C	D	E	F
1						
2						
3						
4	Interest	1217%	1030%	970%	1200%	
5	Investment	\$5,000	\$12,700	\$4,000	\$1,200	
6	Period	2	4	4	2	
7						

Figure 12-1 Labels Interest, Investment, and Period each name a cell to its right

To prevent confusion when using range names in formulas, apply the suggested naming conventions presented in "Selecting Name" earlier in this chapter.

If a label in the specified range duplicates a range name in the file, Lotus-DM reassigns the range name to the new range.

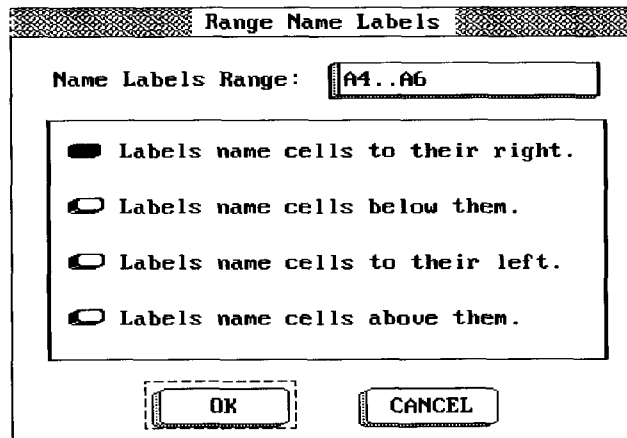
In any formulas that use a range address for a single cell (for example, B5..B5 as opposed to just B5) to refer to a cell you named with Name Labels, Lotus-DM automatically replaces the range address with the corresponding range name.

12-12 Range Commands

For example, suppose the formulas @MAX(B5..B5) and +B5/30 exist when you assign the name APRIL to B5. Lotus-DM automatically changes the first formula to @MAX(APRIL), but because the second formula uses a cell address instead of a range address, Lotus-DM leaves that formula as +B5/30.

NOTE Lotus-DM uses only the labels in the range as range names; it ignores any numbers or formulas in the range. If any of the labels exceed 15 characters, Lotus-DM uses only the first 15 characters.

When you select Name Labels, you see the Range Name Labels dialog box.



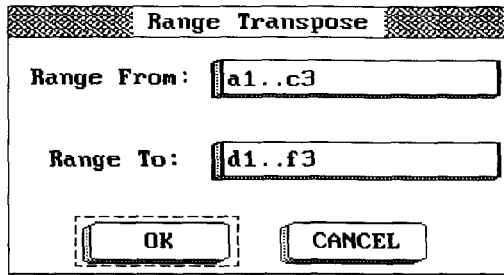
Specify the range that contains the labels you want to assign as range names in the Name Labels Range field. Select the option that identifies what cell you want the labels to name.

Select OK to assign the label as a range name, or select CANCEL to return to the worksheet.

Transpose

Select Transpose to copy a range of data, rearranging the range from columns to rows, or from rows to columns. The data in the worksheet changes from a horizontal arrangement to a vertical one, or *vice versa*. For example, if you have a vertical two-column table, with labels in the first column and corresponding values in the second column, you can use Transpose to rearrange it horizontally so that labels are in a row above the row of values.

When you select Transpose you see the Transpose dialog box.



Specify the range whose data you want to transpose in the Range From field. Specify the range for the transposed data in the Range To field. You need to specify only the top left cell of the range in the Range To field.

CAUTION Specifying overlapping ranges will result in data loss. Also, do not use this command if your range contains formulas with relative addresses.

Lotus-DM does not adjust relative cell addresses to refer to the same cells.

Starting in the first cell of the range you specified in the Range To field, Lotus-DM creates a transposed copy of the entire Range From range. Each cell in the Range To range inherits the cell format and protection status of the corresponding cell in the Range From range.

Select OK to transpose the range, or CANCEL to return to the worksheet.

Protect/Unprotect

Select Protect to turn protection on or Unprotect to turn protection off. Turning protection on prevents changes when the worksheet is protected globally. Turning protection off permits changes to a range when the worksheet is protected globally.

- When a worksheet is globally protected, Lotus-DM displays PR in the control panel when the cell pointer is on a protected cell. The Range menu says Unprotect.
- When the cell pointer is on an unprotected cell, Lotus-DM displays U in the control panel. The Range menu says Protect.

NOTE Protect takes effect the moment you select it.

Chapter 13

Graph Commands

Graphs are tools for illustrating the relationships between numbers. Because of their visual nature, graphs often convey messages about numbers more quickly and dramatically than the numbers themselves. This chapter describes the commands you use to create and enhance graphs that illustrate your worksheet data. Figure 13-1 shows a sample stacked bar graph.

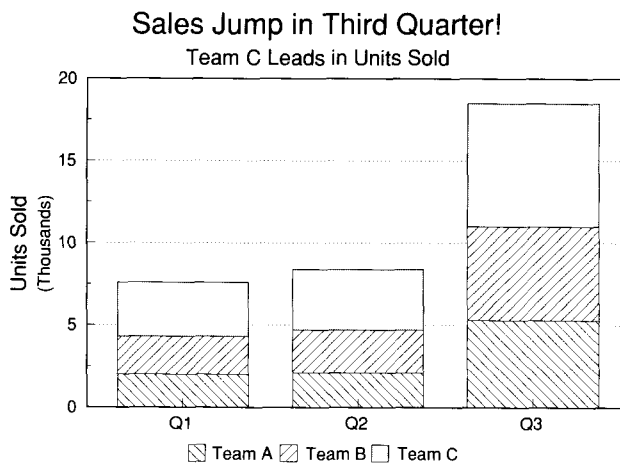


Figure 13-1 Sample stacked bar graph

13-2 Graph Commands

All Lotus-DM graph types except pie charts share the following characteristics: a grid structure, x- and y-axes, ranges, and optional settings. The **frame** is the box around the graph; the lines that extend from side to side and from top to bottom within the frame are the **grid lines**. The bottom line is the **x-axis**, and the left line is the **y-axis**. The **ranges** are sets of values or labels that you create in your worksheet. Your graph plots points, lines, and the height of bars at the intersection of corresponding x-axis and y-axis ranges. You must specify at least one y-axis range for every graph type except pie charts. You can enhance the appearance of your graph with the **graph settings**: graph type, text, grids, scaling, and formats.

Select Graph (F6) to see the Graph commands, described in Table 13-1. Use the Graph commands to create, view, save, and print graphs that illustrate your worksheet data.

Table 13-1 Graph commands

Select	To
View	Display the current graph on your screen.
Save	Save the current graph in a graph file with a .PIC extension.
PrintGraph	Print your graph (see Chapter 15 in <i>Reference</i> for more information).
Type	Specify the type of graph you want to create: line, bar, stacked bar, pie, or XY.
Ranges	Specify the sets of values and labels you want to graph and, for pie charts, slice characteristics.
Options	Specify the display mode (black-and-white or color) and, in line and XY graphs, whether Lotus-DM connects plotted points with lines and/or marks the points with symbols.
Data Labels	Label the points or bars in a graph.
Legends	Create a key for the A through F ranges.
Titles	Add graph titles and axis titles.
Grids	Add or remove grid lines.
Scaling	Determine the set of numbers that shows along a scaled axis, add a scale indicator, and specify a skip factor for the unscaled x-axis.
X Format	Determine the format for numbers along the scaled x-axis in an XY graph.
Y Format	Determine the format for numbers along the scaled y-axis in all graph types except pie charts.
Name	Create, retrieve, delete, and reset named graphs in the current worksheet.
Reset	Delete specified range addresses, and reset the current graph settings to the default graph settings.

To create a graph, select the type of graph (line, bar, stacked bar, pie, or XY) that best illustrates the data in your worksheet. Then, for all graph types except pie, specify ranges for each set of points, lines, or bars in the graph. For pie charts, specify a

single range for the pie slices and, optionally, a range to set the appearance of each slice. Next, specify text (titles, legends, and labels) and other graph settings (grids, scaling, and formats). You can view the graph on your screen and adjust the settings if necessary. Then, specify a name for your graph and use File Save or File Save as to save the graph settings with the current worksheet file.

CAUTION Be sure to save the worksheet file after you create your graph. This saves your graph settings with the worksheet. If you want to work with more than one set of graph settings, be sure to name each graph and save it with the worksheet. Otherwise, you will not be able to retrieve your graphs for future use. See "Save" and "Save As" in Chapter 9 for more information on saving worksheet files.

Save your graph in a graph file with a .PIC extension for use with PrintGraph and other programs. Finally, use PrintGraph to print a copy of your finished graph.

The following sections describe the Graph commands in the order they appear on the Graph menu.

View

Select View (CTRL-F10) to display the **current graph**, which is a graph based on the current graph settings. As you specify new graph settings or change the data in the worksheet, the current graph changes. Use View to check your graph settings as you revise them.

You can view the current graph in black-and-white or in color (if you have a color monitor). See "Options" later in this chapter for information on choosing the way your screen displays graphs.

While you are viewing a graph, some menu commands remain available. These include Graph commands, Edit Copy, File Exit, and File Run. DeskMate Setup (F10) is also available. The rest of the commands are shadowed, and you cannot select them. Use the Graph commands to change the graph settings and see the results immediately.

Use Edit Copy to copy the graph you are viewing to the clipboard. See "Copy" in Chapter 10 for more information. If the graph is too large for the clipboard, however, you cannot copy it.

CAUTION Lotus-DM overwrites the current clipboard image when you copy a new image or attempt to copy an image that is too large.

After you copy a graph to the clipboard, you can switch to another DeskMate application, such as Draw, where you can paste the graph from the clipboard to the new application and add enhancements to the graph's design. Be sure to save your graph settings and save the current worksheet file before you switch to another DeskMate

13-4 Graph Commands

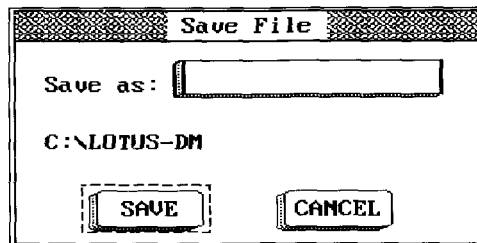
application, change the graph settings, retrieve another worksheet file, or exit Lotus-DM. You can also save the current graph in a graph file with a .PIC extension for printing with PrintGraph. If you overwrite the clipboard before saving the graph settings with the worksheet file, you may lose the graph and have to re-create it.

When you finish viewing the current graph, press either ENTER or CTRL-F10 to return to the current worksheet.

If you plan to work with more than one set of graph settings, you can preserve the current graph settings by creating a named graph. See "Name" later in this chapter for more information on named graphs.

Save

Select Save to save the current graph in a **graph file**, which is a separate file for graphs only and has the extension .PIC. You cannot modify graph files. If you change the data in the worksheet after you save a graph file, the saved graph does not change. You can print your graph with PrintGraph and use it with another software program that is compatible with the .PIC file format. When you select Save, you see the Save File dialog box.



Save As Specify the file name for your graph in the Save As field. Include the drive and directory, if they differ from the current path. Lotus-DM adds the .PIC extension automatically.

(NOTE) If you are working with more than one set of graph settings and you want to work with your graph in Lotus-DM again, you can name it within your worksheet and then save the worksheet file. (See "Name" later in this chapter for more information on creating and using named graphs, and "Save" and "Save As" in Chapter 9 for information on saving worksheet files.) Otherwise, you may not be able to retrieve your graph from Lotus-DM and you must re-create it.

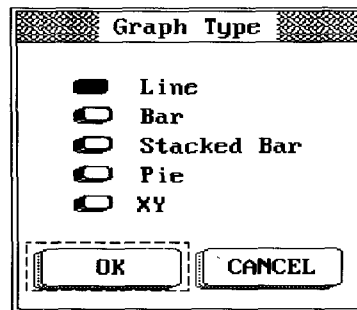
When you finish, select SAVE to save your current graph in a graph file, or select CANCEL to discontinue the process and return to your worksheet without saving the current graph.

PrintGraph

Select PrintGraph to run a separate program within Lotus-DM that you use to print graphs or the current clipboard image. Read Chapter 15 in *Reference* for instructions on using PrintGraph.

Type

Select Type (CTRL-T) to create one of five types of graphs: line, bar, stacked bar, pie, and XY. When you select Type, you see the Graph Type dialog box.



Select Line, Bar, Stacked Bar, Pie, or XY. Each graph type depicts information in a distinct way. Figure 13-2 illustrates the five types of graphs. Line is the default graph type.

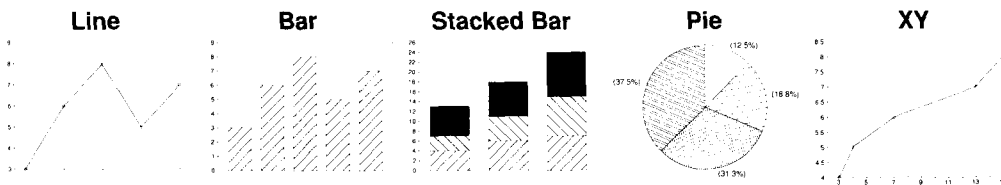


Figure 13-2 Types of graphs

13-6 Graph Commands

In all graph types except pie charts, you create each set of points, lines, or bars in your graph by specifying a corresponding set of ranges in a worksheet. You can specify up to six y-axis ranges labeled A through F and one x-axis range labeled X. See "Ranges" later in this chapter for information on how to specify ranges.

The y-axis is always scaled: the numbers that show along the y-axis encompass the specified values in ranges A through F. The Lotus-DM scaling options provide the y-axis labels. In line, bar, and stacked bar graphs, the x-axis is unscaled: Lotus-DM uses the contents of the X range as x-axis labels, which can contain numbers or letters. The x-axis is scaled only in XY graphs.

The specified range for an unscaled axis can contain either all labels or all values. The specified range for a scaled axis, however, must contain only values.

Line Select Line to create a **line graph**. Line graphs generally plot changes in one or more values over time. Figure 13-3 shows a line graph.

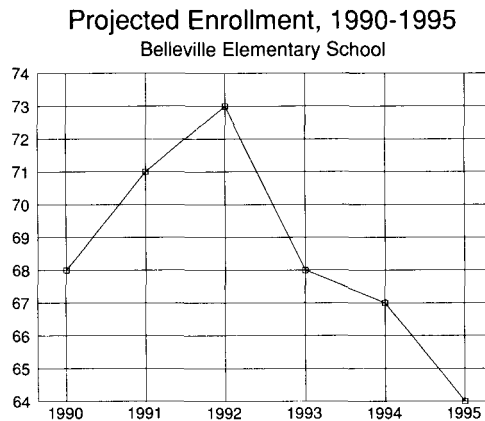


Figure 13-3 Line graph

Each line in a line graph represents one y-axis range. Each point along the line represents the intersection of one value within the range and the corresponding label specified in the X range.

Figure 13-3 depicts the following ranges:

A:	68	71	73	68	67	64
X:	1990	1991	1992	1993	1994	1995

The A range specifies the y-axis values; the X range specifies the x-axis labels.

Line graphs can display up to six y-axis ranges (A through F) and one x-axis range (X). The y-axis is scaled; the x-axis is unscaled.

Bar Select Bar to create a **bar graph**. You typically use bar graphs to compare related data at a given point in time. Figure 13-4 shows a bar graph.

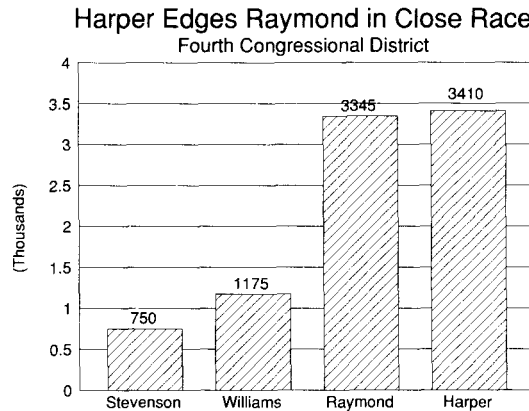


Figure 13-4 Bar graph with data labels

Bar graphs consist of one or more bars. Each bar represents one value from each y-axis range, grouped above the corresponding x-axis label specified in the X range.

Figure 13-4 depicts the following ranges:

A:	750	1175	3345	3410
X:	Stevenson	Williams	Raymond	Harper

The A range specifies the y-axis values; the X range specifies the x-axis labels.

The following data labels show above the bars and make the graph easier to understand:

A:	750	1175	3345	3410
----	-----	------	------	------

Lotus-DM automatically adds the scale indicator (Thousands) to the y-axis. The scale indicator displays the order of magnitude. See "Data Labels" and "Scaling" later in this chapter for more information.

Bar graphs can display up to six y-axis ranges (A through F) and one x-axis range (X). The y-axis is scaled; the x-axis is unscaled.

Stacked Bar Select Stacked Bar to create a **stacked bar graph**. Stacked bar graphs compare values by stacking parts of bars one on top of another to form a single bar. Different colors or hatch patterns show the separate parts of the bar. Figure 13-5 shows a stacked bar graph, where each bar represents two values.

Bars with positive values are stacked by range in ascending alphabetical order: the portion that represents the A range appears below the portion that represents the B range, the portion that represents the B range appears below the portion that represents the C range, and so on. Negative values are stacked by range in descending alphabetical order.

13-8 Graph Commands

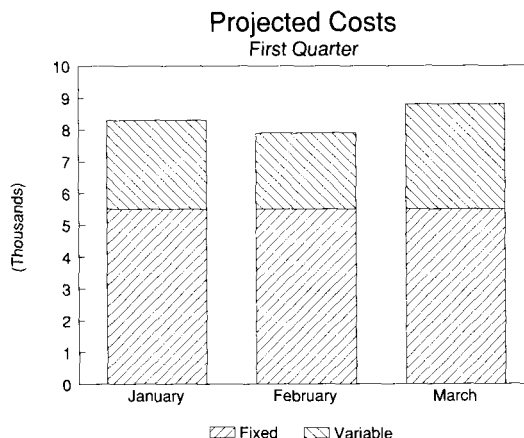


Figure 13-5 Stacked bar graph with legends

Figure 13-5 depicts the following ranges:

A:	5500	5500	5500
B:	2800	2400	3300
X:	January	February	March

The A and B ranges specify the y-axis values; the X range specifies the x-axis labels.

In Figure 13-5, each stacked bar represents one value from each of the two y-axis ranges.

The following legends show at the bottom and make the graph easier to understand:

A:	Fixed
B:	Variable

Lotus-DM automatically adds the scale indicator (Thousands) to the y-axis. See "Legends" and "Scaling" later in this chapter for more information.

Stacked bar graphs can display up to six y-axis ranges (A through F) and one x-axis range (X). The y-axis is scaled; the x-axis is unscaled.

Pie Select Pie to create a **pie chart**. Pie charts relate two or more values by representing them as slices of a pie. They are useful for comparing parts to the whole. For example, in a set of values totaling 80, the pie slice representing 20 would be exactly one quarter of the entire pie. Figure 13-6 shows a pie chart.

Pie charts can illustrate up to three ranges: A, B, and X. The A range represents the values for all the slices that make up the whole pie.

Ratchets Dominate Sales

ADEPT Industries, Q3

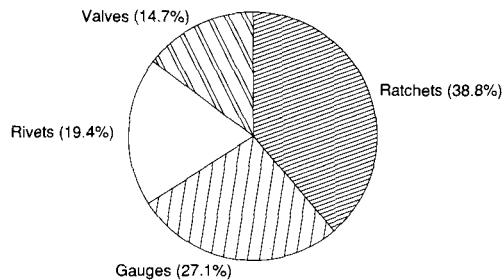


Figure 13-6 Pie chart

The B range determines the color or hatch pattern of each pie slice (depending on the graphic display mode) and whether the pie includes any exploded (separated) slices. See "Options" later in this chapter for information on setting the display mode to black-and-white or color.

When you specify the B range, make it the same size as the A range. Enter a number from 1 to 8 in each cell in the B range to specify the colors or hatch patterns for each slice. The color assignments depend on your monitor. The black-and-white hatch patterns and their corresponding numbers are the same for all monitors. Figure 13-7 illustrates hatch patterns.

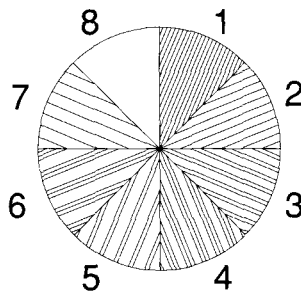


Figure 13-7 Hatch patterns

You can emphasize one or more values in a pie chart by exploding (separating slightly from the pie) the slices that represent those values. To explode one or more slices in a pie chart, add 100 to the B range values that correspond to the slices you want to separate from the rest of the pie.

13-10 Graph Commands

The X range specifies labels for each pie slice. When you specify the X range, make it the same size as the A range. Then specify a label in each X range cell to correspond to each A range cell. Lotus-DM calculates the value of each slice and displays it as a percentage of the whole next to the corresponding slice in each pie chart.

You can also add a one- or two-line title to a pie chart, but you cannot add axis titles or legends. See "Titles" later in this chapter.

Figure 13-6 depicts the following ranges:

A:	250	175	125	95
B:	1	7	8	5
X:	Ratchets	Gauges	Rivets	Valves

The A range specifies values, the B range specifies hatch patterns, and the X range specifies data labels.

XY Select XY to create an **XY graph**. XY graphs show correlations between two types of numeric data, for example, sales and profits. Figure 13-8 shows an XY graph.

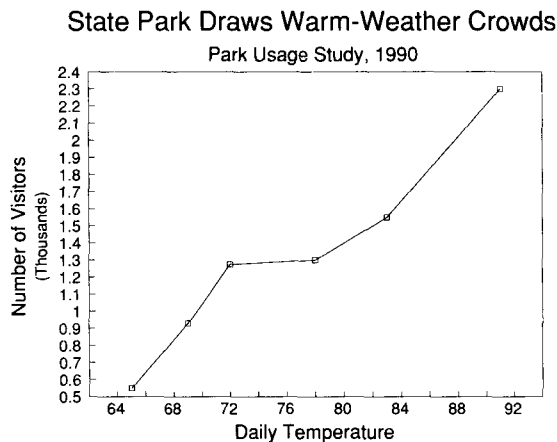


Figure 13-8 XY graph with axis titles

XY graphs resemble line graphs in the sense that values are plotted as points in the graph. Unlike line graphs, however, the x-axis is scaled: the numbers that show along the x-axis encompass the specified values in the X range. The X range provides x-axis values that match y-axis values and plot within the graph. Therefore, the data in the X range must be values, not labels. The XY graph is the only Lotus-DM graph with a scaled x-axis and a scaled y-axis.

Figure 13-8 depicts the following ranges:

A:	550	930	1275	1300	1550	2300
X:	65	69	72	78	83	91

The A range specifies the y-axis values; the X range specifies the x-axis values.

The following axis titles make the graph easier to understand:

X-axis: Daily Temperature

Y-axis: Number of Visitors

Lotus-DM automatically adds the scale indicator (Thousands) to the y-axis. See "Titles" and "Scaling" later in this chapter for more information.

XY graphs can illustrate up to six y-axis ranges (A through F) and one x-axis range (X). Both axes are scaled. The Lotus-DM scaling options provide the axis labels. See "Scaling" later in this chapter for more information on x-axis and y-axis scales.

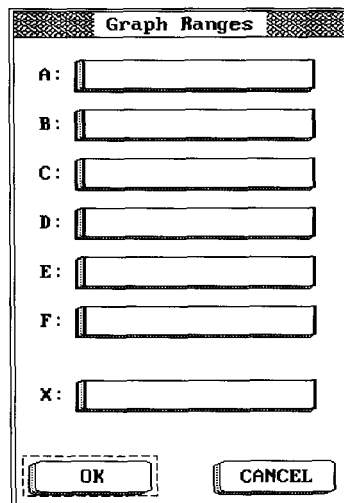
When you finish, select OK to specify the graph type, or select CANCEL to return to your current worksheet without specifying a graph type.

Ranges

Select Ranges (CTRL-R) to specify range addresses for the A through F y-axis ranges and the X x-axis range in your current worksheet. These ranges correspond to each set of points, lines, bars, or pie slices in a graph.

Each graph type uses ranges in its own way. For each graph type except pie charts, Lotus-DM matches the values in each y-axis range with the values or labels in the x-axis range and plots the points of lines or heights of bars within the graph. Each set of ranges within a graph matches up; therefore, each range should be the same size.

Specify values or labels for each x- and y-axis range in your worksheet. Then select Graph Ranges. When you select Ranges, you see the Graph Ranges dialog box.



The image shows a dialog box titled "Graph Ranges". It contains seven input fields, each preceded by a label: "A:", "B:", "C:", "D:", "E:", "F:", and "X:". Each label is followed by a rectangular text box. At the bottom of the dialog box, there are two buttons: "OK" and "CANCEL".

13-12 Graph Commands

Specify range addresses for up to six y-axis ranges (A through F) and one x-axis range (X) in the adjacent range field. You must specify at least one y-axis range.

How Lotus-DM uses the A through F and X ranges depends on the type of graph you create. See "Type" earlier in this chapter for more information on the ranges required for each type of graph.

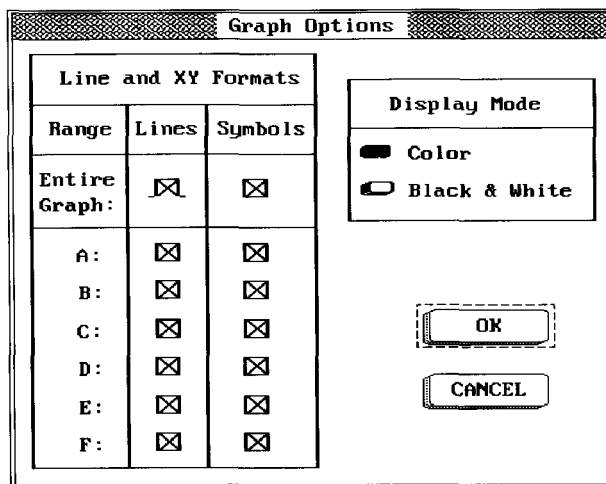
A through F Ranges Specify range addresses for the y-axis. A y-axis range can contain only values (numbers and/or numeric formulas); cells containing labels or blank cells are interpreted as zero. Ranges can contain any number of columns and rows, within memory constraints.

X Range Specify a range address for the x-axis. An x-axis range can contain values or labels, depending on the graph type. Ranges can contain any number of columns and rows, within memory constraints.

When you finish, select OK to add the specified ranges to the current graph, or select CANCEL to return to the current worksheet without specifying new ranges.

Options

Use Options to select the format for line and XY graphs and the display mode for viewing graphs on your screen. When you select Options, you see the Graph Options dialog box.



The dialog box is titled "Graph Options". It contains two main sections: "Line and XY Formats" and "Display Mode".

Line and XY Formats

Range	Lines	Symbols
Entire Graph:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Display Mode

☒ Color

☐ Black & White

OK

CANCEL

Line and XY Formats

Select Lines and/or Symbols for an entire graph or for individual graph ranges to determine the appearance of line and XY graphs. You can select Line and XY Formats only when the current graph type is line or XY. When the graph type is bar, stacked bar, or pie, these options are shadowed and you cannot select them. Figure 13-9 illustrates the Line and XY Formats options with data labels (A, B, C) shown for clarity in the last illustration.

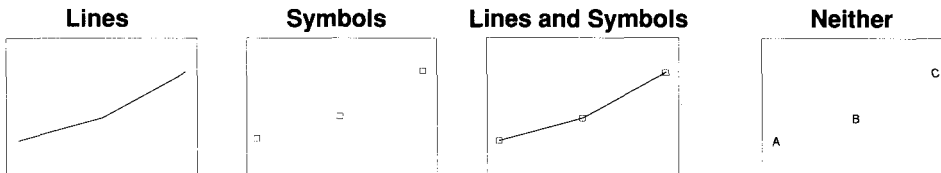


Figure 13-9 Line and XY Formats options

Entire Graph Select Lines and/or Symbols. Your selections affect the entire line or XY graph.

- Select Lines to show data as a line with no marked points.
- Select Symbols to mark only points and no line.
- Select Lines and Symbols to show marked points along a line.
- Select neither lines nor symbols to show data labels, if specified, for the points along the line. See "Data Labels" later in this chapter for more information on specifying labels for the points, bars, or pie slices in your graph.

A through F Ranges Select Lines and/or Symbols for each y-axis range in a line or XY graph. See above for descriptions of these options.

Display Mode

Select a display mode for viewing the current graph on the screen. Lotus-DM matches the default display setting to your monitor.

Color Select Color, if your screen display supports colors, to show contrasting colors to distinguish bars, pie slices, lines, and symbols.

Black & White Select Black & White to show monochrome hatch patterns to distinguish bars and pie slices. Figure 13-7 earlier in this chapter illustrates the standard hatch patterns.

When you finish, select OK to verify the new graph options, or select CANCEL to return to your current worksheet without making changes to the current graph options.

Data Labels

Use Data Labels to add text next to the plotted points or tops of bars in a line, bar, stacked bar, or XY graph.

Figure 13-10 illustrates a bar graph with data labels above the bars.

NOTE To create data labels for pie charts, specify an X range the same length as the A range. Then specify a label in each X range cell that corresponds to the A range cell. See "Type" earlier in this chapter.

Before you select Data Labels, enter labels that correspond to each y-axis range in the current worksheet. Then select Data Labels. When you select Data Labels, you see the Graph Data Labels dialog box.

Graph Data Labels						
Ranges		Alignments				
		Center	Left	Above	Right	Below
A:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F:	<input type="text"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A Through F Ranges

Specify the range address containing the labels for each corresponding Range field and select the alignment of each label in relation to the points or tops of bars in your graph. Center is the default alignment setting for line and XY graphs. Above is the only alignment available for bar and stacked bar graphs.

NOTE In stacked bar graphs, only the label for the top section displays. Use one range of labels to describe all parts of the stacked bars in the graph. Specify the range address in the Range field that corresponds to the topmost section.

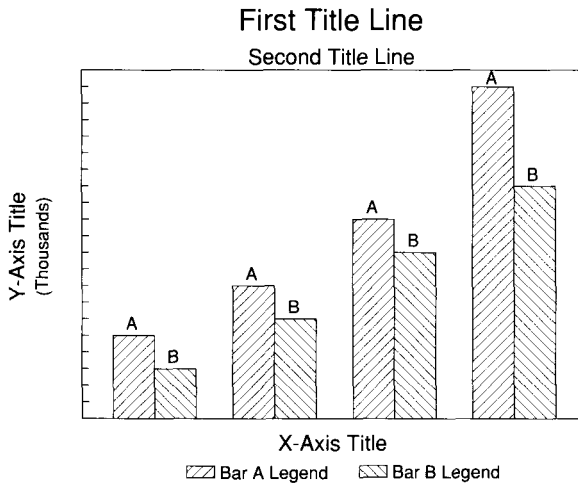


Figure 13-10 Text options

Alignments

Select an alignment option to determine where Lotus-DM adds labels.

Center Select Center to add labels on the points plotted for the specified range.

Left Select Left to add labels to the left of points plotted for the specified range.

Above Select Above to add labels above points or tops of bars plotted for the specified range.

Right Select Right to add labels to the right of points plotted for the specified range.

Below Select Below to add labels below points plotted for the specified range.

NOTE If the format of the cells containing the data label entries is Hidden, Lotus-DM will not display them. Lotus-DM will, however, display data label entries in hidden columns. See "Format" in Chapter 12 for more information on range formats.

When you finish, select OK to add data labels to the current graph, or select CANCEL to return to your current worksheet without adding new data labels.

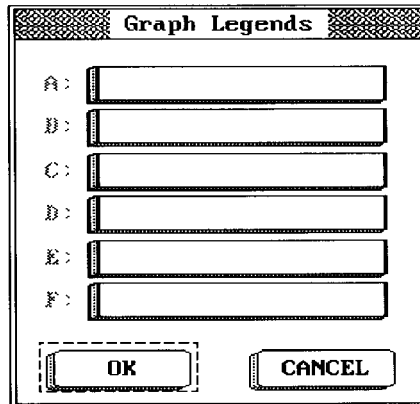
Legends

Use Legends to create a key to the symbols, lines, colors, or hatch patterns used in your graph (see Figure 13-10 earlier in this chapter).

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For each graph type except pie, you can create a legend for each y-axis range. The legends, which appear beneath the graph, identify the y-axis range represented by each symbol, line, color, or hatch pattern in the graph.

When you select Legends, you see the Graph Legends dialog box.



Specify text for each legend in the corresponding range field. To ensure that your legends display fully and print out completely, limit them to 19 characters. Legends will wrap to a second line if necessary, but Lotus-DM cuts legend text that extends beyond the graph frame.

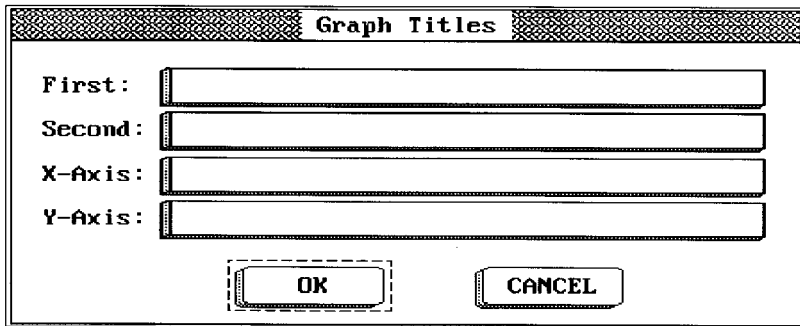
You can enter text directly in the field or specify a cell or range address containing text in the current worksheet. To specify text for a legend that exists in the worksheet, type \ (backslash) then specify the cell or range address or range name. When you specify a range address or range name, Lotus-DM uses the text in the upper left cell of the specified range.

When you finish, select OK to add legends to the current graph, or select CANCEL to return to your current worksheet without adding new legends.

Titles

Use Titles to add a title to the top of your graph and to label the x-axis and the y-axis. For an illustration of text options, see Figure 13-10 earlier in this chapter. When you select Titles, you see the Graph Titles dialog box.

Specify a graph title up to two lines long, an x-axis title, and/or a y-axis title in the corresponding title field.



The image shows a dialog box titled "Graph Titles". It contains four text input fields labeled "First:", "Second:", "X-Axis:", and "Y-Axis:". Below the fields are two buttons: "OK" and "CANCEL". The "OK" button is highlighted with a dashed border.

You can enter text directly in the field or specify a cell or range address containing text in the current worksheet. To specify text for a title that exists in the worksheet, type \ (backslash) then specify the cell or range address or range name. When you specify a range address or range name, Lotus-DM uses the text in the upper left cell of the specified range.

NOTE For pie charts, you can add a one- or two-line title, but you cannot add axis titles. See "Type" earlier in this chapter.

First Specify the text for the first line of the graph title, up to 39 characters long. The first title line displays in large type, centered above the graph.

Second Specify the text for the second line of the graph title, up to 39 characters long. The second line displays in regular type beneath the first title line.

X-Axis Specify the text for the x-axis title, up to 39 characters long. The x-axis title displays in regular type, centered beneath the x-axis.

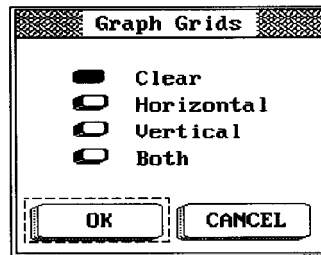
Y-Axis Specify the text for the y-axis title, up to 39 characters long. The y-axis title displays in regular type, centered sideways along the y-axis.

When you finish, select OK to add titles to the current graph, or select CANCEL to return to your current worksheet without adding new titles.

Grids

Select Grids to add or remove grid lines in a graph. Horizontal grid lines originate from the y-axis, and vertical grid lines originate from the x-axis. Your plotted data appears inside the graph frame, where the y-axis values intersect with the x-axis values or labels. When you select Grids, you see the Graph Grids dialog box.

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All graph types except pie charts can use a grid. Clear is the default setting. Figure 13-11 illustrates the four grid options on a line graph.

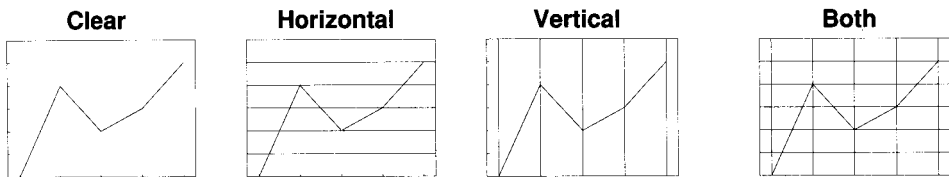


Figure 13-11 Grid options

Select Clear, Horizontal, Vertical, or Both.

Clear Select Clear to remove grid lines from your graph.

Horizontal Select Horizontal to add grid lines from the y-axis to the right side of the frame.

Vertical Select Vertical to add grid lines from the x-axis to the top of the frame.

Both Select Both to add horizontal and vertical grid lines to your graph.

When you finish, select OK to verify the grid settings, or select CANCEL to return to your current worksheet without changing the current grid settings.

Scaling

Use Scaling to determine the scaling method for the y-axis and, in XY graphs only, the x-axis. For all graph types except pie charts, the scaling method affects how Lotus-DM plots your data within the graph. For an unscaled x-axis, you can also specify a skip factor to limit the number of displayed x-axis labels. When you select Scaling, you see the Graph Scaling dialog box.

X Scaling options specify the x-axis. Y Scaling options specify the y-axis.

Select a scaling method.

The dialog box is titled "Graph Scaling" and is divided into two main sections: "X Scaling" and "Y Scaling". Each section contains a "Method" group box with radio buttons for "Automatic" (selected) and "Manual". Below the method group is a "Manual Limits" section with "Upper:" and "Lower:" labels and input fields, both containing the value "0". At the bottom of each section is an "Indicator" checkbox, which is checked. At the very bottom of the dialog is a "Skip Factor:" label followed by an input field containing the value "1", and two buttons labeled "OK" and "CANCEL".

Automatic Select Automatic to create a scale that automatically shows all range values for the specified axis. This is the default method.

Manual Select Manual to create a scale based on the upper and lower limits you specify (or as near to those limits as possible if rounding is necessary). When Lotus-DM draws the graph, it displays only the data that falls within the limits you specify. Therefore, some of the contents of the y-axis (A through F) ranges and, for XY graphs, some of the contents of the x-axis (X) range may not appear in the graph. If you selected Manual scaling, specify a Manual Limits option.

- Specify the upper scale limit for the selected axis in the Upper field.
- Specify the lower scale limit for the selected axis in the Lower field.

Indicator Select Indicator to display the scale indicator between the scaled axis labels and the axis title on your graph. When Lotus-DM uses an order of magnitude other than zero for the numbers along a scaled axis, it creates a **scale indicator**, such as (*Thousands*) or (*Times 10E15*), to identify the order of magnitude. (Figure 13-10 earlier in this chapter shows a scale indicator along the y-axis.)

Skip Factor Specify the **skip factor**, a positive integer that controls the labels displayed along the unscaled x-axis, in the Skip field. The skip factor determines the number of X range labels to omit along the unscaled x-axis (in line, bar, and stacked bar graphs). The first label always shows. For example, when you specify a skip factor of 3, Lotus-DM shows every third label in the X range (first, fourth, seventh, and

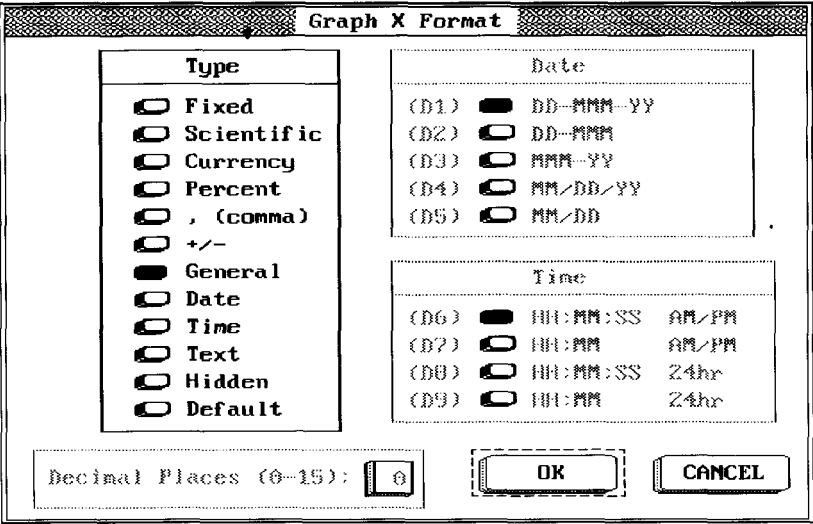
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so on); with a skip factor of 10, Lotus-DM shows every tenth label (first, eleventh, twenty-first, and so on). The default skip factor is 1, which displays all the labels along the x-axis.

When you finish, select OK to verify the new scaling settings, or select CANCEL to return to your current worksheet without changing the current scaling settings.

X Format

Use X Format to specify the format of numbers, including dates and times, that display along the scaled x-axis of your graph. These options are available only for XY graphs, the only Lotus-DM graph type that uses a scaled x-axis. When you select X Format, you see the Graph X Format dialog box.



The dialog box is titled "Graph X Format". It contains a "Type" list on the left with radio buttons for: Fixed, Scientific, Currency, Percent, , (comma), +/-, General, Date, Time, Text, Hidden, and Default. To the right of the list are two sections: "Date" and "Time". The "Date" section has five options: (D1) DD-MMM-YY, (D2) DD-MMM, (D3) MMM-YY, (D4) MM/DD/YY, and (D5) MM/DD. The "Time" section has five options: (D6) HH:MM:SS AM/PM, (D7) HH:MM AM/PM, (D8) HH:MM:SS 24hr, and (D9) HH:MM 24hr. At the bottom left is a field for "Decimal Places (0-15):" with a spinner box showing "0". At the bottom right are "OK" and "CANCEL" buttons.

Type
<input type="radio"/> Fixed
<input type="radio"/> Scientific
<input type="radio"/> Currency
<input type="radio"/> Percent
<input type="radio"/> , (comma)
<input type="radio"/> +/-
<input checked="" type="radio"/> General
<input type="radio"/> Date
<input type="radio"/> Time
<input type="radio"/> Text
<input type="radio"/> Hidden
<input type="radio"/> Default

Date	
(D1)	<input type="radio"/> DD-MMM-YY
(D2)	<input type="radio"/> DD-MMM
(D3)	<input type="radio"/> MMM-YY
(D4)	<input type="radio"/> MM/DD/YY
(D5)	<input type="radio"/> MM/DD

Time	
(D6)	<input type="radio"/> HH:MM:SS AM/PM
(D7)	<input type="radio"/> HH:MM AM/PM
(D8)	<input type="radio"/> HH:MM:SS 24hr
(D9)	<input type="radio"/> HH:MM 24hr

Decimal Places (0-15):

Select Fixed, Scientific, Currency, Percent, , (comma), +/-, General, Date, Time, Text, Hidden, or Default.

If you select Fixed, Scientific, Currency, Percent, or , (comma), you can also specify the number of digits Lotus-DM shows to the right of the decimal point in the Decimal Places field. If you do not select one of these formats, the Decimal Places field is shadowed and you cannot use it. General is the default format, and 0 is the default decimal setting.

If you select Date or Time, select a Date option or a Time option. If you do not select Date or Time, these options are shadowed and you cannot select them. Use Worksheet Format and Worksheet International to change the Date and Time options that are currently available. See "Format" and "International" in Chapter 11 for more information.

See "Y Format" next for descriptions of each format setting for scaled axes.

When you finish, select OK to verify the new graph scaling format, or select CANCEL to return to your current worksheet without changing the current graph scaling format for numbers, dates, and times.

Y Format

Select Y Format to specify the format of numbers, including dates and times, that display along the y-axis of your graph. These options are available for all graph types except pie charts.

Y Format determines the way Lotus-DM displays values along the scaled y-axis in your graph. Lotus-DM initially displays data in the General format, which displays numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point.

Y Format does not affect the appearance of your data in the worksheet. Use Range Format to change a range of worksheet data. See "Format" in Chapter 12 for more information.

When you select Y Format, you see the Graph Y Format dialog box.

Select Fixed, Scientific, Currency, Percent, , (comma), +/-, General, Date, Time, Text, Hidden, or Default.

If you select Fixed, Scientific, Currency, Percent, or , (comma), you can also specify the number of digits Lotus-DM shows to the right of the decimal point in the Decimal Places field. If you do not select one of these formats, the Decimal Places field is shadowed and you cannot use it. General is the default format, and 0 is the default decimal setting.

If you select Date or Time, select a Date option or a Time option. If you do not select Date or Time, these options are shadowed and you cannot select them. Use Worksheet Format and Worksheet International to change the Date and Time options that are currently available. See "Format" and "International" in Chapter 11 for more information.

Fixed Select Fixed to display numbers with up to 15 decimal places, a minus sign for negatives, and a leading zero for decimal values. For example, 12.389 displays as 12 in a Fixed format when you specify 0 decimal places.

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Graph Y Format																									
<table border="1"> <thead> <tr> <th>Type</th> </tr> </thead> <tbody> <tr><td><input type="radio"/> Fixed</td></tr> <tr><td><input type="radio"/> Scientific</td></tr> <tr><td><input type="radio"/> Currency</td></tr> <tr><td><input type="radio"/> Percent</td></tr> <tr><td><input type="radio"/> , (comma)</td></tr> <tr><td><input type="radio"/> +/-</td></tr> <tr><td><input checked="" type="radio"/> General</td></tr> <tr><td><input type="radio"/> Date</td></tr> <tr><td><input type="radio"/> Time</td></tr> <tr><td><input type="radio"/> Text</td></tr> <tr><td><input type="radio"/> Hidden</td></tr> <tr><td><input type="radio"/> Default</td></tr> </tbody> </table>	Type	<input type="radio"/> Fixed	<input type="radio"/> Scientific	<input type="radio"/> Currency	<input type="radio"/> Percent	<input type="radio"/> , (comma)	<input type="radio"/> +/-	<input checked="" type="radio"/> General	<input type="radio"/> Date	<input type="radio"/> Time	<input type="radio"/> Text	<input type="radio"/> Hidden	<input type="radio"/> Default	<table border="1"> <thead> <tr> <th>Date</th> </tr> </thead> <tbody> <tr><td>(D1) <input type="radio"/> DD-MMM-YY</td></tr> <tr><td>(D2) <input type="radio"/> DD-MMM</td></tr> <tr><td>(D3) <input type="radio"/> MMM-YY</td></tr> <tr><td>(D4) <input type="radio"/> MM/DD/YY</td></tr> <tr><td>(D5) <input type="radio"/> MM/DD</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Time</th> </tr> </thead> <tbody> <tr><td>(D6) <input type="radio"/> HH:MM:SS AM/PM</td></tr> <tr><td>(D7) <input type="radio"/> HH:MM AM/PM</td></tr> <tr><td>(D8) <input type="radio"/> HH:MM:SS 24hr</td></tr> <tr><td>(D9) <input type="radio"/> HH:MM 24hr</td></tr> </tbody> </table>	Date	(D1) <input type="radio"/> DD-MMM-YY	(D2) <input type="radio"/> DD-MMM	(D3) <input type="radio"/> MMM-YY	(D4) <input type="radio"/> MM/DD/YY	(D5) <input type="radio"/> MM/DD	Time	(D6) <input type="radio"/> HH:MM:SS AM/PM	(D7) <input type="radio"/> HH:MM AM/PM	(D8) <input type="radio"/> HH:MM:SS 24hr	(D9) <input type="radio"/> HH:MM 24hr
Type																									
<input type="radio"/> Fixed																									
<input type="radio"/> Scientific																									
<input type="radio"/> Currency																									
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(D7) <input type="radio"/> HH:MM AM/PM																									
(D8) <input type="radio"/> HH:MM:SS 24hr																									
(D9) <input type="radio"/> HH:MM 24hr																									
Decimal Places (0-15): <input type="text" value="0"/>	<div>OK</div> <div>CANCEL</div>																								

Scientific Select Scientific to display numbers in scientific (exponential) notation, with up to 15 decimal places in the mantissa and an exponent from -99 to +99. For example, 12.245 displays as 1.2E+01 in Scientific format with 1 decimal place. The value 124500000000 displays as 1.25E+11 when you specify 2 decimal places.

Currency Select Currency to display numbers with a currency symbol, thousands separators, up to 15 decimal places, parentheses or a minus sign for negatives, and a leading zero for decimal values. The currency symbol Lotus-DM uses depends on the Worksheet International setting for Currency. For example, -.256 displays as (\$0.3) when you specify 1 decimal place with U.S. currency. The value 12 displays as \$12.00 when you specify 2 decimal places with U.S. currency. See "International" in Chapter 11 for more information.

Comma Select , (comma) to display numbers with thousands separators, up to 15 decimal places, parentheses or a minus sign for negatives, and a leading zero for decimal values. Comma format is the same as Currency format without the currency symbol. For example, 8999 displays as 8,999.00 when you specify 2 decimal places and use a comma (the default) for the thousands separator. See "International" in Chapter 11 for more information on setting the default thousands separator.

General Select General to display numbers with a minus sign for negatives, no thousands separators, and no trailing zeros to the right of the decimal point. For example, 1650.00 displays as 1650 and -12.42700 displays as -12.427.

+/- Select +/- to display a series of plus or minus signs or a period. The number of plus or minus signs in the series equals the integer value of the entry. Plus signs indicate a positive value, minus signs indicate a negative value, and a period indicates a number between -1 and 1. If the integer value of the entry exceeds the column width, Lotus-DM displays asterisks. For example, 5.9 displays as +++++.

Percent Select Percent to display numbers as percentages (that is, multiplied by 100 and shown with a percent sign), with up to 15 decimal places. For example, 12.42738 displays as 1242.7% when you specify one decimal place, and -.0425 displays as -4.25% when you specify 2 decimal places.

Date Select Date to display a date that corresponds to a value. Lotus-DM assigns a number for each date from January 1, 1900 (1) to December 31, 2099 (73050). Lotus-DM uses the integer part of a number to determine the date the number represents and ignores the decimal part of the number.

Use @DATE to enter a date number. @DATE calculates the date number for a date you specify. For example, to enter the date number for September 11, 1989, you could enter @DATE(89,9,11) in the worksheet. Lotus-DM calculates the date number automatically, in this case, 32762. To display the date rather than the date number in your graph, use one of the five date formats.

The five Date formats (D1 – D5) are as follows: DD-MMM-YY, DD-MMM, MMM-YY, MM/DD/YY (Intn'l long), and MM/DD (Intn'l short). Table 13-2 illustrates how each format displays along the scaled y-axis in your graph when you specify @DATE(89,8,14) in the y-axis range in the worksheet. The Intn'l long and Intn'l short displays reflect the default settings, which show in the Graph Y Format dialog box. See "International" in Chapter 11 for more information.

Table 13-2 Date formats

Date format	Y-axis display
(D1) DD-MMM-YY	14-Aug-89
(D2) DD-MMM	14-Aug
(D3) MMM-YY	Aug-89
(D4) Intn'l long	08/14/89
(D5) Intn'l short	08/14

NOTE The date number displays in the worksheet unless you use Range Format to change it. Y Format affects only the numbers along the y-axis of your graph; it does not affect the appearance of numbers in the worksheet.

Time Select Time to display numbers in the Time format you select. Lotus-DM represents the time of day in decimal format: .000 = midnight, .5 = noon, .999988 = 11:59 PM. You can also enter the time of day in fraction format based on a 24-hour clock, for example, 15/24 = 03:00 PM.

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For positive numbers, Lotus-DM calculates the time number by adding the decimal part of the number to zero. For negative numbers, Lotus-DM calculates the time number by subtracting the decimal part of the number from one.

Use @TIME to enter the time number. @TIME calculates the time number for a time you specify. To display the time rather than the time number, use one of the four time formats.

The four Time formats (D6 – D9) are as follows: HH:MM:SS (AM/PM), HH:MM (AM/PM), HH:MM:SS (24hr) (Intn'l long), and HH:MM (24hr) (Intn'l short). Table 13-3 illustrates how each time format displays along the scaled y-axis in your graph when you specify @TIME(14,3,7) in the y-axis range in the worksheet. The Intn'l long and Intn'l short displays reflect the default settings, which show in the Graph Y Format dialog box. See "International" in Chapter 11 for more information.

Table 13-3 Time formats

Time format	Y-axis display
(D6) HH:MM:SS (AM/PM)	02:03:07 PM
(D7) HH:MM (AM/PM)	02:03 PM
(D8) Intn'l long	14:03:07
(D9) Intn'l short	14:03

(NOTE) The time number displays in the worksheet unless you use Range Format to change it. Y Format affects only the numbers along the y-axis of your graph; it does not affect the appearance of numbers in the worksheet.

Text Select Text to display formulas as entered rather than as their computed values (or as much of the formulas as fits within the current column width) and to display numbers in General format. For example, 165.00 displays as 165 and +FIRST&LAST displays as +FIRST&LAST.

Hidden Select Hidden to make the numbers along the y-axis invisible, though the values still exist in the worksheet.

Default Select Default to use global cell format specified with Worksheet Format. See "Format" and "International" in Chapter 11 for more information.

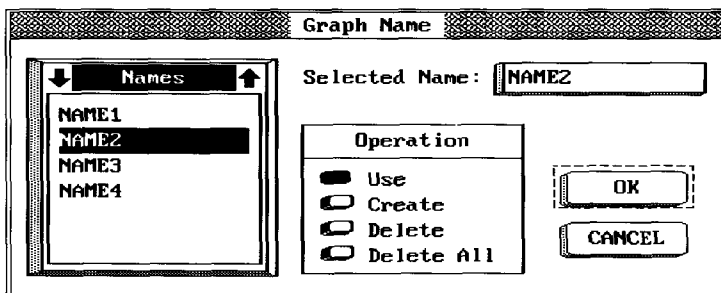
When you finish, select OK to verify the new graph scaling format, or select CANCEL to return to your current worksheet without changing the current graph scaling format for numbers, dates, and times.

Name

Select Name (CTRL-E) to create and name, retrieve, or delete the current named graphs.

If you want to work with more than one set of graph settings, you can save your work by creating a named graph within your worksheet file and then saving your worksheet file. Otherwise, the current graph settings will be erased when you select new settings, retrieve another worksheet, or exit Lotus-DM, and you will have to re-create them. (See "Save" and "Save As" in Chapter 9 for information on saving worksheet files.)

When you select Name, you see the Graph Name dialog box.



Specify a graph name in the Selected Name field or select a graph name from the Names list box.

Select Use, Create, Delete, or Delete All from the Operation options.

Use Select Use to retrieve the existing named graph you specified in the Selected Name field.

If you change a named graph, you must save the new settings or your changes will be erased. See "Create" next.

(NOTE) When you retrieve a named graph, you lose all the settings in the current graph. To preserve a graph with its current settings, save it as a named graph with Name Create before you retrieve another named graph.

Create Select Create to store the current graph settings with your worksheet file as a named graph. Named graphs store graph settings only. If you change the data in your worksheet, you also change all related named graphs. You can create up to 64 named graphs, depending on available memory.

Once you name a graph and save it with the current worksheet, you can retrieve it at any time with Name Use. If you make changes to an existing named graph, use Create to store the new graph settings under the original name or under a new name.

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NOTE Create names the current graph and stores its settings with the current worksheet. In order to retrieve your named graph in future sessions, you must save it with the current worksheet file. See "Save" and "Save As" in Chapter 9 for more information on saving worksheet files.

Delete Select Delete to remove the specified named graph permanently from the related worksheet file.

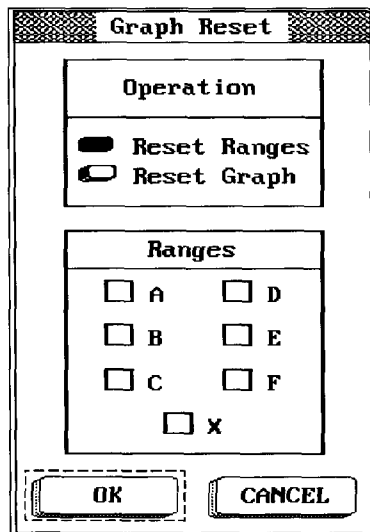
CAUTION Once you delete a named graph, Lotus-DM erases all the graph settings for the selected graph. Once deleted, your graph cannot be retrieved.

Delete All Select Delete All to delete all the named graphs stored with the current worksheet. Make sure that you want to erase all the named graphs, because you cannot retrieve them after you delete them. You do not need to specify a name in the Selected Name field when you select Delete All.

When you finish, select OK to make a named graph current, to create or delete a named graph, or to delete all the current named graphs. Select CANCEL to return to your current worksheet without making any changes.

Reset

Select Reset to delete some or all the specified range addresses or to change all the graph settings back to their default settings. When you select Reset, you see the Graph Reset dialog box.



The image shows a dialog box titled "Graph Reset". It contains two main sections: "Operation" and "Ranges".

Operation

- ☒ Reset Ranges
- ☐ Reset Graph

Ranges

<input type="checkbox"/> A	<input type="checkbox"/> D
<input type="checkbox"/> B	<input type="checkbox"/> E
<input type="checkbox"/> C	<input type="checkbox"/> F
<input type="checkbox"/> X	

At the bottom of the dialog box are two buttons: "OK" and "CANCEL".

Select Reset Ranges or Reset Graph from the Operation options.

Reset Ranges Select Reset Ranges to delete some or all of the range addresses you specified in the current graph with Graph Ranges. Reset Ranges deletes only the graph range settings; it does not affect your worksheet data. (See "Ranges" earlier in this chapter for more information.) Then, select each range you want to reset. If you leave the Ranges options blank, Lotus-DM deletes none of the range addresses in the current graph.

Reset Graph Select Reset Graph to reset all current graph settings to their default settings and to clear all specified ranges, titles, and legends. Make sure that you do not want to retain any settings, because you must re-create the current settings to restore them if you have reset them.

If you want to reset some (but not all) of the current graph settings, you must select the relevant Graph command and reset each setting individually. Reset Graph does not affect named graphs.

Table 13-4 lists the default graph settings.

Table 13-4 Default graph settings

Command	Default settings
Type	Line
Options	Both lines and symbols format
Data Labels	Center alignment
Grids	Clear
Scaling	Automatic x-axis and y-axis scaling, with scale indicators and a skip factor of 1
X Format	General number format; DD-MMM-YY date format; HH:MM:SS AM/PM time format; 0 decimal places
Y Format	General number format; DD-MMM-YY date format; HH:MM:SS AM/PM time format; 0 decimal places

When you finish, select OK to delete the selected ranges or to reset the current graph settings, or select CANCEL to return to your current worksheet without changing the selected ranges or current graph settings.

Chapter 14

Data Commands

The Data commands let you enter, organize, and analyze data in a database table. A Lotus-DM **database table** is a worksheet range consisting of related data organized in rows and columns. You can have as many database tables in a given Lotus-DM worksheet as you want, until there are no more cells available in the worksheet or until Lotus-DM has used all available memory.

Database Terminology

The following terms have special meanings in the context of database table:

- **Field.** Each column in the database table comprises one **field**, because all the information in the column is categorically the same. A database table can contain up to 256 fields. Fields contain either labels or values. Do not mix labels and values within a single field.
- **Record.** Each row in the database table comprises a single **record**, because it contains information about one particular item in the database table. A database table can contain up to 8,191 records.

(NOTE)

The size of a database table is contingent on the amount of available memory. The MEM status indicator in the edit panel lights up when a database table approaches memory limits. See Appendix D for information on memory management.

14-2 Data Commands

	A	B	C	D	E
1		Field Names			
2					
3			Record		
4		F			
5		i			
6		e			
7		d			

Database Table

Figure 14-1 Elements of a database table: fields, records, and field names

- **Field Name.** Each cell in the first row of the database table contains a label identifying the kind of information appearing in the column below. These labels are called **field names** and they must be unique for each field within a database table.

You can widen a column using Worksheet Column (CTRL-W) to accommodate both the field name and the largest entry you want to display in a field. Lotus-DM displays asterisks for a value in a cell if it is longer than the column width, and shows a long label when a label exceeds the column width if the cell to its right is blank. If the cell to its right is not blank, Lotus-DM truncates the display of a long label. The maximum width is 240 characters. Do not insert any blank rows or divider lines between the row of field names (the first row) and any subsequent rows in the database table.

The Data commands perform the tasks detailed in Table 14-1.

Fill

Select Fill (CTRL-D) to enter an ascending or descending sequence of values in a range you specify in the worksheet before selecting this command. The range can be part of a database table or another part of the worksheet. Lotus-DM fills the range with values you specify downward through the leftmost column and then downward through each subsequent column, from left to right, until it fills the range or reaches the Stop Value.

Table 14-1 Data commands

Select	To
Fill	Fill a range with a sequence of values.
Table	Create a table that shows how the results of formulas vary when you change the numbers used in the formulas.
Sort	Arrange records in a database table in the order you specify.
Query	Locate and extract selected records in a database table.
Distribution	Create a frequency distribution (the number of values in a range that fall within specified numeric intervals).
Matrix Multiply	Multiply matrices formed by rows and columns of entries.
Matrix Invert	Create the inverse of a square matrix.
Regression	Perform a regression analysis (determines the relationships among up to 16 independent variables).
Parse Setup	Identify the location of the format cell to which Lotus-DM refers when parsing data.
Parse	Separate and convert a single column of long labels, an input column, into several columns of data.

If Lotus-DM reaches the Stop Value or exceeds the memory limit before filling the range, Lotus-DM leaves the remaining cells in the range blank.

When you select Fill, you see the Data Fill dialog box.

The image shows a 'Data Fill' dialog box. It has a title bar with the text 'Data Fill'. Inside the dialog, there are four labeled input fields: 'Range:' containing 'a1..h7', 'Start Value:' containing '1', 'Step:' containing '5', and 'Stop Value:' containing 'B191'. At the bottom of the dialog, there are two buttons: 'OK' and 'CANCEL'.

Range Specify the name or address of the range you want Lotus-DM to fill with sequential values. When you select Fill for the first time during a session, you see the address of the current range displayed in the Range field. Lotus-DM displays a the most recently specified range in the Range field each subsequent time you select Fill during the current session. If the range shown is not the one you want, specify the correct range address by typing over the name or address displayed in the Range field.

14-4 Data Commands

Start Value Specify the first value Lotus-DM enters in the top left cell of the range. The start value can be any value, a formula, or an @function. When you select Fill for the first time during a session, you see the default start value, 0, in the Start Value field. Lotus-DM displays the most recently specified start value each subsequent time you select Fill during the current session.

Step Value Specify the increment between values in the sequence. The step value can be any positive or negative number. If you specify a negative step value, the stop value you specify must be less than the start value. When you select Fill for the first time during a session, you see the default step value, 1, in the Step Value field. Lotus-DM displays the most recently specified step value each subsequent time you select Fill during the current session.

Stop Value Specify the value Lotus-DM uses as a limit for the sequence. The Stop Value can be any positive or negative number. When you select Fill for the first time during a session, you see the default stop value, 8191, in the Stop Value field. Lotus-DM displays the most recently specified stop value each subsequent time you select Fill during the current session.

Select OK to fill the range with values as you specified, or select CANCEL to return to the worksheet.

Table

Select Table to create a table that shows how the results of formulas vary when you change the value of one or two variables used in those formulas. Table is particularly useful in performing what-if analyses. There are two types of tables, Data Table 1 and Data Table 2. Data Table 1 calculates one or more formulas that use only one variable. Data Table 2 calculates only one formula that uses two variables.

Before Using Table

Before you use Table, you set up the worksheet. To set up the worksheet, create a table range and one or two input cells. A **table range** is a range that contains a data table.

An **input cell** is a cell where Lotus-DM calculates the results of a formula as it substitutes a value for a variable. Each variable needs a corresponding input cell. If you label the input cell(s), specify the label in the cell to the left of the input cell. Lotus-DM uses the cell above the input cell in some applications. See "Using Table with Database Tables" later in this chapter.

Setting up the worksheet properly is an important part of using Table. Figure 14-2 identifies the setup each data table requires.

Data Table 1

	A	B	C	D	E	F	G
1	Blank Cell		Formulas				
2							
3	Input		Results				
4	Values		Area				
5							
6							
7	Input Cell						
8	<div></div>						

Data Table 2

	A	B	C	D	E	F	G
1	Formula	Input Values for input cell 2					
2	Input Values for Input cell 1	Results Area					
3							
4							
5							
6							
7	Input Cell 1		Input Cell 2				
8	<input type="text"/>		<input type="text"/>				

Table Range =



Figure 14-2 Setups for Data Table 1 and Data Table 2

Figure 14-2 shows you how to set up the worksheet before you select Table. The elements for each table setup are described in the following sections. See the section "Using Table with Database Tables" later in this chapter for information on how to set up Data Table 1 and Data Table 2 to reference database tables in a worksheet.

Setting Up Data Table 1

You set up Data Table 1 by creating a table range and a single input cell. The table range can appear anywhere on a worksheet. The table range for Data Table 1 consists of four parts: a blank cell, formulas, input values, and the results area.

Blank Cell is a cell containing no data whose address is the intersection of the first row and the first column of the table range.

Formulas go in the first row of the table range, starting at the second cell from the left, where each cell can contain one formula. The first cell in the row must be blank. Each formula can contain only one variable. Use the address of the input cell to represent the variable in each formula. When Lotus-DM calculates the formulas, it fills the field beneath each formula with results as it substitutes the values you specify as input values for the variable in the formulas.

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NOTE If you include blank cells or those containing only nondisplaying characters to separate the formulas across the first row of the table, Lotus-DM puts nothing or zeros, respectively, in the fields beneath them.

Input Values go in the first column of the table range, not including the topmost cell. Each cell in the first column must contain one value. Lotus-DM calculates the formulas with these values.

Results Area is the part of the table range below the formulas and to the right of the input values. The results area should be blank (unless you want Lotus-DM to write over any data), because Lotus-DM fills it with the formula results.

Input Cell is a cell Lotus-DM uses as a scratch pad when it makes calculations for a table, and serves as a reference to the variable in the formulas. The input cell must be outside the table range. The input cell should be blank, because Lotus-DM writes over any data in the input cell when it calculates.

Setting Up Data Table 2

You set up Data Table 2 by creating a table range and two input cells. The table can appear anywhere on a worksheet. The table range for Data Table 2 consists of four parts: a formula, input values for the first variable, input values for the second variable, and a results area.

Formula goes in the cell whose address is the intersection of the first row and the first column of the table. The formula contains two variables. Use the addresses of the two input cells to represent the two variables in the formula.

You may want to format the formula cell as a text cell using Range Format if the formula contains a string. Otherwise, unless the data in the cells include values only, the formula will evaluate to 0 or ERR. This will not affect the results of the Data Table command, however. Note that logical formulas evaluate only to 0 or 1 and are therefore not recommended for most applications.

Input Values for input cell 1 is the first column of the table, not including the topmost cell, that contains values to be used as first variables in the formula. Each cell in the first column must contain one value.

Input Values for input cell 2 is the first row of the table, not including the leftmost cell, that contains values to be used as second variables in the formula. Each cell in the first row must contain one value.

Results Area is the part of the table range below and to the right of the input values. The results area should be blank (unless you want Lotus-DM to write over any existing data), because Lotus-DM fills it with the formula results. Lotus-DM displays the result of the formula at each intersection of the row and column containing the first and second variables.

Input Cell 1 and Input Cell 2 are cells Lotus-DM uses as scratch pads when it makes calculations for a table. Both input cells also serve as a reference to the variables in the formula. The input cells must be outside the table range. Both input cells should be blank, because Lotus-DM writes over any data in them when it calculates.

Using Table with Database Tables

You can use Table to have Lotus-DM extract certain records that meet various criteria you specify in your Data Table formula(s) and write these records in the results area of the table. When you use Table with a database table, you set up the table range differently than when you use Table with a worksheet: you specify different kinds of formulas, you specify different input values, and you use a special label for your input cell(s).

Formulas Whether you are using Data Table 1 or Data Table 2, the formula or formulas you enter in your table that refer to a database must use the database statistical @functions. Use the address(es) of the input cell(s) to represent the variables in formulas. See "Database @Functions," and individual @function descriptions in Chapter 17 for more information.

The Input Values In both Data Table 1 and Data Table 2, you specify values or labels from your criteria range as your input values. You must enter these values or labels exactly as they appear in the database table.

- **Input Values and Data Table 1** Specify values or labels from the criteria range in the area of the table reserved for input values. When Lotus-DM calculates the data table, it uses these values or labels as the criteria to determine which records to include in calculations.
- **Input Values and Data Table 2** Specify values or labels from the first criteria range field, the field associated with input cell 1, in the first column of the table below the cell containing the formula. Specify values or labels from the second criteria range, the field associated with input cell 2, in the top row of the table to the right of the cell containing the formula.

Specify locations for the two input cells. Each input cell must be immediately below a cell containing the field name that refers to its corresponding variable. If you already created a criteria range for the database table, you can use it to specify the input cells, or you can create a separate criteria range specifically for the data table.

The Input Cells Specify the field name of the criteria range field you refer to in the cell directly above the input cell. For Data Table 2, because you refer to two field names, specify both field names above the correct corresponding input cell.

Selecting Table

When you select Table you see the Data Table dialog box.

The screenshot shows a dialog box titled "Data Table". It contains two sections: "Data Table 1" and "Data Table 2". "Data Table 1" is selected, indicated by a checked checkbox. It has a "Table Range" of "a1..e11" and an "Input Cell" of "e15". "Data Table 2" is unselected, indicated by an unchecked checkbox. It has a "Table Range" of "A1..A1", an "Input Cell 1" of "A1", and an "Input Cell 2" of "A1". At the bottom of the dialog are three buttons: "OK", "CANCEL", and "RESET".

Data Table 1 or Data Table 2 Specify a data table type. Select Data Table 1 to calculate one or more formulas that use only one variable. Select Data Table 2 to calculate only one formula that uses two variables.

Table Range Specify the range of the table in the Table Range field. The table range is an area of the worksheet reserved for the table you create using this command. See "Before Using Table" earlier in this chapter for more information on the table range.

Input Cell Specify the address of the input cell in the Input Cell field. The input cell is the cell where Lotus-DM calculates the results of a formula as it substitutes a value for a variable. The input cell cannot exist within the table range.

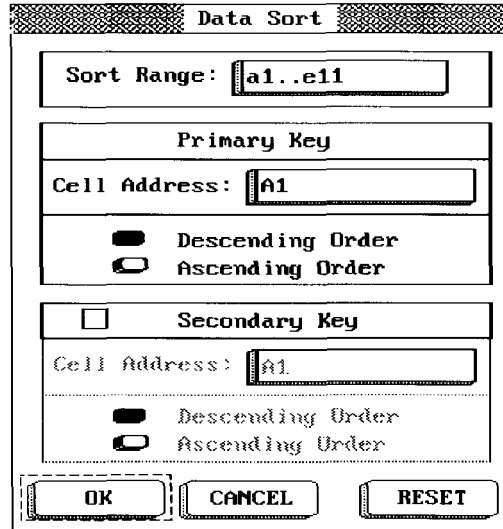
For Data Table 1, specify the address of one input cell because the formula(s) contain only one variable. For Data Table 2, specify the addresses of two input cells because the formula contains two variables.

Press CTRL-F8 to repeat the last Data Table command you selected using the previous specifications.

Select OK to process the data table as you specified, or select CANCEL to return to the worksheet. Select RESET to display the currently selected range in all fields. Use RESET before you save a file if you do not want to save these settings with the file.

Sort

Select Sort to rearrange records in a database table according to criteria you specify. When you select Sort, you see the Data Sort dialog box.



The image shows a 'Data Sort' dialog box with a title bar. It contains several fields and options:

- Sort Range:** A text box containing 'a1..e11'.
- Primary Key:** A section containing a 'Cell Address' text box with 'A1'.
- Order Selection:** Two radio buttons; 'Descending Order' is selected, and 'Ascending Order' is unselected.
- Secondary Key:** A section with an unchecked checkbox, a 'Cell Address' text box with 'A1', and two radio buttons (both unselected) for 'Descending Order' and 'Ascending Order'.
- Buttons:** 'OK', 'CANCEL', and 'RESET' buttons at the bottom.

Sort Range Specify the sort range in the Sort Range field. The sort range is the range that is affected by the Sort command. You must include the full width of the database table when defining the sort range to maintain the integrity of information in database table records.

Do not include the field names in the sort range, because they function only to identify the type of information listed beneath them.

Be aware of including cells containing formulas in the sort range. If you do have formulas in the sort range, apply these guidelines:

- Make sure that formulas with relative addresses refer to cells in the same record.
- A formula that refers to a cell outside the database table should contain the absolute address of that cell.
- Don't include formulas that refer to cells outside the current record in the database table.

Primary Key Specify a cell address for the primary key, or the field that contains the information by which you want to sort the database table, in the Cell Address field. The address can be for any cell in the field.

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Lotus-DM sorts records in two steps. First it reorders the values in the primary key. Second, Lotus-DM rearranges the records of the database table in accordance with the order established in the primary key.

Choose the primary key carefully. The primary key for a name-and-address database table, for example, would be the field containing last names.

Select either Descending Order or Ascending Order to tell Lotus-DM how to arrange the order of data in the primary key. To list last names alphabetically in a name-and-address database table, for example, select Ascending Order for the primary key.

(NOTE) You can use Data Fill to enter record numbers in a field in a database table before you use Sort, and include the record numbers in the sort range. You can then use the field that contains these numbers as the primary sort key if you want to sort the records according to their original order.

Secondary Key Specify a cell address for the secondary key (optional). The secondary key is a tie-breaker when two values in the primary key are the same. In the example of the name-and-address database table, they secondary key would determine the order of two records where the last names are the same. Specify the address of any cell in the Cell Address field.

Select either Descending Order or Ascending Order for the values in the secondary key.

Sort Order

The sort order is the order in which Lotus-DM arranges records when the sort keys (the fields you are sorting by) contain a mixture of different types of labels—that is, labels beginning with letters, labels beginning with numbers, and labels beginning with special characters. The sort order is also called the collating sequence.

The following table shows the collating sequences Lotus-DM follows for ascending order. Descending order reverses the order shown in the table. The sort order ignores label prefixes.

The sort order of records whose primary and secondary key entries are equal is not predictable.

Table 14-2 Data Sort collating sequence

Collating sequence	Ascending order
Numbers first	<ol style="list-style-type: none">1. Blank cells2. Labels beginning with numbers in numerical order3. Labels beginning with letters in alphabetical order4. Labels beginning with other characters5. Values
	Lotus-DM ignores capitalization.

Select OK to sort the range according to your specifications or CANCEL to return to the worksheet. Select RESET to display the current range in the fields, and to display the default sort order setting.

Query

Select Query to search a database table for particular records, copy records from a database table to a separate part of the worksheet, extract records to eliminate duplicates, and remove selected records.

Before Using Query

Before you use Query, you set up your worksheet. To set up your worksheet, create an input range, a criteria range, and an output range.

The **input range** is the range that contains the records in the database table you want Lotus-DM to search.

The **criterion range** tells Lotus-DM which records to search for in the input range. The first row of the criterion range contains copies of the field names from the input range you are searching. The remaining rows contain the criteria you want Lotus-DM to use.

Apply the following guidelines when you create a criterion range:

- Choose a blank range either several rows above, or to the right or left of the input range. In general, it is not a good idea to choose the area below the input range, unless you are certain that you will not be adding records to the input range.
- In the first row of the criterion range, copy some or all of the field names from the input range. You must copy field names exactly as they appear in the input range. You need to copy only the names of the fields you want Lotus-DM to search. Copying all the field names, however, makes it easier to change criteria (using any fields) whenever you want. You can include up to 32 field names in the criterion range.
- Enter your criteria in the second and subsequent rows of the criterion range. Enter each criterion below the appropriate field name. You can enter labels or values exactly as they appear in the input range if you want Lotus-DM to search for records that match the criteria exactly; or you can use wild-card characters to search for records that are similar to the search criteria. You can also enter formulas as criteria.
- Enter criteria for different fields in a single row of the criterion range to search for only those records that match all the criteria at once. Lotus-DM treats criteria in the same row as if they were linked by the logical operator #AND#.

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- Enter criteria for different fields in separate rows of the criterion range to search for records that match any of the criteria. Lotus-DM treats criteria in separate rows as if they were linked by the logical operator #OR#.

The **output range** is area to which Lotus-DM copies the results of the Extract or Unique operations. Like the criterion range, the first row of the output range contains field names copied from the input range. Lotus-DM uses the remaining rows of the output range to copy the selected records.

Use the following guidelines when you create an output range:

- Choose an area that does not overlap your input or criterion ranges. Be sure that you leave enough rows in the output range for the maximum number of records Lotus-DM will select; the maximum size of the output range will always be less than or equal to the width of the criterion range times the length of the input range. In general, it is not a good idea to choose the area below the input range, unless you are certain that you will not be adding records to the input range.
- The maximum width of the output range is 32 fields.
- Specify a single-row output range that contains only the field names if you want Lotus-DM to determine the number of rows it needs for the output range.
- Copy field names from the input range to the first row of the output range. Include each of the fields that you want listed when Lotus-DM copies records that match your criteria. Each field name must be identical to the corresponding field name in the input and criterion ranges, but you can arrange the fields in the output range in any order.

Use Range Name to name some of or all of these ranges before you display the Data Query dialog box. This way, you enter a name instead of an address in the Input Range, Criterion range, or Output Range fields.

Figure 14-3 illustrates the worksheet setup for using Query, including an input range, a criterion range, and an output range. However, note that Figure 14-3 contains data in the output range, because it reflects the results of a Query Extract.

Entering Labels as Criteria

- To search for exact matches, enter labels exactly as they appear in the input range.
- Use the wild-card characters ? and * to search for similar labels in the input range:
 - ? Matches any single character. For example, h?t matches hat, hot, and hut, but does not match huts; h??d matches head and hood, but not heel.
 - * Matches all characters to the end of a label. For example, cat* matches cat, cat-sup, and category, but not cart.
- Precede a label with a ~ (tilde) to search for all labels except that one. For example, ~Smith matches all records with an entry in that field other than Smith.

Input Range Criterion Range (E1..H2)

Help F₁ Aug 10, 1989 Lotus-DM - C:\LOTUS-DM\QUERY.WK1 7:06 pm

File F₂ Edit F₃ Worksheet F₄ Range F₅ Graph F₆ Data F₇ ? F₉ F₁₀

A1 'NAME READY

	A	B	C	D	E	F	G
1	NAME	MONTH	ACCOUNT	SALES	NAME	MONTH	ACCOUNT
2	Wilson	May	BCD Corp	\$1,050		May	
3	Lorenzo	May	Rosebud Corp	\$1,200			
4	Wilson	May	Gen. Corp	\$1,325			
5	Benedict	May	OH Assoc.	\$1,205			
6	Horowitz	May	Music Express	\$1,065			
7	Lorenzo	June	World Inc.	\$1,075			
8	Lorenzo	June	Rosebud Corp	\$1,970			
9	Horowitz	June	Travel Plans	\$2,100			
10	Wilson	June	BCD corp	\$2,350			
11							
12	NAME	MONTH	ACCOUNT	SALES			
13	Wilson	May	BCD Corp	\$1,050			
14	Lorenzo	May	Rosebud Corp	\$1,200			
15	Wilson	May	Gen. Corp	\$1,325			
16	Benedict	May	OH Assoc.	\$1,205			
17	Horowitz	May	Music Express	\$1,065			
18							

Output Range

Figure 14-3 A Data Query

- Combine a ~ (tilde) with wild-card characters to create label criteria. For example, ~S* matches all records with an entry in that field that do not begin with S.
- Lotus-DM never matches a label criterion with blank cells in the input range.

Entering Values as Criteria

- You do not need to format values exactly as they appear in the input range to search for exact matches. For example, \$23 matches 23, 23.000, and 2.30E+01. You cannot link values using the logical operators #AND#, #NOT#, or #OR#, because Lotus-DM evaluates the operator (and the neighboring characters) as a string and assigns the string a value of 0. For example, >3#AND#<6 matches all entries greater than 0, because the string 3#AND#<6 has a value of 0. See the following section for information on entering formulas as criteria.

Entering Formulas as Criteria

- You can enter one or more formulas linked by logical operators to search for labels or values. A formula you enter as a criterion can include a field name or the address of the first record in a field, an operator, and a value or label. Lotus-DM assumes the formula refers to the field in the input range that corresponds to the field name under which you are entering the formula.

(NOTE) If a formula contains a field name that matches an existing range name, the query may not yield the correct results. Make sure your formulas do not contain field names that match existing range names, unless the named range is a single-cell range that refers to the cell below the corresponding field name.

- You can also combine criteria in a formula to search for records that match more than one criterion. For example, you could enter +MONTH="May"#AND#SALES>1500 in the criterion cell under the MONTH field name to search for all records in May with sales greater than 1500.
- Use relative cell addresses or range names in formulas that refer to other fields in the input range. Use absolute cell addresses to refer to values outside the input range.

Entering Multiple-Field Criteria

- Specify criteria for different fields in a single row of the criterion range to search for only those records that match all the criteria at once. Lotus-DM treats criteria in the same row as if they were linked by the logical operator #AND#.
- Specify criteria for different fields in separate rows of the criterion range to search for records that match any of the criteria. Lotus-DM treats criteria in separate rows as if they were linked by the logical operator #OR#.

	E	F	G	H	I	J	K
1	THE CRITERION RANGE (E2..H4)						
2	NAME	MONTH	ACCOUNT	SALES			
3		May					
4	Lorenzo		Rosebud Corp.				
5							

Figure 14-4 Creating a logical #OR# condition in the criterion range

- A blank cell in the criterion range tells Lotus-DM to include any records in the input range, as long as the records match the other criteria.

(NOTE) If a multiple-row criterion range contains a blank row, Lotus-DM ignores the blank row and selects all the records that match any criteria in the remaining row(s) of the criterion range.

- Use the logical operators #AND#, #NOT#, or #OR# in formulas to create criteria that match more than one condition in the same field. For example, the formula +SALES>1500#AND#+SALES<2200 searches for all records with SALES entries greater than 1500 but less than 2200.

Selecting Query

When you select Query, you see the Data Query dialog box.

Data Query													
Input Range:	a1..d9												
Criterion Range:	e1..h2												
Output Range:	A1..A1												
<table border="1"> <thead> <tr> <th colspan="2">Operation</th> </tr> </thead> <tbody> <tr> <td><input type="radio"/></td> <td>Find Previous</td> </tr> <tr> <td><input type="radio"/></td> <td>Find Next</td> </tr> <tr> <td><input type="radio"/></td> <td>Delete</td> </tr> <tr> <td><input type="radio"/></td> <td>Extract</td> </tr> <tr> <td><input type="radio"/></td> <td>Unique</td> </tr> </tbody> </table>	Operation		<input type="radio"/>	Find Previous	<input type="radio"/>	Find Next	<input type="radio"/>	Delete	<input type="radio"/>	Extract	<input type="radio"/>	Unique	<div>RESET</div> <div>OK</div> <div>CANCEL</div>
Operation													
<input type="radio"/>	Find Previous												
<input type="radio"/>	Find Next												
<input type="radio"/>	Delete												
<input type="radio"/>	Extract												
<input type="radio"/>	Unique												

Input Range Specify the input range, either by range address or by range name if it is a named range, in the Input Range field. The input range is the range that contains the records in the database table you want Lotus-DM to search. The input range must include the field names.

Criterion Range Specify the criterion range, either by range address or by range name if it is a named range, in the Criterion Range field. The criterion range is the range that tells Lotus-DM which records to search for in the input range.

Output Range Specify the output range, either by range address or by range name if it is a named range, in the Output Range field. The output range is the area to which Lotus-DM copies the results of Extract or Unique. Specify the output range only if you select the Extract or Unique operation.

Operation Select one of the five operations, described in Table 14-3.

Select OK to start the query as you specified or select CANCEL to return to the worksheet. Lotus-DM retains the most recently specified input, criteria, and output ranges with your worksheet. Select RESET to display the default settings.

Table 14-3 Query operations

Select	To
Find Previous	Locate the previous record in the input range that matches the criteria you specified in the criterion range.
Find Next	Locate the next record in the input range that matches the criteria you specified in the criterion range. This is the default setting.
Delete	Delete the records in the input range that match the criteria you specified in the criterion range and delete the rows from the worksheet. As a safety precaution, Lotus-DM prompts you for confirmation before the deletion.
Extract	Copy to the output range the records in the input range that match the criteria you specified in the criterion range.
Unique	Copy to the output range the records in the input range that match the criteria you specified in the criterion range. Unlike Extract, Unique eliminates any duplicate records from the output range and sorts the records.

Distribution

Select Distribution to create a frequency distribution of the values in a range. A **frequency distribution** counts how many of the values in a range (the values range) fall within specified numeric intervals (the bin range). You can use Distribution in conjunction with Graph commands to create bar graphs.

Before Using Distribution

Before you use Distribution, you set up the worksheet. To set up the worksheet, create a values range, a bin range, and an output range. Figure 14-5 illustrates the setup for Distribution.

Values Range The values range contains the values you want to analyze. You can create a values range anywhere on the worksheet. Cells in the values range that are blank or that contain labels are not evaluated.

Bin Range The bin range contains numeric intervals for the frequency distribution of values in the values range. You must create a bin range to the immediate left of the output range.

You can use any values (including formulas) in the bin range, provided each value within the range is unique, and the values are in ascending order (from smallest to greatest). Do not include labels or blank cells in the bin range.

To create a bin range with equal intervals, use Data Fill, and specify the interval for the frequency distribution in the Step field. See "Fill" earlier in this chapter for more information.

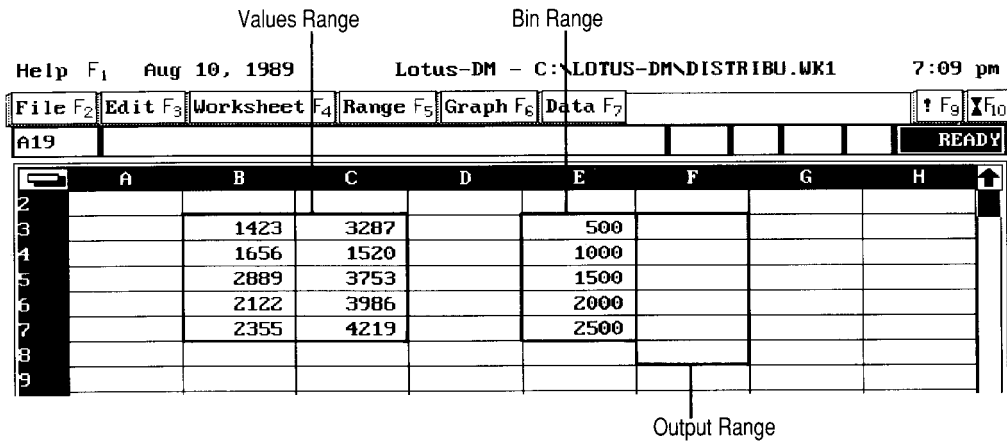


Figure 14-5 Setting up the worksheet for Distribution

Output Range Lotus-DM fills the field to the immediate right of the bin range with the results of Distribution as you specified. You do not have to set up the output range, because Lotus-DM fills it automatically, writing over any existing data in the output range. The output range contains numbers that represent how many values in the values range are less than or equal to the value in the bin range, but greater than the preceding value in the bin range. The last number in the output range appears in the row below the last row of the bin range. It represents the number of values in the values range that are greater than the last value in the bin range.

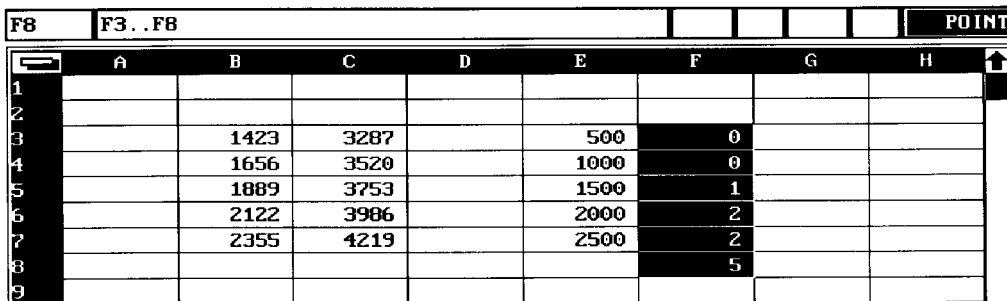
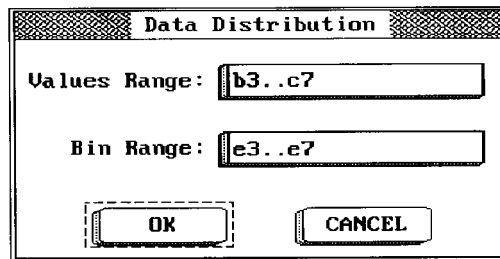


Figure 14-6 Results in the output range

Selecting Distribution

When you select Distribution, you see the Data Distribution dialog box.



Values Range Specify the range containing the values you want to analyze in the Values Range field.

The Bin Range Specify the range containing the intervals for the frequency distribution in the bin range in the Bin Range field.

Select OK to create the frequency distribution as you specified. Select CANCEL to return to the worksheet.

Matrix Multiply

Select Matrix Multiply to multiply matrices formed by rows and columns of entries. The command multiplies the columns of one matrix by the rows of a second matrix and creates a third matrix that contains the results of the multiplication. When multiplying matrices, the first range of values must have the same number of columns as there are rows in the second range of values. The largest possible matrix is 90 rows by 90 columns.

Before Selecting Matrix Multiply

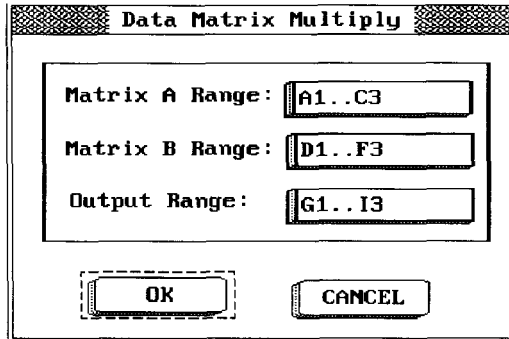
You must set up your worksheet before selecting Matrix Multiply. To set up your worksheet, you must create Matrix A, Matrix B, and an output range. Matrix A contains the values of one matrix, while Matrix B contains the values for the other matrix. Matrix A must contain the same number of columns as there are rows in Matrix B. You can set up both Matrix A and Matrix B as database tables. Refer to "Terms You Need to Know" earlier in this chapter for information on the elements of a database table.

The output range is where Lotus-DM displays the results of the multiplication of the columns in Matrix A by the rows in Matrix B. The output range should be blank, because Lotus-DM will write over any existing data in that range. The output range will comprise as many columns as has Matrix B and as many rows as has Matrix A.

You can use Range Name to name Matrix A and Matrix B before you display the Data Matrix Multiply dialog box. This way you enter a range name instead of an address in the Matrix A Range and Matrix B Range fields.

Selecting Matrix Multiply

When you select Matrix Multiply, you see the Data Matrix Multiply dialog box.



The dialog box is titled "Data Matrix Multiply". It contains three input fields: "Matrix A Range:" with the value "A1..C3", "Matrix B Range:" with the value "D1..F3", and "Output Range:" with the value "G1..I3". At the bottom, there are two buttons: "OK" and "CANCEL".

Matrix A Range Specify the range for Matrix A.

Matrix B Range Specify the range for Matrix B.

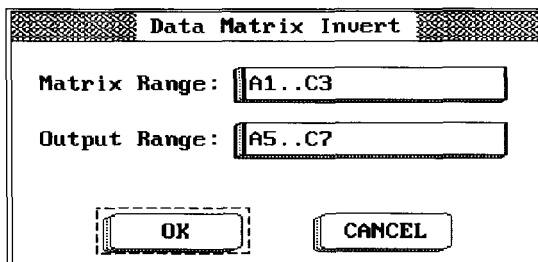
Output Range Specify the output range. The output range is where you want Lotus-DM to put the product of the matrix multiplication.

Select OK to multiply the matrices or CANCEL to return to the worksheet.

Matrix Invert

Select Matrix Invert to create the inverse of a square matrix. You can invert only square matrices: those that have the same number of columns as rows. The largest possible matrix is 90 rows by 90 columns.

When you select Matrix Invert, you see the Data Matrix Invert dialog box.



The dialog box is titled "Data Matrix Invert". It contains two input fields: "Matrix Range:" with the value "A1..C3" and "Output Range:" with the value "A5..C7". At the bottom, there are two buttons: "OK" and "CANCEL".

Matrix Range Specify the range of the matrix you want to invert. The matrix must be a square matrix.

Output Range Specify the output range. The output range is where you want Lotus-DM to put the inverted matrix.

Select OK to invert the matrix or CANCEL to return to the worksheet.

Regression

Select Regression to produce statistics that describe the correlation between one data range and another. Regression also calculates the slope of the line that best illustrates the data. If a high correlation between two or more sets of data exists, you can use these statistics to predict future trends. Use Regression to analyze financial, marketing, or research data.

Before Selecting Regression

You must set up your worksheet before you select Regression. To set up your worksheet, create an X range, a Y range, and an output range.

	Y Range		X Range					
	A	B	C	D	E	F	G	H
1	Y	X1	X2					
2	0.586	0.455	3.98					
3	0.58	0.419	3.99					
4	0.549	0.407	4.03					
5	0.512	0.418	3.8					
6	0.488	0.398	3.99					
7	0.481	0.373	4.11					
8	0.481	0.383	3.95					
9								
10	Regression Output:							
11	Constant			-0.80217				
12	Std Err of Y Est			0.024287				
13	R Squared			0.814661				
14	No. of Observations			7				
15	Degrees of Freedom			4				
16								
17	X Coefficient(s)	1.656355	0.163972					
18	Std Err of Coef.	0.395183	0.113724					

Figure 14-7 Data Regression

X Range contains all the columns of data that Lotus-DM analyzes as independent variables. You can specify up to 16 independent variables. You must create a column

in the X range for each independent variable you want Lotus-DM to analyze. Specify the values for the independent variables in their respective columns. The number of rows in the X range must be equal to the number of rows in the Y range.

Y Range contains the column of data to be analyzed as dependent variables. Specify the values for the dependent variables in the column. The number of rows in the Y range must be equal to the number of rows in the X range.

Output Range is where Lotus-DM enters the following information when it processes Regression: the standard error of the Y-estimate, the R-squared value, the number of observations, the degrees of freedom, the X-coefficients (for each of the independent variables), and the standard error of each of the coefficients. The output range must be at least nine rows long and two columns wider than the number of independent variables; that is, it must be a minimum of four columns wide.

You can use Range Name to name some of or all of the ranges before you display the Data Regression dialog box. This way you can enter a range name instead of an address in the X Range, Y Range, or Output Range fields.

Selecting Regression

When you select Regression, you see the Data Regression dialog box.

Data Regression

X Range: c2..d8

Y Range: b2..b8

Output Range: b10..e18

Zero Intercept

☒ Compute

☐ Force to zero

OK CANCEL

X Range Specify the range containing the independent variables in the X Range field. The X range can be a maximum of 16 columns wide. It must contain the same number of rows as the Y Range.

Y Range Specify the range containing the dependent variables in the Y Range field. The Y range must contain the same number of rows as the X range.

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Output Range Specify the range where Lotus-DM displays the results of the regression analysis. Lotus-DM displays labeled information in the output range as described in Table 14-4.

Table 14-4 Statistics Lotus-DM displays after performing a regression analysis

Label	Description
Constant	The y-axis intercept (where the best-fitting line intersects the y-axis).
Standard error of the Y estimate	The standard error of the estimated Y values.
R Squared value	<p>The reliability of the regression (a value from 0 to 1). The closer the R^2 value is to 1, the greater the dependence of variables.</p> <p>NOTE If Lotus-DM displays a value less than zero, you specified a zero intercept when it was not appropriate to do so. Select the Zero Intercept Compute option and recalculate the regression and adjust the R^2 value accordingly.</p>
Number of observations	The number of records in a database table or rows in a worksheet included in the X and Y ranges.
Degrees of freedom	<p>The number of observations (rows in the X range) minus the number of independent variables (number of columns in the X range) minus 1.</p> <p>If you use a zero intercept, the degrees of freedom equal the number of observations minus the number of independent variables.</p>
X coefficients	The slope for each independent variable, or the amount that the dependent variable increases for every increase in the independent variable.
Standard error of the X coefficients	The standard error for each of the x-coefficients. If this value is less than one-half of the x-coefficient, then the predictions are correct.

Zero Intercept Select Compute (the default) or Force to zero. If you select Compute, Lotus-DM calculates the y-axis intercept. If you select Force to zero, Lotus-DM uses 0 (zero) for the y-axis intercept. Do not select Force to zero unless the data for the dependent variables must equal zero when all independent variables equal zero.

Select OK to perform the regression analysis or CANCEL to return to the worksheet.

Parse Setup

Select Parse Setup to have Lotus-DM create a format line that Data Parse uses to convert a column of long labels into several columns of labels or numbers. For example, you can have Lotus-DM create a format line to convert the three-word label Average Monthly Sales into three separate labels, one label per column. You use Parse Setup in conjunction with Data Parse to convert an ASCII text file, imported into your worksheet with File Import, into a standard Lotus-DM worksheet or database table.

Before Selecting Parse Setup

When you use File Import to import an ASCII text file into a Lotus-DM worksheet, the data is treated as long labels and fills only one column until you parse the data. However, the column containing the cell pointer when you execute the File Import command is the only column that contains the imported data. You can view or print the imported data, but you cannot calculate with the numbers each label contains, nor can you easily move any part of the label. To work with imported data in Lotus-DM, you must parse it.

The column containing the imported data is called the **input column**. Each long label in the input column corresponds to a row of data in the imported file. When you execute File Import, Lotus-DM reads the imported file row by row (using a carriage return as an end-of-line delimiter). Lotus-DM gathers data in a row in groups of 240 characters (including spaces), the maximum length of a label. Lotus-DM does not import data that comes after the row's first 240 characters.

A group of data separated from another group of data by a space is called a **data block**. The goal of parsing is for Lotus-DM to insert each data block in the long label into separate but contiguous cells in the worksheet.

To identify how you want Lotus-DM to parse the data, create one or more format lines. A **format line** sets the standard for how all labels in the cells below it will be parsed into individual cells. When you execute Parse Setup, Lotus-DM inserts a format line in the worksheet.

AZ	NAME	MONTH	ACCOUNT	SALES				READY
1	A	B	C	D	E	F	G	
2	NAME	MONTH	ACCOUNT	SALES				
3	Wilson	May	BCD Corp.	1050				
4	Lorenzo	May	Rose Corp.	1200				
5	Wilson	May	Gen Corp.	1238				
6	Benedict	May	DH Assoc.	1205				
7								

Figure 14-8 Long Labels before Parse Setup

A2	!	L>>>*****L>>>*****L>>>>*****L>>>*					READY
	A	B	C	D	E	F	G
1							
2	L>>>*****L>>>*****L>>>>*****L>>>*****						
3	NAME	MONTH	ACCOUNT	SALES			
4	Wilson	May	BCD Corp.	1050			
5	Lorenzo	May	Rose Corp.	1200			
6	Wilson	May	Gen Corp.	1238			
7	Benedict	May	OH Assoc.	1205			
8							

Figure 14-9 The format line after using Parse Setup

Format Lines

The format line is a label preceded by the vertical bar label prefix (!). The label prefix means that it is a nonprinting label. (Some screens may display a split vertical bar; others, an unbroken vertical bar.) The characters in the format line indicate the data type and width of each data block in the long label below the format line. The **data type** is the type of data—value, date, time, or label—within a data block.

Format lines can contain the symbols shown in Table 14-5.

Table 14-5 Format line symbols

Symbol	Description
D	Represents the first character of a date data block.
L	Represents the first character of a label data block.
S	Skips the data block below the skip symbol when parsing. You enter the skip symbol (S) when you edit a format line. Use this symbol when your labels include a data block you do not want Lotus-DM to parse.
T	Represents the first character of a time data block.
V	Represents the first character of a value data block.
>	Represents second and subsequent characters in a data block. For example, Lotus-DM displays a value data block that is four characters wide as V>>>.
*	Represents a blank space that can become part of a data block if that block in any label requires extra characters.

NOTE

If a data block contains an ambiguous entry—that is, data to which Lotus-DM could assign more than one data type—Lotus-DM determines the data type using the following order of precedence: value, date, time, and label. For example, if a data block contains the characters 4/10, Lotus-DM identifies the data type as a value instead of a date, because values come before dates in the order of precedence.

You need to edit the format line if:

- Any data block (including adjacent * characters) is not wide enough to accommodate all of the data that Lotus-DM will parse in the labels below it.
- You want Lotus-DM to parse an ambiguous entry in a particular way. In the example in the **NOTE** above, you would change the data-type character from V (value) to D (date) if you wanted Lotus-DM to interpret 4/10 as a date.
- Any single block contains a space, because the format line treats the block as two shorter blocks

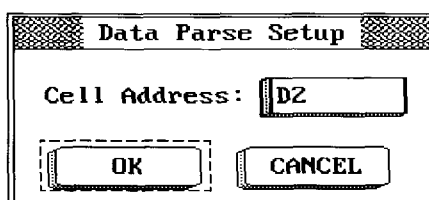
To edit a format line, press CTRL-F2. Lotus-DM highlights the format line, and places the cursor under the first character in the line. Use the cursor movement keys as necessary to edit the format line. Press ENTER to finalize the changes you make to the format line.

You need to create additional format lines if:

- Any label below the format line contains a block whose data type does not match that indicated in the format line.
- Any label below the format line contains a block whose width should be different from that indicated in the format line.
- In addition to values, your imported data contains titles, column headings, other descriptive labels, or a row of characters separating different parts of the worksheet.

Selecting Parse Setup

When you select Parse Setup, you see the Data Parse Setup dialog box.



Cell Address Specify a cell in the input column, the column that contains the imported data, to be used to create the format line. Lotus-DM assesses the contents of the long label in the format cell to set the standard for how all the labels in the remaining cells of the input column will be parsed. Because Lotus-DM reads cells in the input column from top to bottom, you should always identify the topmost cell in the input column.

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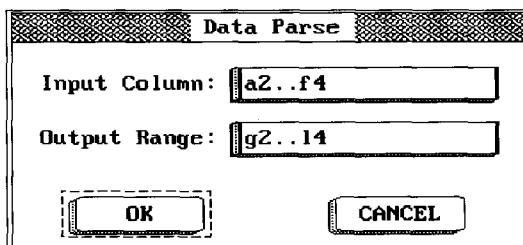
When Lotus-DM assesses the data in the long label, it automatically inserts a format line of the same length in the cell it used to create the format line. It moves all affected long labels down one cell.

Select OK to have Lotus-DM create a format line. Select CANCEL to return to the worksheet.

Parse

Select Parse to convert a column of long labels into several columns of labels or numbers. Parse applies the format line(s) created when you selected Data Parse Setup. Refer to "Before Selecting Parse Setup" in the previous section for more information on format lines.

When you select Parse, you see the Data Parse dialog box.



Input Column Specify the input column in the Input Column field. The input column contains the long labels from the imported file. If you plan to create more than one format line, enter a range address that includes only those labels you want a given format line to affect.

Output Range Specify the address or range name of the first cell in a blank range large enough to hold your rows and columns of parsed data.

CAUTION Be sure the area you specify as the output range is blank or contains unimportant data. Parse uses as many rows and columns as it needs to hold the parsed data and writes over any existing data in that range with the parsed data.

Lotus-DM produces a parsed copy of the imported data in the output range by entering each data block as a value, date, time, or label in an individual cell (see Figure 14-10). If Lotus-DM cannot parse a particular entry using the format specified in the preceding format line, Lotus-DM parses the entry as a label.

A2	NAME	MONTH	ACCOUNT	SALES					READY
1	A	B	C	D	E	F	G		
2	L>>>*****L>>>*****L>>>*****L>>>*****								
3	NAME	MONTH	ACCOUNT	SALES					
4	Wilson	May	BCD Corp.	1050					
5	Lorenzo	May	Rose Corp.	1200					
6	Wilson	May	Gen Corp.	1238					
7	Benedict	May	OH Assoc.	1205					
8									
9									
10	NAME	MONTH	ACCOUNT	SALES					
11	Wilson	May	BCD Corp.	1050					
12	Lorenzo	May	Rose Corp.	1200					
13	Wilson	May	Gen Corp.	1238					
14	Benedict	May	OH Assoc.	1205					
15									

Figure 14-10 Parsed data

If the input column contains one or more blank cells, Lotus-DM ignores these cells when it parses the information in the output range. For example, if the input column is A1..A10 and contains two blank cells, A3 and A4, and you specify A20 as the output range, Lotus-DM enters the parsed labels in rows 20 through 27.

Select OK to parse the long labels, or CANCEL to return to the worksheet.

Chapter 15

PrintGraph Commands

PrintGraph is a separate program within Lotus-DM that you use to print graphs. This program prints only graph files with a .PIC extension or the current clipboard image.

Read Chapter 13 in *Reference* for more information on creating graph files in Lotus-DM. See your DeskMate manual for information on creating graphs in other DeskMate applications and copying or cutting a graph image to the clipboard.

Before you begin your PrintGraph session, make sure that you are using a printer capable of printing graphs and that your printer is on-line and ready. If you are not sure whether your printer can print graphs, check your printer manual. In addition, you can use your printer with PrintGraph only if you have selected appropriate printer settings using DeskMate Setup (F10). For more information on selecting printer settings, see your DeskMate manual or "Using the Setup Accessory" in Appendix A.

NOTE If you want to print a copy of a Lotus-DM worksheet file, use File Print, not PrintGraph. See "Print" in Chapter 9 for more information on printing worksheet files.

You can start PrintGraph from Lotus-DM, directly from the DeskMate desktop, or from DOS. To start PrintGraph from Lotus-DM, select Graph PrintGraph.

NOTE To print the current graph, be sure to save it before you use PrintGraph. Select Graph Save to save the current graph settings in a graph file with a .PIC extension, as required by PrintGraph. See "Save" in Chapter 13 for more information.

15-2 PrintGraph Commands

To start PrintGraph from the DeskMate desktop, select PGRAPH.PDM from the Programs list box.

To start PrintGraph from DOS, type PGRAPH at the DOS prompt for the directory where your PrintGraph files are stored. For more information, see Appendix A in *Reference*.

When you start PrintGraph, you see the PrintGraph screen.

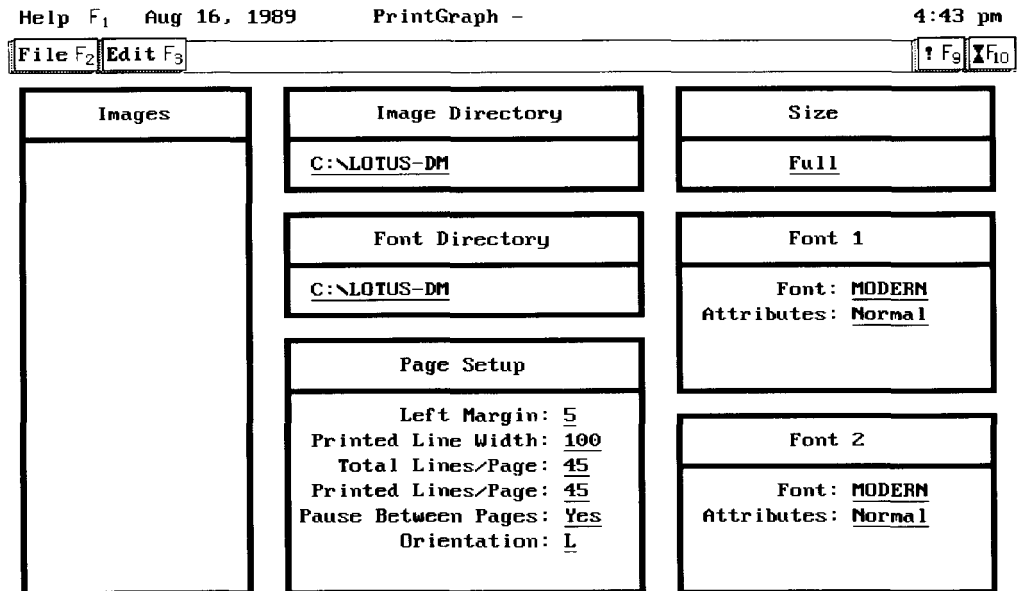


Figure 15-1 The PrintGraph screen

The PrintGraph screen displays the menu bar and seven boxes that list the current settings.

(NOTE) If you are using a mouse, you can click or double-click any one of the seven boxes to select the related PrintGraph command. For example, click the Page Setup box to select File Page Setup.

Use the PrintGraph commands to select graph files or the current clipboard image and to specify the page and image settings for the printed graph. The **page settings** determine the position of the graph on the printed page; the **image settings** affect the appearance of the graph itself. Preview the selected graphs one at a time to check the specified settings, then print one or more graphs on your printer.

Table 15-1 lists the PrintGraph commands.

Table 15-1 PrintGraph commands

Select	To
File	Select, preview, and print graph files with a .PIC extension or the current clipboard image; select the page and image settings; save and reset the page and image settings for the printed graph.
Edit	Select the size of the printed graph.

The following sections describe the PrintGraph commands.

File

Use the File commands to select, preview, and print graphs or the current clipboard image. You can also select the page settings, and save and reset the page and image settings for your printed graph. Table 15-2 lists the File commands.

Table 15-2 File commands in PrintGraph

Select	To
Image(s)	Select and preview one or more graph files with a .PIC extension or the current clipboard image.
Image Directory	Specify the directory where your graph (.PIC) files are stored.
Font 1	Select the type design (font) and attributes for the first title line in the printed graph.
Font 2	Select the type design (font) and attributes for all text, except the first title line, in the printed graph.
Font Directory	Specify the directory where your font (.FNT) files are stored.
Page Setup	Select page settings for the printed page.
Print	Print the selected graph or clipboard image with the specified page and image settings.
Save	Store the current page and image settings.
Reset	Reset the current page and image settings to the default (the last settings you saved).
Exit	End the PrintGraph session.
Run	Begin a new DeskMate application.
About PGraph	View general information about the PrintGraph program.

The following sections describe the File commands in the order they appear on the File menu.

Image(s)

Use Image(s) (CTRL-I) to select and preview graph files or the current clipboard image. When you select Image(s), you see the File Image(s) dialog box.

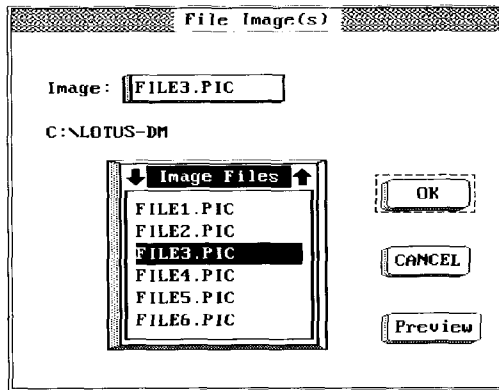


Image Select a graph file with a .PIC extension or the current clipboard image.

Select a graph file by specifying the file name in the Image field or by selecting the file name from the Image Files list box. You can select one or more files to print or a single file to preview.

The Image Files list box displays an alphabetical list of graph files in the specified directory. You can select one file at a time or a group of files.

If you want to select a file or a group of files from a different directory, use File Image Directory in PrintGraph to change the current image directory. See "Image Directory" later in this chapter.

You can select more than one file in the Image Files list box. To select a group of files with a mouse, press SHIFT and click each selection. Do not release SHIFT until you have made all your selections. To select a consecutive group of files with a mouse, point to the first file that you want to select, click, then drag the highlight over each consecutive selection.

To select a group of files with the keyboard, press CTRL while you scroll the list with ↑ and ↓. Press the space bar next to each selection. Do not release CTRL until you have made all your selections. To select a consecutive group of files with the keyboard, press SHIFT while you scroll the list, highlighting each consecutive file in turn. Do not release SHIFT until you have made your selections.

NOTE When you select a group of files from the keyboard, be sure to press TAB to move the cursor to another field. Otherwise, you may deselect the group of files.

The graph files print in the order you select them.

You can also select, print, and preview the current clipboard image created in another DeskMate application. The clipboard can hold only one image at a time, and you overwrite its contents when you copy a new image to the clipboard.

CAUTION Be sure to save a copy of the clipboard contents in the DeskMate application where you created it. Otherwise, you lose your work when the image is overwritten.

You must select, preview, and print the clipboard image separately from graph files. PrintGraph deselects the clipboard image when you select a graph file. Likewise, PrintGraph deselects graph files when you select the current clipboard image.

Select the current clipboard image by typing clipboard in the Image field. (It is not listed in the Image Files list box.) Unlike other DeskMate applications, you do not see the clipboard image when you select it. Select Preview to view the clipboard image. Read "Preview" next for more information.

The current page and image settings apply to all the graphs you select. To print graphs with individual settings, select and print them separately.

Preview Select Preview (CTRL-F10) to view one selected image with the current settings. With Preview, you can see how your graph will look on the printed page.

While you preview a graph, you can select File Font 1 or File Font 2 to change the font and the font attributes for the text in the graph. (All other menu items are shadowed, and you cannot select them.) PrintGraph redraws the graph to reflect the changes you make. See "Font 1" and "Font 2" later in this chapter for more information. You can change font settings only for graph files; you cannot change the clipboard image. These changes affect only the screen image and the printed graph. They do not change the graph file saved on the disk.

NOTE If you want to make changes to a graph file, you must return to Lotus-DM and use the Graph commands to modify the graph settings. If you did not save the graph's settings with the worksheet file, however, you may have to re-create the graph. After you have modified the graph, use Graph Save to save it in a graph file again before returning to PrintGraph.

If you have selected the current clipboard image, you can preview it. You cannot change the fonts or the font attributes: all of the menu items are shadowed, and you cannot select them.

When you finish viewing the selected image, use one of the following methods to return to the File Image(s) dialog box:

- Press ENTER.
- Press CTRL-F10.

You can then select another file or retain the current selection.

When you finish selecting and previewing your image files, select OK to confirm your selections or select CANCEL. The PrintGraph screen shows the currently selected images.

Image Directory

Use Image Directory to specify the directory where you have stored graph (.PIC) files. When you select Image Directory, you see the File Image Directory dialog box.

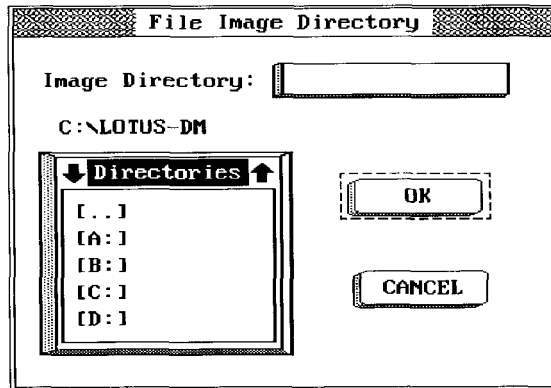


Image Directory Specify the drive and name of the directory that contains the image files in the Image Directory field, or select a directory from the Directories list box. Select OK to confirm the specified directory. You see the new path above the Directories list box. See "Working With Files" in Chapter 8 for more information on specifying directories.

When you finish, select OK to verify the new image directory or select CANCEL to retain the current image directory. The PrintGraph screen shows the currently selected image directory.

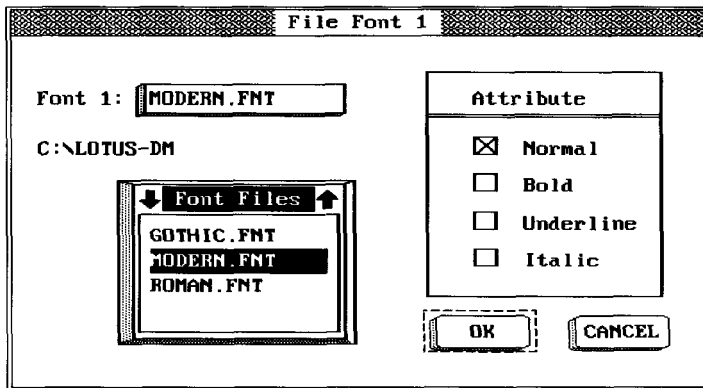
Font 1

Use Font 1 (CTRL-F) to select the font and font attributes for the first title line of your printed graph.

A font is the overall design of the printed characters in the text. Each font has a distinct appearance, and all the characters in one font share common design characteristics. PrintGraph uses two different fonts for the text in your graphs: Font 1 sets the design for the first line of the graph's title, and Font 2 sets the design for all other alphanumeric characters in the graph, including other titles, legends, and numbers.

(NOTE) You can select File Page Setup and Edit Size options in PrintGraph for images copied from the clipboard, but you cannot change the fonts. If you want to make changes to your clipboard image, select File Run to return to the DeskMate application where it was created, make your changes, and copy the corrected image to the clipboard again. Then you can return to PrintGraph and retrieve the corrected clipboard image.

When you select Font 1, you see the File Font 1 dialog box.



Font 1 Specify the font name in the Font 1 field, or select a font file (.FNT) from the Font Files list box. If you want to select a font file from a different directory, use File Font Directory in PrintGraph to change the current directory. See "Font Directory" later in this chapter.

You can select more than one Attribute option, for example, Bold Italic. When you select Normal, though, you cannot select any other font attribute. Each set of attributes is also available for Font 2.

Normal Select Normal to print the first title line in regular type.

Bold Select Bold to print the first title line in bold type.

Underline Select Underline to underline the first title line.

Italic Select Italic to print the first title line in slanted type.

(NOTE) Your system may not support the italic attribute.

When you finish, select OK to save your font selection or select CANCEL to return to the PrintGraph screen without making changes. The PrintGraph screen shows the currently selected fonts and font attributes.

Font 2

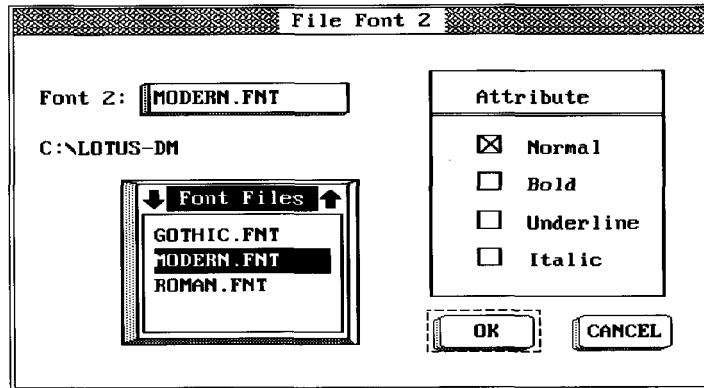
Use Font 2 (CTRL-T) to select the font and font attributes for all text, except the first title line, in your printed graph.

A font is the overall design of the printed characters in the text. Each font has a distinct appearance, and all the characters in one font share common design characteristics. PrintGraph uses two different fonts for the text in your graphs: Font 1 sets the design for the first line of the graph's title, and Font 2 sets the design for all other alphanumeric characters in the graph, including other titles, legends, and numbers.

15-8 PrintGraph Commands

NOTE You can select File Page Setup and Edit Size options in PrintGraph for images copied from the clipboard, but you cannot change the fonts. If you want to make changes to your clipboard image, select File Run to return to the DeskMate application where it was created, make your changes, and copy the corrected image to the clipboard again. Then you can return to PrintGraph and retrieve the corrected clipboard image.

When you select Font 2, you see the File Font 2 dialog box.



Font 2 Specify the font name in the Font 2 field, or select a font file (.FNT) from the Font Files list box. If you want to select a font file from a different directory, use File Font Directory in PrintGraph to change the current directory. See "Font Directory" next in this chapter.

You can select more than one Attribute option, for example, bold italic. When you select Normal, though, you cannot select any other font attribute. Each set of attributes is also available for Font 1.

Normal Select Normal to print all text, except the first title line, in regular type.

Bold Select Bold to print all text, except the first title line, in bold type.

Underline Select Underline to underline all text, except the first title line.

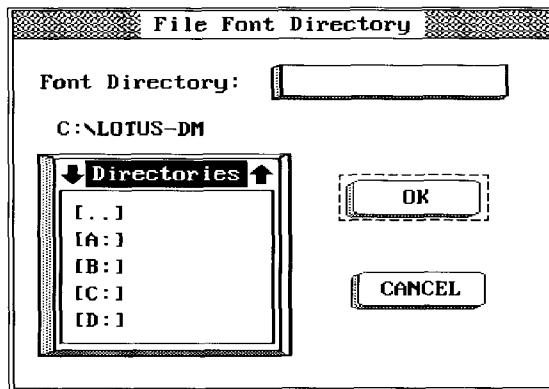
Italic Select Italic to print all text, except the first title line, in slanted type.

NOTE Your system may not support the italic attribute.

When you finish, select OK to save your font selection or select CANCEL. The PrintGraph screen shows the currently selected fonts and font attributes.

Font Directory

Use Font Directory to specify the directory where you have stored your font (.FNT) files. When you select Font Directory, you see the File Font Directory dialog box.



Font Directory Specify the drive and name of the directory that contains the font files in the Font Directory field, or select a directory from the Directories list box. Select OK to confirm the specified directory. You see the new path above the Directories list box. See "Working With Files" in Chapter 8 for more information on specifying directories.

When you finish, select OK to verify the new directory or select CANCEL to retain the current directory. The PrintGraph screen shows the currently selected font directory.

Page Setup

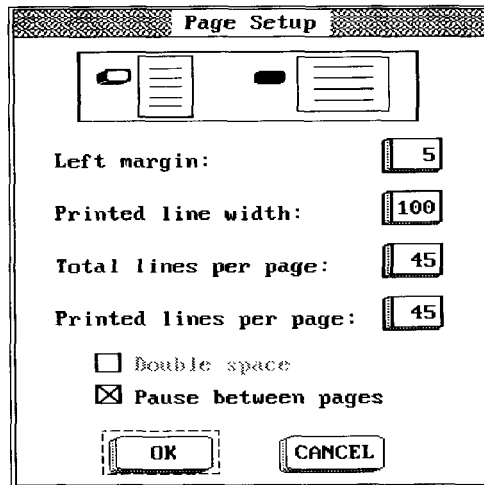
Use Page Setup (CTRL-G) to specify the page orientation, to specify the page settings, to pause between pages when printing, and to print more than one copy of your graph. When you select Page Setup, you see the Page Setup dialog box.

(NOTE) Help (F1) is unavailable from the Page Setup dialog box. To use the on-line Help system for Page Setup, press ESC to exit the dialog box. Then press F1. Help is available through the Lotus-DM Help index.

Orientation Select the **orientation** of the graph on the printed page. The illustrations at the top of the Page Setup dialog box depict the two available page orientations: portrait and landscape. With **portrait**, the graph prints straight across the page. With **landscape**, the graph rotates 90° to print sideways on the page.

Left Margin Specify the number of blank spaces to leave between the printed graph and the left edge of the paper.

15-10 PrintGraph Commands



NOTE Use DeskMate Setup (F10) to specify the number of characters that print per inch. The more characters per inch, the smaller the space for each character. See your DeskMate manual or "Using the Setup Accessory" in Appendix A for information on using DeskMate Setup.

Printed Line Width Specify the number of characters that make up the line width of the printed graph. The line begins at the specified left margin and ends at the right margin.

Total Lines per Page Set the length of the print area by specifying the number of lines that print on the page.

NOTE With portrait orientation, 8.5-by-11-inch paper contains 66 lines per page; with landscape orientation, it contains 45 lines per page.

Printed Lines per Page Set the length of the printed graph by specifying the number of printed lines on the page. This number must be less than or equal to the total lines per page you specify. PrintGraph fits your graph into the area you specify, centering it in the specified total page length. This way, you can add white space above and below your printed graph.

To change the print area, specify new page settings in the Left margin, Printed line width, Total lines per page, and/or Printed lines per page fields. These settings define the boundaries for the printed graph.

Double Space You cannot print double-spaced graphs; therefore, the Double space option is shadowed.

Pause Between Pages Select or deselect Pause between pages to switch between printing one page at a time and printing continuously, and to print more than one copy of your graph. The Pause between pages option also gives you time to load the next page when you print with single sheets of paper.

NOTE You see a Print message box when the printer pauses after printing a graph. Select YES to make another copy of the graph, select NO to print the next selected graph or to finish printing, or select CANCEL to stop printing and return to the PrintGraph screen.

When you finish, select OK to verify the new page settings or select CANCEL to retain the default page settings. The PrintGraph screen lists the currently selected page settings.

Print

Select Print (CTRL-P) to begin printing your graph. Before you print, make sure you are using a printer that is capable of printing graphs and that your printer is on-line and ready. (See your printer manual or your DeskMate manual for more information.)

When you select Print, PrintGraph uses the current page and image settings to format and print the selected graph. The height and width are adjusted automatically to fit the defined print area while retaining the graph's original proportions. During printing, your printer may pause for several seconds.

You see a Print message box. To stop printing early, select CANCEL. Do not turn the printer off.

NOTE You can print more than one copy of your graph if you select the Pause between pages option in File Page Setup in PrintGraph. When the printer pauses, you see a Print message box. Select YES to make another copy of the graph, select NO to print the next selected graph or to finish printing, or select CANCEL to stop printing and return to the PrintGraph screen. See "Page Setup" earlier in this chapter for more information.

When PrintGraph finishes printing, you return to the PrintGraph screen automatically.

Save

Select Save (CTRL-S) to store the current page and image settings in the PrintGraph configuration file, PGRAPH.CNF.

Each time you start a session or select File Reset in PrintGraph, PrintGraph reads page settings from PGRAPH.CNF. You can change these settings any time during the current session, but you must use Save to copy your changes to PGRAPH.CNF if you want them to be the default settings for future PrintGraph sessions.

15-12 PrintGraph Commands

Reset

Select Reset (CTRL-R) to replace the current page and image settings with those in the PrintGraph configuration file, PGRAPH.CNF.

Use Reset if you have changed but not saved the settings during the current session. Reset restores the default page settings (the last settings you saved), which are stored in PGRAPH.CNF.

Exit

Select Exit (ESC) to end your PrintGraph session. You return to Lotus-DM, the DeskMate desktop, or DOS, depending on where you started PrintGraph.

NOTE PrintGraph does not automatically save its current page and image settings when you exit. If you want to save the current settings for future sessions, use File Save in PrintGraph.

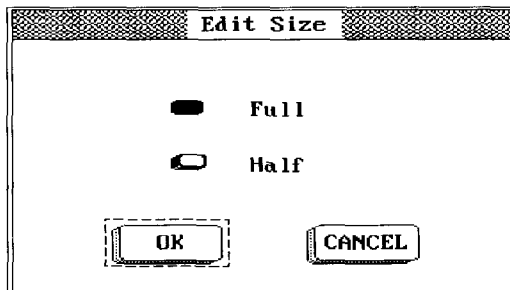
If you return to Lotus-DM, your worksheet and the current worksheet settings remain intact: the settings you used in PrintGraph apply only to the printed page and do not affect your current worksheet or graph settings.

Edit

The only Edit command is Size. Size affects only the printed graph; it does not change the graph file or clipboard image.

Size

Use Size (CTRL-Z) to print one full-sized graph per page, or one or two half-sized graphs per page. When you select Size, you see the Edit Size dialog box.



Full Select Full to print one full-sized graph on the page. The height and width are adjusted automatically to fit the defined print area while retaining the graph's original proportions.

The position of the full-sized graph on the printed page depends on the page orientation specified by File Page Setup in PrintGraph. Select portrait orientation to print your graph straight across the page. Select landscape orientation to rotate your graph 90° and print it sideways on the page. See "Page Setup" earlier in this chapter.

Half Select Half to print one or two half-sized graphs on the page. The height and width are adjusted automatically to fit the defined print area while retaining the graph's original proportions.

You can print half-sized graphs only when you select portrait orientation with File Page Setup in PrintGraph. With portrait orientation, Half prints one half-sized graph at the top of the page or two half-sized graphs one above the other. See "Page Setup" earlier in this chapter for more information on selecting page orientation and on defining the print area.

When you finish, select OK to verify the size of your printed graph or select CANCEL. The PrintGraph screen shows the currently selected graph size.

Chapter 16

Translate Commands

Translate is a separate program within Lotus-DM that you use to translate files to other file formats. A **file format** is the way a file is stored. Translate converts Lotus-DM worksheet files to other file formats and converts database and worksheet files from other programs to Lotus-DM file format.

You can start Translate from Lotus-DM, from the DeskMate desktop, or from DOS. To start Translate from Lotus-DM, select File Translate. To start Translate from the DeskMate desktop, select TRANSLAT.PDM from the Programs list box. To start Translate from DOS, type TRANSLAT at the DOS prompt.

Translate Terminology

Two important terms pertain to the Translate commands.

- The **source file** is the file you want to translate. It is in the file format of the **source product**, which is the software that was used to create the file.
- The **destination file** is the new file you create with Translate. It contains source file data that has been translated into the file format of the **destination product**, which is the software you use to work with the file once you have translated it.

For example, if you translate a Lotus-DM file named PRNT.WK1 to a dBASE III® file named PRNT.DBF, Lotus-DM is the source product, PRNT.WK1 is the source file, dBASE III is the destination product, and PRNT.DBF is the destination file.

Available Translations

Translate lets you use Lotus-DM worksheet data in other products, and it also lets you use the data from other worksheet and database management products in a Lotus-DM worksheet. Table 16-1 identifies the file formats that Lotus-DM supports.

Table 16-1 Translate-supported file formats

Supported file formats	File extensions
Lotus-DM	.WK1
Lotus 1-2-3 Release 1A	.WKS
DeskMate Worksheet	.WKS
DIF	.DIF
dBASE III	.DBF

When Not to Use Translate

For files created in certain products translation is not necessary, and you can select File Open during a Lotus-DM session to retrieve them. These products are Lotus 1-2-3 Release 2.01 and 2.2; and Lotus Symphony® Release 1.1, 1.2, and 2. For example, you can retrieve a Symphony Release 1.1 file by selecting File Open and specifying its path in the Open File field. When you select OK, you see the file displayed in the Lotus-DM worksheet.

Lotus 1-2-3 Release 3 files, however, are not directly supported. But you can convert files to the Lotus 1-2-3 Release 2.01 file format from within Lotus 1-2-3 Release 3. You can then use Translate to convert that file to Lotus-DM file format.

Translating Restrictions

You can use Translate only for the file formats outlined in Table 16-1. If you try to translate from or to a nonsupported product, you see an error message telling you that the translation is not supported.

NOTE When you use one Lotus product to retrieve a file created in a different Lotus product or release, the file loses whatever unique features the source program offered. See Appendix C for more information on what features are and are not supported in Lotus-DM.

When a source product contains a feature or @function that has no equivalent in the destination product, Translate produces a label or an error message in the destination file in place of the feature or @function. In most cases, Translate produces the result of the formula rather than the formula itself in the translated file.

See Appendix B for information on how Lotus-DM translates and displays characters from LICS or ASCII (IBM Code Page 437).

The amount of memory available in your computer may restrict the size of the files you translate. See Appendix D for more information on memory management.

You cannot translate password-protected files.

Translate accepts Lotus-DM files created with File Save As and File Xtract. See "Save As" and "Xtract" in Chapter 9 for more information.

Selecting Translate File Commands

When you run Translate, you see the Translate screen.

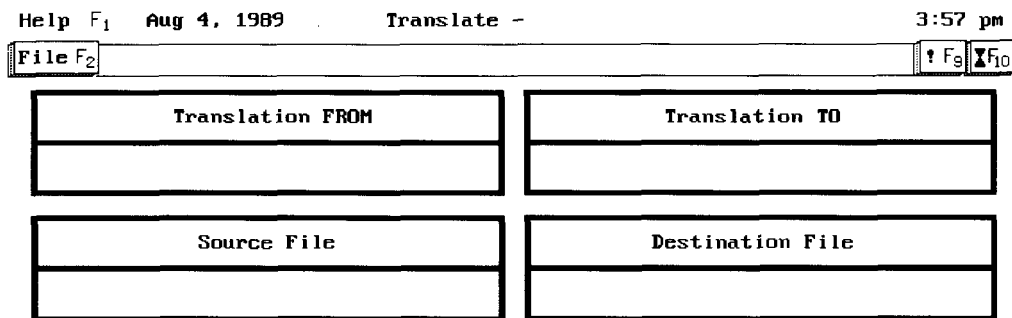


Figure 16-1 The Translate screen

The Translate screen displays File (F2) on the menu bar, and four boxes that show selections you make for translating a file. To display the File pull-down menu using a mouse, click File (F2) on the menu bar. To display the File pull-down menu using the keyboard, press F2.

(NOTE) If you are using a mouse, you can also click any of the four boxes to display the corresponding File command dialog box. For example, click the Source File box to see the File Source dialog box. You click the four boxes to specify the source and destination products and the source and destination files. However, you must select Begin from the File pull-down menu in order to begin the translation according to your specifications. Lotus-DM translates only when you select Begin (CTRL-B).

16-4 Translate Commands

Use the File commands to specify your translation criteria and begin translating a file according to your specifications. Table 16-2 lists the Translate File commands.

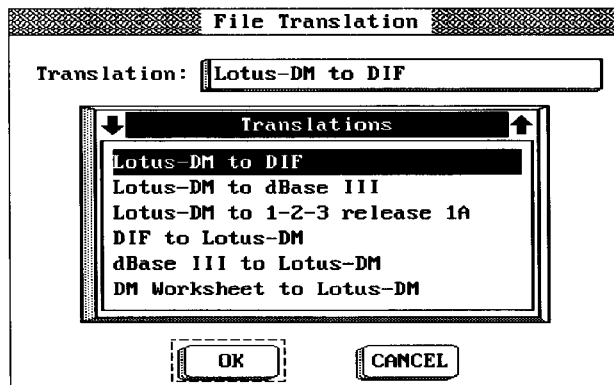
Table 16-2 The Translate File commands

Select	To
Translation	Select the source and destination products.
Source	Specify the file to translate.
Destination	Specify the new file, which is a translation of the source file.
Clear	Erase the current selections for the source product and file, and for the destination product and file.
Begin	Begin translating the file according to your specifications.
Run	Exit the Translate program and run a new DeskMate application.
Exit	End the Translate program.
About Translate	View general information about the Translate program.

The following sections describe the Translate File commands in the order they appear on the File menu.

Translation

Select Translation (CTRL-T) to select the file format you want to translate from and the file format to translate to. When you select Translation, you see the File Translation dialog box.

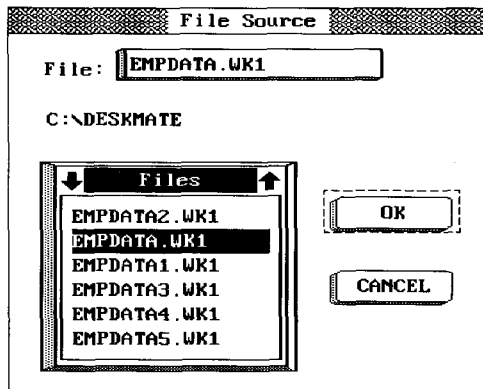


You see all possible translations listed in the Translations list box. Select the phrase that describes the source and destination products in the Translations list box. You see the selected phrase in the Translation field.

Select OK to confirm the source and destination products and to return to the Translate screen. Select CANCEL to return to the Translate screen without confirming the source and destination products.

Source

Select Source (CTRL-S) to specify the source file, or the file you want to translate. When you select Source, you see the File Source dialog box.

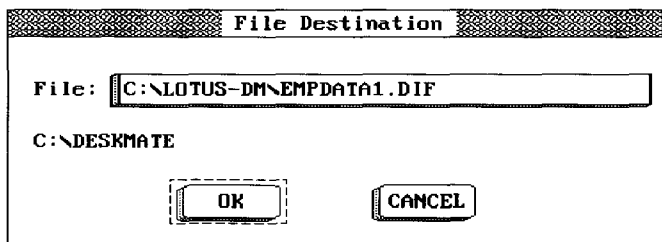


Specify the source file in the File field or select the file name from the Files list box. Select OK to confirm the source file and to return to the Translate screen. Select CANCEL to return to the Translate screen without specifying a source file.

Destination

Select Destination (CTRL-D) to specify the destination file, or the file that Lotus-DM creates when it translates the source file.

When you select Destination, you see the File Destination dialog box.



16-6 Translate Commands

Specify the name of the destination file in the File field. If the destination file is not in the current drive or directory, specify the path.

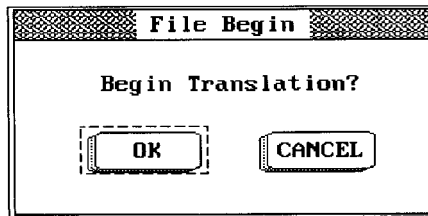
If you have already specified a source file and a destination product, you see the name of the source file in the File field, followed by the standard file extension for the destination product. See Table 16-1 for a list of products and their standard file extensions. You can use the name that appears in the File field for the destination file, or you can specify a new destination file name by typing over it and its file extension. If the name you specify for the destination file already exists, Translate displays a prompt that asks if you want to write over the existing file. Select OK to write over the file or CANCEL to specify a different destination file name.

Select OK to confirm the name of the destination file and return to the Translate screen. Select CANCEL to return to the Translate screen without specifying a destination file name.

Begin

Select Begin (CTRL-B) to begin translating a source file according to the destination file specifications. If you are translating from DIF file format refer to "Translating from DIF Format" below. If you are translating to dBASE III format refer to "Translating to dBASE III Format" below.

When you select Begin, you see the File Begin dialog box.

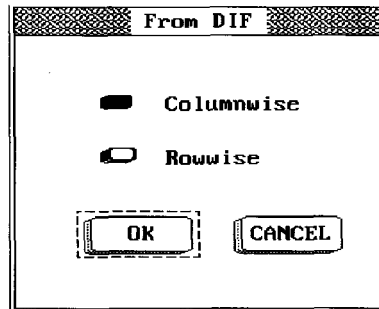


Select OK to begin translating as you specified and return to the Translate screen, or CANCEL to return to the Translate screen without translating.

If you select OK, you see a bar that indicates the percentage of translation completed. Beneath the bar, you see a CANCEL button. You can click CANCEL with the mouse or press ESC on the keyboard to stop the translation and delete the destination file from disk.

Translating from DIF Format

If you specified DIF as the file format you want to translate from and then select Begin, you see the From DIF dialog box.

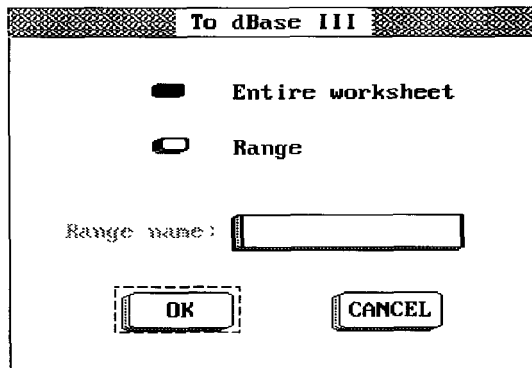


Specify the orientation as Columnwise or Rowwise. Columnwise preserves the original orientation of the file. Rowwise the original orientation of the file, displaying original columns as rows and rows as columns.

Select OK to confirm the orientation of a file translated from DIF file format. You see the File Begin dialog box. See "Begin" earlier in this chapter. Select CANCEL to return to the Translate screen without starting the translation.

Translating to dBASE III Format

If you specified dBASE III as the file format you want to translate to and then select Begin, you see the To dBASE III dialog box.



You can translate only database tables from Lotus-DM to dBASE III. Refer to Chapter 14 for more information on database tables. Select Entire Worksheet to translate the entire Lotus-DM worksheet to dBASE III file format. Select Range to translate a named range in Lotus-DM to dBASE III file format. The range must be a named range, not a range address. Then specify the name of the range in the Range name field.

16-8 Translate Commands

Select OK to translate an entire Lotus-DM worksheet or a named range into dBASE III file format. You see the File Begin dialog box. See "Begin" earlier in this chapter. Select CANCEL to return to the Translate screen without starting the translation.

Clear

Select Clear (CTRL-C) to remove selections from the four boxes displayed on the Translate screen. This command takes effect instantaneously.

Exit

Select Exit (ESC) to end the Translate program. You return to Lotus-DM, the DeskMate desktop, or DOS, depending on where you started Translate.

Chapter 17

@Functions

The Lotus-DM **@functions** are built-in formulas that perform a variety of calculations. You can use @functions (pronounced "at functions") for database, financial, logical, mathematical, statistical, string, or date-and-time calculations. For example, instead of adding a list of values with the formula `+B1+B2+B3+B4`, you can use the formula `@SUM(B1..B4)` to produce the same result.

Most of Lotus-DM's @functions calculate numeric values. Some @functions manipulate sequences of text, which are called **strings**. For example, `@LENGTH(B9)` counts the number of characters in cell B9, when B9 contains text.

The examples in this chapter assume that the cell receiving the results is formatted appropriately. For example, in Figure 17-1 the cell displaying the result \$12.55 has a format of Currency, 2 decimal places. The format indicator displays this format (C2) in the edit panel.

This chapter is divided into three sections:

- "Syntax of @Functions" explains the rules for writing formulas that contain @functions.
- "Types of @Functions" lists the Lotus-DM @functions by category, and describes the specific rules pertaining to each category.
- "@Function Descriptions" contains descriptions and examples of each @function, arranged alphabetically.

Syntax of @Functions

Each @function has a specific structure, or **syntax**. Unless you follow this syntax exactly, Lotus-DM cannot interpret the @function. Refer to the description of the @function to see its specific syntax. The general syntax of @functions is as follows:

@FUNCTION

or

@FUNCTION(argument1,argument2,...,argumentn)

- **@FUNCTION** represents the name of the @function. It tells Lotus-DM which calculation to perform.
- *argument1,argument2,...,argumentn* represent the data Lotus-DM uses in the @function calculations.

Arguments in @Functions

Arguments supply the information Lotus-DM needs to complete the @function calculation. For example, when Lotus-DM encounters the @function @SUM(B4..B25), the argument B4..B25 tells Lotus-DM to add the values in the range B4..B25.

The arguments in an @function can be any length, providing the total number of characters in the cell that contains the @function does not exceed 240.

@Functions use four types of information as arguments: values, strings, locations (cells or ranges), and conditions (usually logical formulas).

- Value arguments can be a number, a numeric formula, or the range name or address of a cell that contains a number or numeric formula.
- String arguments can be a **literal string** (any sequence of letters, numbers, and symbols enclosed in quotation marks), a **string formula** (a formula that manipulates strings), or the range name or address of a cell that contains a label or string formula. Lotus-DM treats strings as labels.

(NOTE) Every literal string used as a string argument should be enclosed in quotation marks. This prevents Lotus-DM from treating the literal string as a number, formula, address, or range name. It also prevents Lotus-DM from treating commas, semicolons, or periods within the literal string as argument separators.

- Location arguments can be a range name, address, or any formula that evaluates to a range name or address.
- Condition arguments can be a **logical formula** (a formula that uses one of the logical operators < > = <> >= <= #NOT# #AND# #OR#) or the range name or address of a cell that contains a logical formula. You can also use any numeric or string formula, number, literal string, or cell reference as a condition argument.

Basic Rules of Syntax

Follow these general guidelines when you enter @functions:

- Begin every @function with the @ (at symbol).
- You can type @functions in either uppercase or lowercase letters; Lotus-DM displays them in uppercase letters.
- Do not include spaces between the @function name and its arguments. For example, @AVG(B6..B12) is correct; @AVG (B6..B12) is not.
- Always enclose an @function's arguments in parentheses.
- Separate multiple arguments with a valid argument separator. Initially, commas and semicolons are valid argument separators, but you can use Worksheet International to set semicolons only or semicolons and periods as valid argument separators. Use the same argument separator throughout the @function.
- Lotus-DM assigns the value 0 to blank cells that are referenced by financial, logical, mathematical, and statistical @functions. For example, @SUM(A1,A2,A3) returns 0 if all the cells are blank.
- You can use an @function by itself as a formula or combine it with other @functions and formulas.
- When you use an @function as an argument, enclose the arguments for each @function in parentheses. For example, in @INT(@SUM(A5..A11)), the argument for @INT is (@SUM(A5..A11)), and the argument for @SUM is (A5..A11).

Types of @Functions

Lotus-DM @functions comprise eight categories: database, date and time, financial, logical, mathematical, special, statistical, and string. The following sections describe the characteristics of each category and list the @functions pertaining to each category. For a complete description of each @function, see "@Function Descriptions" later in this chapter.

Database @Functions

Database @functions scan a database table, select the records that match the criteria in the criteria range, and then perform calculations on the selected values or labels in the field you specify. For information about setting up a Lotus-DM database table, see Chapter 14 in *Reference*.

All database @functions have three arguments: *input*, *offset*, and *criteria*. These arguments are described as follows:

17-4 @Functions

- The *input* range contains the database table, including all the database records and their field names. The *input* range can be the address or name of a range that contains the database table.
- *offset* is the column's offset number containing the field. An **offset number** corresponds to the position that a column occupies in a range. The first column of the input range is field 0, the second column is field 1, the third column is field 2, and so on.
- *criteria* is a range you create to specify selection requirements. Each *criteria* range must include field names from the *input* range and the criteria you want Lotus-DM to use. You must enter the criteria directly below their corresponding field names. *criteria* can be a range address or a range name.

Table 17-1 lists the database @functions.

Table 17-1 Database @functions

@Function	Action
@DAVG	Averages the values in the offset column of a database table.
@DCOUNT	Counts the nonblank cells in the offset column of a database table.
@DMAX	Finds the largest value in the offset column of a database table.
@DMIN	Finds the smallest value in the offset column of a database table.
@DSTD	Calculates the population standard deviation of the values in the offset column of a database table.
@DSUM	Sums the values in the offset column of a database table.
@DVAR	Calculates the population variance of the values in the offset column of a database table.

Date and Time @Functions

Date and time @functions generate and use numbers that represent dates and times that you can use in calculations.

- Date @functions use **date numbers**, which are consecutive integers that correspond to dates from January 1, 1900 (date number 1) through December 31, 2099 (the date number 73050).
- Time @functions use **time numbers**, which are decimal values that correspond to times from midnight (time number 0.000000) through 11:59:59 PM (time number 0.999988).

To format date and time numbers so Lotus-DM displays them as actual dates and times, use Range Format or Worksheet Format. For example, @DATE(89,1,7) returns the date number 32515. You can format this number to appear on the screen as 07-Jan-89, 07-Jan, Jan-89, or in an International Date format, such as 01/07/89.

Similarly, @TIME(14,30,50) returns the time number 0.604745. You can format this number to appear on the screen as 02:30 PM, 02:30:50 PM, or in an International Time format, such as 14:30.

If you enter a number that contains decimal places as a date number in an argument, Lotus-DM uses only the integer part of the number. For example, Lotus-DM returns both @YEAR(31790.6) and @YEAR(31790) as 87.

Tables 17-2 through 17-4 list the date and time @functions.

Table 17-2 Date @functions

@Function	Action
@DATE	Returns the date number for a set of year, month, and day values. For example, @DATE(89,1,7) returns 32515, the date number for January 7, 1989.
@DATEVALUE	Returns the date number for a <i>string</i> that represents a date. For example, @DATEVALUE("7-Jan-89") returns the date number 32515.
@DAY	Returns the number of the day in a date number. For example, @DAY(32515) returns the value 7 because 32515 is the date number for January 7, 1989.
@MONTH	Returns the number of the month in a date number. For example, @MONTH(32515) returns the value 1 because 32515 is the date number for January 7, 1989.
@YEAR	Returns a two- or three-digit number for the year in a date number. For example, @YEAR(32515) returns the value 89 because 32515 is the date number for January 7, 1989.

Table 17-3 Time @functions

@Function	Action
@HOUR	Returns the hour in a time number (based on a 24-hour format). For example, @HOUR(0.604745) returns the value 14 because 0.604745 is the time number for 2:30:50 PM.
@MINUTE	Returns the minutes in a time number. For example, @MINUTE(0.604745) returns the value 30 because 0.604745 is the time number for 2:30:50 PM.
@SECOND	Returns the seconds in a time number. For example, @SECOND(0.604745) returns the value 50 because 0.604745 is the time number for 2:30:50 PM.
@TIME	Returns the time number for a set of hour, minutes, and seconds values. For example, @TIME(14,30,50) returns 0.604745, the time number for 2:30:50 PM.
@TIMEVALUE	Returns the time number for a string that represents a time. For example, @TIMEVALUE("02:30:50 PM") returns the time number 0.604745.

17-6 @Functions

Table 17-4 Current date and time @function

@Function	Action
@NOW	Returns the value that corresponds to the current date and time on the computer's clock. For example, @NOW returns the value 32515.604745 at 2:30:50 PM (the time number 0.604745) on January 7, 1989 (the date number 32515).

Financial @Functions

Financial @functions calculate loans, annuities, and cash flows that occur over a term, or period of time.

- Lotus-DM accepts interest rates as either percentages or decimal values. For example, you can enter 15.5% either as .155 or as 15.5%. Lotus-DM automatically converts all percentages to decimal values.
- You must express the term and the interest rate in the same unit of time. For example, in @PMT(1000,.05/12,36) the term is 36 months, so the annual interest rate is divided by 12 to produce a monthly interest rate.
- The financial @functions assume that annuities are ordinary annuities. An **annuity** is a series of equal payments made at regular intervals. An **ordinary annuity** is an annuity in which the payments are made at the end of each time interval.

Table 17-5 list the financial @functions.

Table 17-5 Financial @functions

@Function	Action
@CTERM	Calculates the number of compounding periods necessary for an investment to grow to a future value.
@DDB	Calculates the double-declining balance depreciation allowance of an asset.
@FV	Calculates the future value of a series of equal payments.
@IRR	Calculates the internal rate of return for a series of cash flows.
@NPV	Calculates the net present value of a series of cash flows.
@PMT	Calculates the amount of the periodic payment needed to pay off a loan.
@PV	Calculates the present value of a series of equal payments.
@RATE	Calculates the periodic interest rate necessary for an investment to grow to a future value.
@SLN	Calculates the straight-line depreciation allowance of an asset for one period.
@SYD	Calculates the sum-of-the-years'-digits depreciation allowance of an asset.
@TERM	Calculates the number of payment periods of an investment.

Logical @Functions

Logical @functions produce values based on the result of conditional statements.

- A **conditional statement** is an equation that evaluates to either 1 (the logical value for true) or 0 (the logical value for false). For example, @ISNUMBER tests whether data is a value. If the data is a value, @ISNUMBER returns the logical value 1 (TRUE). If the data is not a value, @ISNUMBER returns the logical value 0 (FALSE).
- You use @ISERR and @ISNA to test for the values ERR (error) and NA (not available). These values cause a **ripple-through effect**. A ripple-through effect exists when a formula evaluates to ERR or NA and other formulas refer to the cell that contains the formula. A formula that refers to a cell that contains the value ERR or NA also evaluates to ERR or NA. For example, if a formula in G12 evaluates to ERR, @AVG(G10..G35) and +E12+F12+G12 also evaluate to ERR, because both refer to G12.

You can use @ISERR and @ISNA in @IF formulas to stop the ripple-through effect. For example, suppose you want to divide the value in G12 by the value in K12. But the value in G12 is the result of a complex formula and you want to be sure the formula has not evaluated to ERR before you use G12 in another calculation. Use @IF(@ISERR(G12),0,G12/K12) to return 0 if G12 contains the value ERR; this prevents Lotus-DM from evaluating the G12/K12 formula if G12 contains the value ERR. If G12 does not contain the value ERR, the @IF formula returns the result of G12/K12.

- You can use @ISNUMBER and @ISSTRING to prevent errors that would occur if a cell used in a formula contained the wrong type of data. For example, @IF(@ISNUMBER(G12),@AVG(A12..K12),"Label") returns @AVG(A12..K12) if G12 contains a value. If G12 contains a label, the @IF formula returns the word Label.
- A blank cell has the value 0.

Table 17-6 lists the logical @functions.

Table 17-6 Logical @functions

@Function	Action
@FALSE	Returns the logical value 0 (false).
@IF	Takes one action if a condition is true; another if the condition is false. For example, @IF(SALES>COSTS,SALES-COSTS,"No profit") returns the result of SALES minus COSTS if sales are greater than costs or the string No profit if sales are less than or equal to costs.
@ISERR	Returns 1 (true) for the value ERR; 0 (false) for any other value.
@ISNA	Returns 1 (true) for the value NA; 0 (false) for any other value.

(continued)

17-8 @Functions

@Function	Action
@ISNUMBER	Returns 1 (true) for a value; 0 (false) for a string.
@ISSTRING	Returns 1 (true) for a string; 0 (false) for a value.
@TRUE	Returns the logical value 1 (true).

Mathematical @Functions

Mathematical @functions compute values.

- Every mathematical @function except @PI takes values as arguments. @PI needs no arguments.
- Each mathematical @function produces, or returns, a value.
- Single arguments can be numbers; cell or range addresses or range names that contain values; or formulas or other @functions that evaluate to numbers.
- Angles you enter for the sine, cosine, and tangent @functions must be expressed in radians. To convert degrees to radians, multiply the number of degrees by @PI/180.
- The arc sine, arc cosine and arc tangent @functions return angles in radians. To convert radians to degrees, multiply the number of radians by 180/@PI.

Tables 17-7 and 17-8 list the mathematical @functions.

Table 17-7 General mathematical @functions

@Function	Action
@ABS	Calculates the absolute (positive) value of a value.
@EXP	Calculates the number <i>e</i> raised to a specified power.
@INT	Returns the integer portion of a value.
@LN	Calculates the natural logarithm (base <i>e</i>) of a value.
@LOG	Calculates the common logarithm (base 10) of a value.
@MOD	Calculates the remainder (modulus) of two values.
@RAND	Generates a random number between 0 and 1.
@ROUND	Rounds a value to a specified number of decimal places.
@SQRT	Calculates the positive square root of a value.

Table 17-8 Trigonometric @functions

@Function	Action
@ACOS	Calculates the arc cosine of a value.
@ASIN	Calculates the arc sine of a value.
@ATAN	Calculates the arc tangent of a value.
@ATAN2	Calculates the four-quadrant arc tangent of two values.
@COS	Calculates the cosine of an angle.
@PI	Returns the value π (calculated at 3.1415926536).
@SIN	Calculates the sine of an angle.
@TAN	Calculates the tangent of an angle.

Special @Functions

Special @functions perform a variety of tasks that locate and return information on specific cells. When using special @functions, keep in mind that an **empty string** has a length of 0. An empty string is one that contains one of the label prefixes " ^ ' \ or |. The cell looks blank, but is treated as a string.

Table 17-9 lists the special @functions.

Table 17-9 Special @functions

@Function	Action
@@	Points to a specific cell whose contents is another cell's address.
@CELL	Returns information about a cell. For example, @CELL("type",B5) returns v if B5 contains a value, b if B5 is blank, and l if B5 contains a label.
@CELLPOINTER	Returns information about the current cell. For example, @CELLPOINTER("type") returns v if the current cell contains a value, b if the current cell is blank, or l if the current cell contains a label.
@CHOOSE	Finds a specified value or string in a list of values and/or strings.
@COLS	Counts the columns in a range.
@ERR	Returns the value ERR (error).
@HLOOKUP	Finds the contents of a cell in a specified row in a range.
@INDEX	Finds the value of the cell in a specified row and column.
@NA	Returns the value NA (not available).
@ROWS	Counts the rows in a range.
@VLOOKUP	Finds the contents of the cell in a specified column in a range.

Statistical @Functions

Statistical @functions perform calculations on lists of values. A list contains one or more arguments. Each argument in a list can be a single value or a range containing values. A list can contain both single values and ranges; for example, @COUNT(B3..B8,C3..C8,D9,J3).

- All statistical @functions accept values and labels as single arguments. Values can be numbers and formulas that evaluate to numbers; and addresses or names for cells and ranges that contain numbers. Labels can be strings enclosed in quotation marks, and addresses or names for cells or ranges.
- Lotus-DM assigns the value 0 to any labels used as arguments in statistical @functions; therefore, labels within ranges in a list do not cause statistical @functions to evaluate to ERR. However, Lotus-DM assigns the value 0 to each label in the range in calculations. For example, if you use @AVG to calculate the average of the values in a range and the range contains a label, Lotus-DM considers the label to have the value 0. When Lotus-DM sums the values and divides by the number of values to calculate the average, the result reflects the extra value in the divisor.
- The statistical @functions ignore blank cells in multiple-cell ranges. For example, if you use @AVG to average the values in a range that spans eight cells, and the range contains a blank cell, Lotus-DM divides the sum by seven to find the correct average.
- Each of the statistical @functions has an equivalent database @function. For example, @AVG averages the values in a range and @DAVG averages the values in the offset column of a database table.

CAUTION Always check for labels in the ranges you use in *list* to guard against unexpected results.

Table 17-10 lists the statistical @functions.

Table 17-10 Statistical @functions

@Function	Action
@AVG	Averages a list of values.
@COUNT	Counts the nonblank cells in a list of ranges.
@MAX	Finds the maximum value in a list.
@MIN	Finds the minimum value in a list.
@STD	Calculates the population standard deviation of a list of values.
@SUM	Sums a list of values.
@VAR	Calculates the population variance of a list of values.

String @Functions

String @functions manipulate strings, make calculations using strings, and produce string values. A **string** is a label consisting of one or more characters. A **literal string** is a string enclosed in quotation marks and can contain letters, numbers, and special characters. A **string formula** is a formula that manipulates strings; the & (ampersand) is the only operator used in string formulas. All strings are labels, not values.

- Always enclose literal strings used as arguments in quotation marks. Lotus-DM treats strings not enclosed in quotation marks as range names.
- Many string @functions use offset numbers to locate the characters in a string. The first offset number is always 0. For example, the string Red Shoes contains 9 characters: the R is at position 0 and the last s is at position 8. The last offset number is always one less than the length of the string. Use positive integers as offset numbers.
- @N and @S require range addresses as arguments. If you enter a single cell range, you can write it two ways: by a range address (B3..B3), or by a cell address preceded by an exclamation point (!B3).
- If you use blank cells as arguments in string @functions, Lotus-DM returns the value ERR. For example, @LENGTH(D9) returns the value ERR if D9 is a blank cell.
- If a cell contains one of the label prefixes " ' ^ \ or | but does not contain text, Lotus-DM treats it as an **empty string**, a string with a length of 0. The cell looks blank, but Lotus-DM will not return the value ERR when you use the cell as an argument in a string @function.

Table 17-11 lists the string @functions.

Table 17-11 String @functions

@Function	Action
@CHAR	Returns the LICS character that corresponds to the value for <i>x</i> .
@CODE	Returns the LICS code number that corresponds to the first character in <i>string</i> .
@EXACT	Returns 1 (true) if two strings are the same; 0 (false) if the strings are different.
@FIND	Calculates the position of the first character of one string within another string.
@LEFT	Returns the first <i>n</i> characters in a string.
@LENGTH	Counts the characters in a string.
@LOWER	Converts all the letters in a string to lowercase.
@MID	Returns a number of characters in a string, starting at a specified character.
@N	Returns the entry in the first cell in a range as a value (returns 0 if the cell contains a label).

(continued)

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@Function	Action
@PROPER	Converts the first letter in each word in a string to uppercase and the rest of the letters in each word to lowercase.
@REPEAT	Duplicates a string a specified number of times.
@REPLACE	Replaces characters in one string with characters from a different string.
@RIGHT	Returns the last <i>n</i> characters in a string.
@S	Returns the label in the first cell in a range as a label (returns a blank cell if the cell contains a value).
@STRING	Converts a value into a label with a specified number of decimal places. For example, @STRING(34.567,1) returns the label (not the value) 34.5.
@TRIM	Removes leading, trailing, and consecutive spaces from a string.
@UPPER	Converts all the letters in a string to uppercase.
@VALUE	Converts a string that represents a number into a value. For example, @VALUE("34.5") returns the value 34.5.

@Function Descriptions

This section contains descriptions and examples of the Lotus-DM @functions and uses the following conventions:

- The @functions are listed alphabetically.
- @Functions, cell addresses, and range names appear in uppercase letters, but can be entered as either uppercase or lowercase letters. Lotus-DM does not distinguish between uppercase and lowercase letters in these cases.
- Argument names are in *italic* but actual arguments used in examples are not *italicized*.

@@

@@(cell address) returns the contents of the cell that *cell address* refers to. The *cell address* acts as a pointer to another cell, whose contents @@ returns.

cell address must be the name or address of a single-cell range that contains a valid cell reference. If you specify a multiple-cell range for *cell address*, @@ evaluates to ERR.

Examples

@@(D4) = 37 when cell D4 contains the label F5 and cell F5 contains the value 37.

@@(D4) = Balance when cell D4 contains the label F5, and cell F5 contains the label Balance.

@ABS

@ABS(x) calculates the absolute (positive) value of x . x can be any value.

Use @ABS when printing certain negative numbers in a report, such as percentage differences between actual and budgeted values, or when you want to find the absolute difference between values in a list of positive and negative values.

Examples

@ABS(1.258) = 1.258

@ABS(-6.2) = 6.2

@ABS("Jones") = 0 because x is a string, and a string has a value of 0.

@ACOS

@ACOS(x) calculates the arc cosine of a value. The arc (or inverse) cosine is the angle, measured in radians, whose cosine is x . The result of @ACOS is a value from 0 to π .

x can be any value from -1 to 1.

NOTE To convert radians to degrees, multiply the radians by $180/@PI$.

Examples

@ACOS(.3) = 1.266103 (radians)

@ACOS(.5)*180/@PI = 60 (degrees)

@ASIN

@ASIN(x) calculates the arc sine of a value. The arc (or inverse) sine is the angle, measured in radians, whose sine is x . The result of @ASIN is a value from $\pi/2$ to $-\pi/2$.

x can be any value from -1 to 1.

NOTE To convert radians to degrees, multiply the radians by $180/@PI$.

Examples

@ASIN(-.246) = -0.248551 (radians)

@ASIN(1)*180/@PI = 90 (degrees)

@ATAN

@ATAN(x) calculates the arc tangent of a value. The arc (or inverse) tangent is the angle, measured in radians, whose tangent is x . The result of @ATAN is a value from $\pi/2$ to $-\pi/2$.

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x can be any value.

NOTE To convert radians to degrees, multiply the radians by $180/@PI$.

Examples

$@ATAN(1) = 0.785398$ (radians)

$@ATAN(@SQRT(3))*180/@PI = 60$ (degrees)

@ATAN2

$@ATAN2(x,y)$ calculates the four-quadrant arc tangent of y/x . The four-quadrant arc (or inverse) tangent is the angle, measured in radians, whose tangent is y/x .

x and y can be any values. If y is 0, $@ATAN2$ returns 0; if both x and y are 0, $@ATAN2$ returns the value ERR.

NOTE $@ATAN2$ differs from $@ATAN$ in that the result of $@ATAN2$ is a value from $-\pi$ to π . Table 17-12 lists the value ranges for $@ATAN2$.

Table 17-12 Value ranges for @ATAN2

x	y	$@ATAN2(x,y)$ results
Positive	Positive	From 0 to $\pi/2$
Negative	Positive	From $\pi/2$ to π
Negative	Negative	From $-\pi$ to $-\pi/2$
Positive	Negative	From $-\pi/2$ to 0

NOTE To convert radians to degrees, multiply the radians by $180/@PI$.

Examples

$@ATAN2(1.5,2) = 0.927295$ (radians)

$@ATAN2(-1.5,2)*180/@PI = 126.8698$ (degrees)

@AVG

$@AVG(list)$ averages the values in *list*.

list can be any combination of values and ranges containing values.

Example

$@AVG(20,30,67,78,90) = 57$

@CELL

@CELL(*attribute*,*range*) returns information about an *attribute* for the first cell in *range*. See Table 17-13 for the kind of information @CELL returns.

(NOTE) @CELL evaluates the first cell in *range* at the point when that cell was last recalculated; be sure you recalculate your work before you use @CELL.

attribute can be any of the 9 arguments listed in Table 17-13. *attribute* can be entered as a literal string, a formula or @function that evaluates to a string, or a reference to a cell that contains a label.

range can be any range name or range address.

Examples

@CELL("row",J5..J5) = 5

@CELL("format",A1..A1) = D2 if A1 has a date format of DD-MMM.

@CELLPOINTER

@CELLPOINTER(*attribute*) returns a value or label that represents information about an *attribute* for the current cell. See Table 17-13 for the kind of information @CELLPOINTER returns.

attribute can be any of the 9 arguments listed in Table 17-13. *attribute* can be entered as a literal string, a string formula, or a reference to a cell that contains a label.

Lotus-DM automatically updates @CELLPOINTER only when you make an entry. To make @CELLPOINTER return information about the current cell if you have simply moved the cell pointer to it, you must recalculate the worksheet.

Examples

@CELLPOINTER("row") = 4, if the cell pointer was in row 4 at the last recalculation.

@CELLPOINTER("col") = 26, if the cell pointer was in column Z at the last recalculation.

Table 17-13 @Cell Attributes

Attribute	Result
address	The absolute address for the first cell in <i>range</i> (for example, \$A\$1)
col	The column letter, as a value from 1 to 256 (1 for column A, 5 for column E, and so on)
contents	The contents of the first cell in <i>range</i>

(continued)

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Attribute	Result
format	The format for the first cell in <i>range</i> : C0 to C15 if Currency, 0 to 15 decimal places F0 to F15 if Fixed, 0 to 15 decimal places G if General, a label, or a blank cell P0 to P15 if Percent, 0 to 15 decimal places S0 to S15 if Sci (Scientific), 0 to 15 decimal places ,0 to ,15 if , (comma), 0 to 15 decimal places + or - if +/- D1 if DD-MMM-YY D2 if DD-MMM D3 if MMM-YY D4 if MM/DD/YY, DD/MM/YY, DD.MM.YY, or YY-MM-DD D5 if MM/DD, DD/MM, DD.MM, or MM-DD D6 if HH:MM:SS AM/PM D7 if HH:MM AM/PM D8 if HH:MM:SS (24 hour), HH.MM.SS (24 hour), HH,MM,SS (24 hour), or HHhMMmSSs D9 if HH:MM (24 hour), HH.MM (24 hour), HH,MM, or HHhMMm T if Text H if Hidden
prefix	The label prefix for the first cell in <i>range</i> : ' for a left-aligned label " for a right-aligned label ^ for a centered label \ for a repeating label Blank (no label prefix) if the cell is empty or contains a value
protect	The protection status for the first cell in <i>range</i> : 1 if it is protected 0 if it is not protected
row	The row number for the first cell in <i>range</i> , from 1 to 8192
type	The type of data in the first cell in <i>range</i> : b if it is blank (that is, has no entry) v if it contains a value l if it contains a label
width	The column width for the first cell in <i>range</i>

@CHAR

@CHAR(*x*) returns the LICS value that corresponds to *x*. See Appendix B for more information on LICS characters. Values not included in the LICS values Lotus-DM supports return ERR.

If your monitor cannot display the character that corresponds to x , Lotus-DM displays a character that resembles the desired character when possible. If no displayable character approximates the character, Lotus-DM displays nothing.

@CHAR is useful for entering foreign language characters and mathematical symbols. Whether a character prints depends on the capabilities of your printer.

Example

@CHAR(163) = £

@CHAR(231) = ç

@CHOOSE

@CHOOSE(*offset*,*list*) finds the value or string in *list* specified by *offset*. *offset* represents an offset number. An offset number corresponds to the position an item occupies in *list*. The first item in the list has an offset number of 0; therefore, if *offset* is 1, @CHOOSE selects the second item in the list.

Offset must be a value, and cannot be greater than the number of items in the argument list minus one. For example, if *list* contains 50 items, the largest number you can specify for *offset* is 49. If you use a reference to a blank cell for *offset*, @CHOOSE returns the value 0.

Examples

@CHOOSE(1,"Profit","Loss","Bankruptcy") = Loss

@CHOOSE(H5,B1,B2,B3) = the value in cell B2 if H5 contains the value 1.

@CHOOSE(H5,12,B1,LAST) = the value in the range name LAST if H5 contains the value 2.

@CODE

@CODE(*string*) returns the LICs code number that corresponds to the first character in *string*. *string* can be a literal string, the range name or address of a range that contains a label, or a formula or @function that evaluates to a string. If *string* is a cell address or range name that refers to a blank cell or a value, @CODE returns the value ERR.

Examples

@CODE("4.5") = 52

@CODE("A") = 65

17-18 @Functions

@COLS

@COLS(*range*) counts the number of columns in *range*.

range can be any range name or address.

Example

@COLS(EMPLOYEES) = 20 if EMPLOYEES is the range name for B3..U75.

Use @COLS to determine the width of a range in order to set appropriate margins when printing a report. For example, if you set the global column width to 10, the formula @COLS(COST) = 5 lets you determine that the range COST is 50 characters wide (including any blanks or spaces).

@COS

@COS(*x*) calculates the cosine of an angle (*x*) measured in radians. The result of @COS is a value from -1 to 1.

x can be any value.

NOTE To convert degrees to radians, multiply the degrees by @PI/180.

Examples

@COS(.523598) = 0.866025

@COS(45*@PI/180) = 0.707106

@COUNT

@COUNT(*list*) counts the nonblank cells in a *list* of ranges.

list can be any combination of ranges. Keep the following in mind about the *list* argument for @COUNT:

- If *list* contains only blank ranges, @COUNT evaluates to 0.
- A single cell address in *list* increases the count by one, even if the cell is blank. For example, if A2 is blank, @COUNT(A2..A2) = 1.
- @COUNT considers cells that contain labels, as well as those that contain values, to be nonblank. To keep an accurate count of values in a range, make sure the range does not contain any labels, such as column headings.
- @COUNT does not ignore cells that evaluate to ERR or NA.

Examples

@COUNT(B5..B11) = 7 if none of the cells are blank.

@COUNT(C5..C10,D5,E5..E10) = 1 if all the cells are blank because D5 is not entered as a range.

@CTERM

@CTERM(*interest*,*future-value*,*present-value*) calculates the number of compounding periods it takes for an investment (*present-value*) to grow to a *future-value*, earning a fixed *interest* rate per compounding period.

interest can be any value greater than -1.

future-value and *present-value* can be any values, but both must be positive or both must be negative.

@CTERM uses the following formula to calculate the compounding period:

$$\frac{\ln(fv/pv)}{\ln(1 + int)} \quad \text{where: } \begin{array}{ll} fv & = \text{future value} \\ pv & = \text{present value} \\ int & = \text{interest rate} \\ \ln & = \text{natural logarithm} \end{array}$$

Example

You just deposited \$10,000 in an account that pays an annual interest rate of 10% (.10), compounded monthly, and you want to determine how many years it will take to double your investment.

Because the formula @CTERM(.10/12,20000,10000)/12 = 6.960312, it will take about seven years to double the original investment of \$10,000.

(NOTE) Because @CTERM calculates the total number of compounding periods, you may need to include the number of periods in which the *interest* rate is compounded in order to express the term and interest rate in the same unit of time. In the preceding example, the annual interest rate of 10%, compounded monthly, is entered as .10/12 (*interest* divided by the number of compounding periods per year).

@DATE

@DATE(*year*,*month*,*day*) returns the date number for the specified *year*, *month*, and *day*. For an explanation of date numbers, see "Date and Time @Functions" earlier in this chapter.

year can be any integer from 0 (the year 1900) to 199 (the year 2099).

month can be any integer from 1 (January) to 12 (December).

day can be any integer from 1 to 31. The value you use for *day* must be a valid day for *month*. For example, you cannot use 31 for *day* if you use 4 (April) for *month*.

If a *year*, *month*, or *day* value is not valid, @DATE returns the value ERR.

Use @DATE to sort by date or to set up search criteria using dates.

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NOTE

Even though February 29, 1900 did not exist (it was not a leap year), Lotus-DM assigns a date number to this "day." This does not invalidate any of your date calculations, unless you use dates between January 1, 1900 and March 1, 1900. If you are using dates within that period, subtract 1 from the results.

Example

@DATE(89,9,27) = 32778

@DATEVALUE

@DATEVALUE(*string*) returns the date number for a *string* that represents a date. For an explanation of date numbers, see "Date and Time @Functions" earlier in this chapter.

string can be a literal string, the range name or address of a cell that contains a label, or a formula or @function that evaluates to a string. *string* must be in one of the Lotus-DM Date formats. For a description of the Lotus-DM Date formats, see "Format" in Chapter 11.

Use @DATEVALUE to convert dates entered as labels to date numbers so that you can use the dates in calculations. @DATEVALUE is also useful with data that has been imported from another program, such as a word processing program.

Examples

@DATEVALUE("23-Aug-89") = 32743

@DATEVALUE("23-Aug") = 32743 if 1989 is the current year.

@DATEVALUE("Aug-89") = 32721

@DATEVALUE(B3) = date number of the date in B3 if it is a correct Date format.

@DAVG

@DAVG(*input*,*offset*,*criteria*) averages values in the *offset* column of the *input* range that meet criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Example

You created a database table of your expenses for a recent trip to Canada, and you want to determine the average amount you spent on gas in Toronto. In Figure 17-1, @DAVG(EXPENSES,2,CRIT_RANGE) searches the *input* range EXPENSES for records that match the criteria in the *criteria* range CRIT_RANGE, and then averages the selected values in the column whose *offset* number is 2 (GAS).

Input Offset Criteria

D15	(C2) @DAVG(EXPENSES,2,CRIT_RANGE)								READY
	A	B	C	D	E	F	G		
1	TRIP EXPENSES								
2									
3	CITY	DATE	GAS	HOTEL	FOOD				
4	Winnipeg	17-Nov	\$27.85	\$0.00	\$4.50				
5	Toronto	18-Nov	18.25	58.65	32.65				
6	Toronto	19-Nov	6.85	58.65	28.00				
7	Ottawa	20-Nov	23.45	60.50	33.74				
8	Montreal	21-Nov	24.38	55.00	29.83				
9	Montreal	22-Nov	6.33	55.00	35.70				
10	Ottawa	23-Nov	22.97	60.50	42.00				
11									
12	CITY								
13	Toronto								
14									
15	Average spent	on gas in Toronto:		\$12.55					
16									

CRIT_RANGE
EXPENSES

Figure 17-1 Calculating an average amount spent with @DAVG

@DAY

@DAY(*date-number*) returns the day of the month (an integer from 1 to 31) in *date-number*. For an explanation of date numbers, see "Date and Time @Functions" earlier in this chapter.

date-number can be any integer from 1 (January 1, 1900) to 73050 (December 31, 2099). Usually, another date @function supplies *date-number*.

Example

@DAY(@NOW) = 25, if this is the 25th day of the month.

@DAY(32515) = 7, the 7th day of the month of January, 1989.

@DCOUNT

@DCOUNT(*input*,*offset*,*criteria*) counts nonblank cells in the *offset* column of the *input* range that meet criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Example

You created a database table of your expenses during a recent trip to Canada and you want to determine how many days you spent more than \$20.00 on gas. In Figure

17-22 @Functions

17-2, @DCOUNT(EXPENSES,2,CRIT_RANGE) searches the *input* range EXPENSES for records that match the criteria in the *criteria* range CRIT_RANGE, and then counts the selected values in the column whose offset number is 2 (GAS).

		Input		Offset		Criteria										READY	
D15	(F0) @DCOUNT(EXPENSES,2,CRIT_RANGE)																
	A	B	C	D	E	F	G										
1	TRIP EXPENSES																
2																	
3	CITY	DATE	GAS	HOTEL	FOOD												
4	Winnipeg	17-Nov	\$27.85	\$0.00	\$4.50												
5	Toronto	18-Nov	18.25	58.65	32.65												
6	Toronto	19-Nov	6.85	58.65	28.00												
7	Ottawa	20-Nov	23.45	60.50	33.74												
8	Montreal	21-Nov	24.38	55.00	29.83												
9	Montreal	22-Nov	6.33	55.00	35.70												
10	Ottawa	23-Nov	22.97	60.50	42.00												
11																	
12																	
13																	
14																	
15	Number of days gas cost more than \$20.			4													
16																	
17																	
18																	

EXPENSES

CRIT RANGE

+C4>20

Figure 17-2 Using @DCOUNT to calculate the number of days

@DDB

@DDB(*cost*,*salvage*,*life*,*period*) calculates the depreciation allowance of an asset for a specified *period*, using the double-declining balance method.

cost represents the amount paid for the asset. *cost* can be any value greater than or equal to *salvage*.

salvage represents the estimated value of the asset at the end of its useful life. *salvage* can be any value.

life represents the number of periods it will take to depreciate the asset to its salvage value. *life* can be any value greater than 2.

period represents the time period for which you want to find the depreciation allowance. *period* can be any value greater than or equal to 1.

The double-declining balance method accelerates the rate of depreciation, so that more depreciation expense occurs (and can be written off) in earlier periods than in later ones.

Depreciation stops when the book value of the asset—that is, the total cost of the asset minus its total depreciation over all prior periods—reaches the salvage value.

@DDB uses the following formula to calculate the double-declining balance depreciation for any period:

$$\frac{(bv * 2)}{n} \quad \text{where: } \begin{array}{l} bv = \text{book value in that period} \\ n = \text{life of the asset} \end{array}$$

Example

You just purchased an office machine for \$10,000. The useful life of this machine is eight years, and the salvage value after eight years is \$1,200. You can calculate the depreciation expense for the fifth year, using the double-declining balance method. @DDB(10000,1200,8,5) = \$791.02, the depreciation expense for the fifth year of the asset's life.

@DMAX

@DMAX(input,offset,criteria) finds the largest value in the *offset* column of the *input* range that meets the criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

		Input		Offset		Criteria				
D15	(D2) @DMAX(EXPENSES,1,CRIT_RANGE)									READY
	A	B	C	D	E	F	G			
1	TRIP EXPENSES									
2										
3	CITY	DATE	GAS	HOTEL	FOOD					
4	Winnepeg	17-Nov	\$27.85	\$0.00	\$4.50					
5	Toronto	18-Nov	18.25	58.65	32.65					
6	Toronto	19-Nov	6.85	58.65	28.00					
7	Ottawa	20-Nov	23.45	60.50	33.74					
8	Montreal	21-Nov	24.38	55.00	29.83					
9	Montreal	22-Nov	6.33	55.00	35.70					
10	Ottawa	23-Nov	22.97	60.50	42.00					
11										
12	CITY									
13	Montreal									
14										
15	The last day	spent in Montreal:		22-Nov						
16										
	CRIT RANGE		EXPENSES							

CRIT_RANGE

EXPENSES

Figure 17-3 Determining the last day spent in Montreal with @DMAX

17-24 @Functions

Example

Now that you have created a database table of your expenses for a trip to Canada, you want to determine the last day you spent in Montreal. In Figure 17-3, `@DMAX(EXPENSES,1,CRIT_RANGE)` searches the *input* range EXPENSES for records that match the criteria in the *criteria* range CRIT_RANGE, and then selects the largest value in the column whose *offset* number is 1 (DATE).

@DMIN

`@DMIN(input,offset,criteria)` finds the smallest value in the *offset* column of the *input* range that meets the criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Example

You created a database table of your expenses for a trip to Canada and you want to determine the first day you spent in Ottawa. `@DMIN(EXPENSES,1,CRIT_RANGE)`, in Figure 17-4, searches the *input* range EXPENSES for records that match the criteria in the *criteria* range CRIT_RANGE, and then selects the smallest value in the column whose *offset* number is 1 (DATE).

Input Offset Criteria

D15	(D2) @DMIN(EXPENSES,1,CRIT_RANGE)						READY
	A	B	C	D	E	F	G
1	TRIP EXPENSES						
2							
3	CITY	DATE	GAS	HOTEL	FOOD		
4	Winnipeg	17-Nov	\$27.85	\$0.00	\$4.50		
5	Toronto	18-Nov	18.25	58.65	32.65		
6	Toronto	19-Nov	6.85	58.65	28.00		
7	Ottawa	20-Nov	23.45	60.50	33.74		
8	Montreal	21-Nov	24.38	55.00	29.83		
9	Montreal	22-Nov	6.33	55.00	35.70		
10	Ottawa	23-Nov	22.97	60.50	42.00		
11							
12	CITY						
13	Ottawa						
14							
15	The last day spent in Montreal:			20-Nov			
16							

CRIT RANGEEXPENSES

Figure 17-4 Determining the first day spent in Ottawa with @DMIN

@DSTD

@DSTD(*input*,*offset*,*criteria*) calculates the population standard deviation of the values in the *offset* column of an *input* range that meet the *criteria* in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Standard deviation measures the degree to which individual values in a list vary from the mean (average) of all values in the list. The lower the standard deviation, the less individual values vary from the mean, and the more reliable the mean. A standard deviation of 0 indicates that all values in the list are equal.

@DSTD produces the most accurate results when the number of observations is large.

(NOTE) Standard deviation is the square root of variance.

@DSTD uses the *n* method (biased) to calculate the standard deviation of population data. The *n* method uses the following formula:

$$\sqrt{\frac{\sum (v_i - avg)^2}{n}} \quad \text{where: } \begin{array}{ll} n & = \text{number of items in list} \\ v_i & = \text{the } i\text{th item in list} \\ avg & = \text{average of values in list} \end{array}$$

Input		Offset	Criteria			
G17	@DSTD(REGION,Z,CRIT_RANGE)					READY
	A	B	C	D	E	F
1	SCORES FOR STUDENTS IN REGION THREE					
2						
3	CITY	AGE	SCORE			
4	HaberLand	16	645			
5	HaberLand	17	640			
6	HaberLand	16	635			
7	HaberLand	17	630			
8	HaberLand	16	625			
9	Mayfair	16	610			
10	HaberLand	17	600			
11	HaberLand	16	600			
12	HaberLand	16	595			
13	HaberLand	17	590			
14	HaberLand	16	590			AGE
15	HaberLand	16	580			16
16						
17	Population standard deviation of 16-year-olds' test scores:					21.50581
18						
	REGION		CRIT_RANGE			

Figure 17-5 Calculating standard deviation of test scores with @DSTD

17-26 @Functions

Example

The database table in Figure 17-5 contains test scores for high school students in several cities. You want to determine the standard deviation of test scores for 16-year-olds. @DSTD(REGION"SCORE",CRIT_RANGE) searches the *input* range for records that match the criteria in the *criteria* range CRIT_RANGE, and then calculates the standard deviation of the selected values from the *field* named SCORE.

@DSUM

@DSUM(*input*,*offset*,*criteria*) sums the values in the *offset* column of an *input* range that meet the criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Example

You want to determine the total amount you spent on hotels in Montreal, as shown earlier in Figure 17-4. If you enter @DSUM(EXPENSES,3,CRIT_RANGE), Lotus-DM searches the *input* range EXPENSES for records that match the criteria in the *criteria* range CRIT_RANGE, and then adds the selected values from the column whose *offset* number is 3 (HOTEL).

@DVAR

@DVAR(*input*,*offset*,*criteria*) calculates the population variance of the values in the *offset* column of an *input* range that meet the criteria in the *criteria* range. For an explanation of the arguments, see "Database @Functions" earlier in this chapter.

Variance is a measure of the degree to which individual values in a list vary from the mean (average) of all the values in the list. The lower the variance, the less the individual values vary from the mean, and the more reliable the mean. A variance of 0 indicates that all values in the list are equal.

@DVAR produces most accurate results when the number of observations is large.

NOTE Variance is the square of standard deviation.

@DVAR uses the *n* (biased) method to calculate variance with the following formula:

$$\frac{\sum (v_i - avg)^2}{n} \quad \text{where:} \quad \begin{array}{ll} n & = \text{number of items in list} \\ v_i & = \text{the } i\text{th item in list} \\ avg & = \text{average of values in list} \end{array}$$

Example

The database table in Figure 17-5 contains test scores for students in several cities. You want to determine the standard deviation of test scores for students from the city of Haberland. @DVAR(REGION,"SCORE",CRIT_RANGE) searches the *input* range for records that match the criteria in the *criteria* range CRIT_RANGE, and then calculates the standard deviation of the selected values from the *field* named SCORE.

@ERR

@ERR returns the value ERR (error).

ERR is a special value in Lotus-DM that indicates an error in a formula. ERR has a ripple-through effect on formulas. @ERR is seldom used by itself, but is often used with @IF to indicate an ERR value under certain conditions.

NOTE You cannot substitute the label ERR for the value ERR in formulas. For example, the formula +A2+34 = ERR if A2 contains a formula that evaluates to ERR, but equals 34 if A2 contains the label ERR.

Example

@IF(B14>3,@ERR,B14) = ERR when the value in B14 is greater than 3.

@EXACT

@EXACT(*string1*,*string2*) tests whether *string1* and *string2* are the same. If the two strings match exactly, @EXACT returns 1 (true); otherwise, @EXACT returns 0 (false).

string1 and *string2* can be literal strings, range names, cell or range addresses that contain labels, or formulas or @functions that evaluate to strings.

@EXACT provides a more precise alternative to the equals operator (=) in a string formula. @EXACT, unlike the equals operator, distinguishes between uppercase and lowercase letters, between letters with and without accent marks, and between strings that contain leading or trailing spaces and those that do not.

Examples

@EXACT("Debit",B2) = 0 (false) when B2 contains the label DEBIT or debit.

@IF(@EXACT(A6,"Posted"),A25,@NA) = the value in A25 if A6 contains the label Posted. If A6 contains any other label, the formula returns the value NA.

@EXP

@EXP(*x*) calculates the value of *e* (approximately 2.718282) raised to the power *x*. *e* is the constant used as the base in natural logarithms.

x can be any value less than or equal to 709. If *x* is greater than 230 or smaller than -227, Lotus-DM can calculate and store the result of @EXP but cannot display it.

If *x* is larger than 709, the calculation is too large for Lotus-DM to store, and @EXP returns the value ERR. If *x* is smaller than -709, @EXP returns the value 0.

Examples

@EXP(1.25) = 3.490342

@EXP(-1.25) = 0.286504

@FALSE

@FALSE returns the logical value 0 (false).

Use @FALSE with @functions such as @IF that require a logical value of 0 (false). You can use either @FALSE or the value 0 in formulas that evaluate logical conditions, but @FALSE makes the formula easier to read.

Example

@IF(A6>=500,@TRUE,@FALSE) = 0 when A6 contains a value less than 500.

@FIND

@FIND(*search-string*,*string*,*start-number*) calculates the position in *string* at which Lotus-DM finds the first occurrence of *search-string*. @FIND begins searching *string* at the position indicated by *start-number*. If Lotus-DM does not find *search-string* in *string*, @FIND returns the value ERR.

search-string and *string* can be literal strings, range names, cell or range addresses that contain labels, or formulas or @functions that evaluate to strings.

start-number represents an offset number of a character in *string*. *start-number* can be any positive integer or 0.

@FIND is case-sensitive; for example, @FIND will not find *search-string* pay in *string* PAYMENT.

@FIND is often used with @LEFT, @MID, @REPLACE, or @RIGHT to locate and extract or replace a string.

Examples

@FIND("P","Accounts Payable",0) = 9 because *search-string* P is at position 9 in *string* Accounts Payable

@FIND("even","Seven is not even",0) = 1

@FIND("even","Seven is not even",1) = 1

@FIND("even","Seven is not even",14) = ERR

@FV

@FV(*payments*,*interest*,*term*) calculates the future value of an investment, based on a series of equal *payments*, earning a periodic *interest* rate, over the number of payment periods in *term*.

payments and *term* can be any values.

interest can be any value greater than -1.

Lotus-DM assumes that calculations made with @FV use an investment that is an ordinary annuity (one in which payments are made at the end of each period).

@FV uses the following formula to calculate future value:

$$pmt * \frac{(1 + int)^n - 1}{int} \quad \text{where: } \begin{array}{ll} pmt & = \text{periodic payment} \\ int & = \text{periodic interest rate} \\ n & = \text{number of periods} \end{array}$$

Examples

You plan to deposit \$2,000 each year for the next 20 years into an individual retirement account. The account pays 7.5% interest, compounded annually; interest is paid on the last day of each year. You make each year's contribution on the last day of the year, and you want to calculate the value of your account in 20 years.

@FV(2000,0.075,20) = \$86,609.36, the value of your account at the end of 20 years.

If you make each year's contribution on the first day of the year, you would calculate the amount for an annuity due. To calculate the future value of an annuity due, use the formula @FV(payments,interest,term)*(1+interest).

@FV(2000,0.075,20)*(1+0.075) = \$93,105.06, the value of your account in 20 years if you make each deposit on the first day of each year.

@HLOOKUP

@HLOOKUP(*x*,*range*,*row-offset*) finds the contents of a cell in the specified row of a horizontal lookup table. A **horizontal lookup table** is a range whose values are in ascending order in the top row.

@HLOOKUP compares the value *x* to each cell in the top row of the table. When Lotus-DM locates a cell in the top row that contains the value *x* (or the value closest to, but not larger than, *x*) it moves down that column the number of rows specified by *row-offset* and returns the contents of the cell as the answer.

x can be any value greater than or equal to the first value in *range*. If *x* is smaller than the first value in *range*, @HLOOKUP returns the value ERR. If *x* is larger than the last value in *range*, @HLOOKUP stops at the last cell in the row and returns the contents of that cell.

range represents the location of the horizontal lookup table. *range* can be any range name or address.

row-offset represents an offset number. An offset number corresponds to the position the row occupies in *range*. The top row has an offset number of 0, the second row has an offset number of 1, and so on. *row-offset* can be zero or any positive integer that is less than or equal to the number of rows in *range* minus 1. For example, if *range* contains 20 rows, the largest number you can use for *row-offset* is 19.

Use @HLOOKUP to locate entries in a table, such as a tax table or a sales commissions table.

17-30 @Functions

Examples

The table in Figure 17-6 contains the number of employees in various departments of a company during a 20-year period.

@HLOOKUP(1975,B3..F7,3) in D9 returns 12, the number of employees in the Documentation department in 1975.

@HLOOKUP(1981,B3..F7,1) in D11 returns 24. 1981 does not appear in the top row of the table, so @HLOOKUP stops at column D, because 1980 is the value closest to, but not larger than, 1981.

Top row

B11	@HLOOKUP(1981,B3..F7,1)					READY
	A	B	C	D	E	F
1			COMPANY GROWTH			
2						
3		1970	1975	1980	1985	1990
4	Production	16	18	24	35	39
5	Marketing	12	15	21	26	31
6	Documentation	8	12	19	24	30
7	Sales	3	8	18	22	28
8						
9	@HLOOKUP(1975,B3..F7,3) ==>	12				
10						
11	@HLOOKUP(1981,B3..F7,1) ==>	24				
12						

Table range (A3..F7)

Figure 17-6 A horizontal lookup table

@HOUR

@HOUR(*time-number*) returns the hour, an integer from 0 (midnight) to 23 (11:00 PM), in a *time-number*. For an explanation of time numbers, see "Date and Time @Functions" earlier in this chapter.

time-number is a decimal value from .000000 (midnight) to .999988 (11:59:59 PM). Usually, another time @function supplies *time-number*.

Examples

@HOUR(.51565) = 12 (noon)

@HOUR(@TIME(13,45,18)) = 13 (1:00 PM), because 13 is the *hour* argument for @TIME(13,45,18).

@IF

@IF(*condition*,*x*,*y*) evaluates *condition* and takes one of two actions, depending on the result of the evaluation. If *condition* is true, @IF returns *x*; if *condition* is false, @IF returns *y*.

condition is usually a logical formula or a reference to a cell that contains a logical formula. However, you can use any formula, number, literal string, or cell reference as *condition*. Lotus-DM evaluates any *condition* that does not equal zero as true and any *condition* that does equal zero as false. Blank cells, strings, ERR, and NA all equal zero when used as *condition*.

x and *y* can be values or strings.

Examples

@IF(9>8,C3,D3) = the value in C3.

@IF(B3-C3>=0,B3-C3,0) = B3-C3 when B3-C3 is positive; otherwise, it returns 0.

@IF(BALANCE>=0,BALANCE"Overdrawn") = the value in the cell name BALANCE if BALANCE is positive; otherwise, it returns Overdrawn.

You can nest @IF functions to create a complex condition. For example, @IF(SALES>10000,SALES*.15,@IF(SALES>=5000,SALES*.10,SALES*.02)) nests two @IF functions to create a formula that determines a commission rate based on three levels of sales: sales greater than \$10,000, sales from \$5,000 to \$10,000, and sales less than \$5,000.

@INDEX

@INDEX(*range*,*column-offset*,*row-offset*) finds the value in the cell located at a specified *column-offset* and *row-offset* of *range*.

range can be any range name or address.

column-offset and *row-offset* represent offset numbers. An offset number corresponds to the position the column or row occupies in *range*. The first column or row has an offset number of 0, the second column or row has an offset number of 1, and so on.

column-offset can be zero or any positive integer that is less than or equal to the number of columns in *range* minus 1. For example, if *range* contains 20 columns, the largest number you could use for *column-offset* is 19.

row-offset can be zero or any positive integer that is less than or equal to the number of rows in *range* minus 1. For example, if *range* contains 20 rows, the largest number you could use for *column-offset* is 19.

Use @INDEX instead of @HLOOKUP or @VLOOKUP when you want to use a lookup table but need to use the relative positions of the rows or columns, instead of specified values, to find an entry.

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Example

Figure 17-7 shows the number of children enrolled in kindergarten through third grade at an elementary school.

@INDEX(SCHOOL,3,4) in D11 returns 114, the number of students in the third grade (row-offset number 4) in 1986 (column-offset number 3).

		Column-offset		Row-offset			
D11	@INDEX(SCHOOL,3,4)						READY
	A	B	C	D	E	F	
1	SCHOOL POPULATION						
2	=====						
3	GRADE	1984	1985	1986	1987	1988	
4	Kindergarten	83	98	90	94	92	
5	First	85	106	98	90	95	
6	Second	79	114	105	100	83	
7	Third	88	78	114	103	102	
8							
9							
10							
11	@INDEX(SCHOOL,3,4) =====>			114			
12							

SCHOOL

Figure 17-7 Determining the number of students in the third grade with @INDEX

@INT

@INT(*x*) returns the integer portion of *x*, without rounding the value.

x can be any value.

(NOTE) If you want to display values as integers in the worksheet but want Lotus-DM to calculate the values to their full precision, set Range Format or Worksheet Format to Fixed with 0 decimal places. Do not use @INT.

Examples

@INT(35.67) = 35

@INT(@NOW) = the date number for the current date without the time, because the time portion is a decimal value.

@IRR

@IRR(*guess,range*) calculates the internal rate of return expected from a series of cash flows generated by an investment. The internal rate of return is the percentage rate at which the present value of an expected series of cash flows is equal to the present value of the initial investment.

Lotus-DM assumes the cash flows are received at regular, equal intervals.

guess represents your estimate of the internal rate of return. *guess* can be any value.

range can be the name or address of the range that contains the cash flows. Lotus-DM considers negative numbers as cash outflows and positive numbers as cash inflows. Normally, the first cash flow in *range* is a negative number that represents the investment.

@IRR uses a series of approximations to calculate the internal rate of return. Because @IRR uses approximations, you enter a guess that you think is reasonable for the internal rate of return. In most cases, your guess should be a percentage between 0 (0%) and 1 (100%). Because more than one solution may be possible, try another guess if the result is less than 0 or greater than 1.

If @IRR cannot approximate the result to within 0.0000001 after 30 calculation iterations, the formula evaluates to ERR. If your guesses continue to return ERR, use @NPV to determine a better guess. If @NPV returns a positive value, your guess is too low. If @NPV returns a negative value, your guess is too high. @NPV returns 0 if your guess is accurate.

(NOTE) @IRR assigns the value 0 to all blank cells in *range* and includes them in the calculation.

		Initial investment							
B16	(P2) @IRR(A2,B2..B14)								READY
	A	B	C	D	E	F	G		
1	Guess	Cash Flows		Guess	Cash flows				
2	5%	(\$1,000)		5%	(\$1,000)				
3		\$120			\$120				
4		120			124				
5		120			128				
6		120			132				
7		120			136				
8		120			130				
9		120			120				
10		120			124				
11		120			128				
12		120			132				
13		120			120				
14		120			124				
15									
16		6.11%			7.09%				
17									

Figure 17-8 Calculating the internal rate of return with @IRR

17-34 @Functions

Example

In Figure 17-8, @IRR(A2,B2..B14) in B16 returns 6.11% over a 12-month term; the initial investment is \$1000 (in B2) and the 12 cash flows are each \$120 (in B3..B14). @IRR(D2,E2..E14) in E16 returns 7.09% over a 12-month term; the initial investment is \$1000 (in E2) and the 12 cash flows are those shown in E3..E14.

@ISERR

@ISERR(*x*) tests *x* for the value ERR. If *x* is the value ERR, @ISERR returns 1 (true); if *x* is not the value ERR, @ISERR returns 0 (false).

x can be any string, value, location, or condition.

Use @ISERR to stop the ripple-through effect of the value ERR.

Example

@ISERR is frequently used to block errors that arise from division by 0. For example, @IF(@ISERR(A1/A2),0,A1/A2) tests the result of the division A1/A2. If the result is the value ERR, the formula returns 0. If the result is any other value, the formula returns that result.

@ISNA

@ISNA(*x*) tests *x* for the value NA. If *x* is the value NA, @ISNA returns 1 (true); if *x* is not the value NA, @ISNA returns 0 (false).

x can be any string, value, location, or condition.

Use @ISNA to stop the ripple-through effect of the value NA.

Example

@ISNA(B1) = 1 if B1 contains the value NA; @ISNA(B1) = 0 if B1 contains any other entry.

@ISNUMBER

@ISNUMBER(*x*) tests *x* for a value. If *x* is a value or a blank cell, @ISNUMBER returns 1 (true); if *x* is a string, @ISNUMBER returns 0 (false).

x can be any string, value, location, or condition.

Use @ISNUMBER to prevent errors that would occur if a cell used in a formula contained the wrong type of data.

@ISSTRING

@ISSTRING(*x*) tests *x* for a string. If *x* is a literal string or cell that contains a label or string formula, **@ISSTRING** returns 1 (true); if *x* is a value or blank cell, **@ISSTRING** returns 0 (false).

x can be any string, value, location, or condition.

Use **@ISSTRING** to prevent errors that would occur if a cell used in a formula contained the wrong type of data.

NOTE **@ISSTRING** returns 1 even if a cell contains only a label prefix or a space.

@LEFT

@LEFT(*string*,*n*) returns the first *n* characters in *string*.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

n can be any positive integer or 0. If *n* is 0, the result of **@LEFT** is an empty string. If *n* is greater than or equal to the length of *string*, **@LEFT** returns the entire *string*.

Lotus-DM counts punctuation and spaces as characters in **@LEFT**.

@LEFT is useful for copying only part of a label into another cell.

Examples

@LEFT("Allons enfants de la",6) = Allons

@LEFT("•••An indented string",3) = •••

NOTE Each • (bullet) represents one space.

@LENGTH

@LENGTH(*string*) counts the number of characters in *string*.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

Lotus-DM counts punctuation and spaces as characters in **@LENGTH**.

Examples

@LENGTH("Mr. •Jones") = 9

Suppose you want to use **@LENGTH** to determine the total length of a line before printing and you are printing a range that contains columns A through D of a worksheet. **@LENGTH(A1&B1&C1&D1)** calculates the total length in characters of the first line.

NOTE Each • (bullet) represents one space.

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@LN

@LN(x) calculates the natural logarithm of x . Natural logarithms use the number e (approximately 2.718281) as a base.

x can be any value greater than 0.

Examples

@LN(2) = 0.693147

@LN(@EXP(1)) = 1, because @EXP(1) = 2.718281.

@LOG

@LOG(x) calculates the common logarithm (base 10) of x .

x can be any value greater than 0.

Examples

@LOG(4) = 0.602059

@LOG(1.0E+14) = 14

@LOWER

@LOWER(*string*) converts all uppercase letters in *string* to lowercase.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

Examples

@LOWER("EXPENSES") = expenses

@LOWER(B2) = e.e. cummings if B2 contains the label E.E. Cummings.

@MAX

@MAX(*list*) finds the largest value in *list*.

list can be any combination of values and ranges (that contain values).

Examples

@MAX(55,39,50,28,67,43) = 67

@MAX(A1..C10) returns the largest value in A1..C10.

@MID

@MID(*string*,*start-number*,*n*) returns *n* characters from *string*, beginning with the character at *start-number*.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

start-number can be any positive integer or 0. *start-number* represents the offset number of a character in string. If *start-number* is greater than the length of *string* minus 1, the result of @MID is an empty string.

n can be any positive integer or 0. If *n* is 0, the result of @MID is an empty string.

NOTE Use a large number for *n* if you don't know the length of *string*; Lotus-DM will return the remainder of *string*.

Lotus-DM counts punctuation and spaces as characters in @MID.

Use @MID when you need to extract a part of a label that is not located at the beginning or end of the label. If you need to extract part of a label but you don't know its *start-number*, use @MID with @FIND.

Examples

@MID("Our finest hour",4,6) = finest

@MID("Our finest hour",4,60) = finest hour

@MID("Our finest hour",25,6) = an empty string

@MIN

@MIN(*list*) finds the smallest value in *list*.

list can be any combination of values and ranges (that contain ranges).

Examples

@MIN(55,39,50,28,67,43) = 28

@MIN(A1..C10) returns the smallest value in A1..C10.

@MINUTE

@MINUTE(*time-number*) returns the minutes in *time number* as an integer from 0 to 59.

For an explanation of time numbers, see "Date and Time @Functions" earlier in this chapter.

time-number can be any decimal value from .000000 (midnight) to .999988 (11:59:59 PM). Usually, another time @function supplies *time-number*.

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Examples

@MINUTE(0.333) = 59 because 0.333 is the time number for 7:59:31.

@MINUTE(@TIME(11,15,45)) = 15 because 15 is the *minutes* argument for @TIME(11,15,45).

@MOD

@MOD(x,y) calculates the remainder (modulus) of x/y .

x can be any value. If x is 0, @MOD returns 0. The sign (+ or -) of x determines the sign of the result.

y can be any value except 0.

@MOD uses the following formula to calculate the modulus:

$x - (y * @INT(x/y))$

Example

@MOD(9,4) = 1

You can use @MOD to calculate the day of the week by entering a date number as x and 7 (the number of days in a week) as y . The remainder of the date number divided by 7 will always be the day of the week: 0 for Saturday, 1 for Sunday, up to 6 for Friday. For example, @MOD(@DATE(85,11,18),7) = 2; November 18, 1985 was a Monday.

@MONTH

@MONTH(*date-number*) returns the month in *date-number* as an integer from 1 (January) to 12 (December). For an explanation of date numbers, see "Date and Time @Functions" earlier in this chapter.

date-number can be any integer from 1 (January 1, 1900) to 73050 (December 31, 2099). Usually, another date @function supplies *date-number*.

Examples

@MONTH(20181) = 4 because 20181 is the date number for April 2, 1955.

@MONTH(@NOW) = date number for the current month.

@N

@N(*range*) returns the value of the first cell in *range*: if the cell contains a value, @N returns that value; if the cell contains a label, @N returns the value 0.

range can be any range name or address.

Examples

@N(B14..B28) = 17 if B14 contains the value 17.

@N(REGION) = 0 if the first cell in region contains a label.

@NA

@NA returns the value NA (not available).

NA indicates that a value needed to complete a formula is not available. NA has a ripple-through effect on formulas.

Use @NA when you are building a worksheet that will contain data that you have not yet determined. You can use @NA in cells where you will enter that data; formulas that refer to those cells will have the value NA until you supply the data.

NOTE You cannot substitute the label NA for the value NA in formulas. For example, the formula +A2+34 = NA when A2 contains @NA, but equals 34 when A2 contains the label NA.

Example

@IF(B14=" ",@NA,B14) = the value NA when B14 is blank.

@NOW

@NOW returns the value that corresponds to the current date and time on the computer's clock. This includes both a date number (integer portion) and a time number (decimal portion). For an explanation of date numbers and time numbers, see "Date and Time @Functions" earlier in this chapter.

You can format the value of @NOW with the Lotus-DM date or time formats. If you format @NOW as a date, Lotus-DM displays only the date (integer) portion of the date-and-time number; if you format @NOW as a time, Lotus-DM displays only the time (decimal) portion of the date-and-time number. In both cases, Lotus-DM continues to calculate with the entire date-and-time number.

@NOW recalculates each time you recalculate your work. If you set recalculation to Automatic, Lotus-DM recalculates @NOW whenever it recalculates another value.

Examples

@NOW = 31048.5 at noon on January 25, 1985.

@INT(@NOW) = 31048 at the same time.

@NOW = 32688.395 at 9:45 AM June 29, 1989.

@NPV

@NPV(*interest*,*range*) calculates the net present value of a series of future cash flows discounted at a fixed, periodic *interest* rate.

Lotus-DM assumes that the cash flows occur at equal time intervals, that the first cash flow occurs at the end of the first period, and that subsequent cash flows occur at the end of subsequent periods.

interest can be any value greater than -1.

range can be the name or address of the range that contains the cash flows.

NOTE @NPV is similar to @PV, except that with @PV all cash flows are equal amounts.

@NPV calculates the net present value using the following formula:

$$\sum_{i=1}^n \frac{v_i}{(1 + \text{int})^i} \quad \text{where: } \begin{array}{ll} v_1 \dots v_n & = \text{series of cash flows in range} \\ \text{int} & = \text{interest rate} \\ n & = \text{number of cash flows} \\ i & = \text{the current iteration (1 through } i) \end{array}$$

Example

In Figure 17-9, @NPV(B2,D2..D6) in B5 returns \$6,707.90, the net present value of the cash flows in D2..D6.

B5	[W15] @NPV(B2,D2..D6)					READY
	A	B	C	D	E	
1	Initial Cash Outflow:	(\$4,700.00)		Cash Flows		
2	Periodic Interest Rate:	7%		\$1,600.00		
3				1,600.00		
4				1,600.00		
5	Net Present Value:	\$6,707.90		1,700.00		
6				1,700.00		

Range containing cash flows

Figure 17-9 Calculating net present value with @NPV

NOTE To determine the net present value of an investment in which you make an initial cash outflow followed by a series of future cash inflows, you must factor the initial cash outflow separately, because it is not affected by the interest. For example, +INITIAL+@NPV(RATE,SERIES) = \$904.07 when INITIAL is the initial cash outflow, RATE is the interest rate, and SERIES is the series of future cash inflows.

@PI

@PI returns the value π (calculated at 3.1415926536). π is the ratio of the circumference of a circle to its diameter.

Example

@PI*4^2 = 50.26548, the area of a circle with a radius of 4.

@PMT

@PMT(*principal*,*interest*,*term*) calculates the amount of the periodic payment needed to pay off a loan, given a specified periodic *interest* rate and number of payment periods. Lotus-DM assumes your calculations are for payments you make at the end of each payment period (an ordinary annuity).

principal represents the value of the loan. *principal* can be any value.

interest represents the periodic interest rate. *interest* can be any value greater than -1.

term represents the number of payment periods. *term* can be any value except 0.

Enter *interest* and *term* in the same units of time. For example, if you are calculating a monthly payment, enter the interest and term in monthly increments. (See the examples below.)

@PMT uses the following formula to calculate periodic payment:

$$\text{prin} * \frac{\text{int}}{1 - (\text{int} + 1)^{-n}} \quad \text{where: } \begin{array}{ll} \text{prin} & = \text{principal} \\ \text{int} & = \text{periodic interest rate} \\ n & = \text{term} \end{array}$$

Examples

You are considering taking out an \$8,000 loan for 3 years at an annual interest rate of 14%, compounded monthly, and you want to determine your monthly payment.

@PMT(8000,0.14/12,36) returns \$273.42, the monthly payment.

If you make payments at the beginning of each month, you would calculate the amount for an annuity due. To calculate the amount of the periodic payment on an annuity due, use the formula @PMT(*principal*,*interest*,*term*)/(1+*interest*). Therefore, @PMT(8000,0.14/12,36)/(1+0.14/12) = \$270.27, the monthly payment.

@PROPER

@PROPER(*string*) capitalizes the first letter of each word in *string* and makes the remaining letters lowercase.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

Use @PROPER when you combine data from several sources and want labels to be consistent throughout your worksheet.

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Examples

NOTE In the following examples, each • (bullet) represents one space.

@PROPER("354-a•babcock") = 354-A Babcock

@PROPER(A7&"•"&G7) returns Morton Smith; Athens, Georgia if A7 contains the label MORTON SMITH, and G7 contains the label Athens, georgia. Note that the ; (semicolon) is in quotation marks and is therefore treated as a literal string instead of an argument separator.

@PV

@PV(*payments, interest, term*) determines the present value of an investment. @PV calculates the present value based on a series of equal investments (*payments*), discounted at a periodic *interest* rate over the number of periods in *term*. *payments* and *term* can be any values. *interest* can be any value greater than -1.

@PV calculates present value with the following formula:

$$pmt * \frac{1 - (1 + int)^{-n}}{int} \quad \text{where: } \begin{array}{ll} pmt & = \text{periodic payment} \\ int & = \text{periodic interest rate} \\ n & = \text{term} \end{array}$$

Example

You won \$1,000,000 and the prize is awarded in 20 annual payments of \$50,000 each. You can either receive annual payments at the end of each year or a single payment of \$400,000 (instead of the million-dollar annuity). You want to find out which option is worth more in today's dollars.

If you were to accept the annual payments of \$50,000, assume that you would invest the money at a rate of 8%, compounded annually.

If you enter @PV(50,0.08,20), Lotus-DM returns \$490,907. The \$1,000,000 paid over 20 years is worth \$490,907 in present dollars.

If you received the annual payments at the beginning of each year, you would calculate the amount for an annuity due. To calculate the present value of an annuity due, use the formula @PV(*payments, interest, term*)*(1+*interest*).

For example, @PV(50000,0.08,20)*(1+0.08) = \$530,180, the value of \$1,000,000 paid over 20 years as an annuity due in present dollars.

@RAND

@RAND generates a random number between 0 and 1. Each time Lotus-DM recalculates your work, @RAND generates a new random number. @RAND is useful for generating test data for simulations. To generate random numbers in different numeric intervals, multiply @RAND by the size of the interval.

Examples

@RAND = 0.419501 or any number between 0 and 1.

@RAND*10 = 6.933674 or any number between 0 and 10.

@INT(@RAND*50)+1 = 49 or any integer from 1 to 50.

@RATE

@RATE(*future-value*,*present-value*,*term*) calculates the periodic interest rate necessary for an investment (*present-value*) to grow to a *future-value* over the number of compounding periods in *term*. *future-value* can be any value. *present-value* and *term* can be any values except 0.

@RATE uses the following formula to calculate the periodic interest rate:

$$\left(\frac{fv}{pv} \right)^{1/n} - 1 \quad \text{where: } \begin{array}{ll} fv & = \text{future value} \\ pv & = \text{present value} \\ n & = \text{term} \end{array}$$

Example

You invested \$10,000 in a bond that matures in five years and has a maturity value of \$18,000. Interest is compounded monthly and you want to determine the periodic interest rate for this investment.

@RATE(18000,10000,5*12) returns .984%, which tells you that the periodic (monthly) interest rate is just under 1% per month. To determine the annual rate, multiply the above formula by 12. This yields a result of 11.8% annually.

@REPEAT

@REPEAT(*string*,*n*) duplicates *string* *n* times.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

n can be any positive integer.

NOTE @REPEAT differs from the repeating label prefix \ (backslash) in that the repeating label prefix repeats a label only as many times as will fill the current cell. @REPEAT duplicates the string as many times as you specify; it is not limited by the current column width.

Examples

@REPEAT("Hello ",3) returns Hello Hello Hello.

@REPEAT("-",10) returns -----.

@REPLACE

@REPLACE(*original-string*,*start-number*,*n*,*new-string*) replaces *n* characters in *original-string*, beginning at *start-number*, with *new-string*.

original-string and *new-string* can be literal strings, range addresses, cell addresses, or range names that contains labels, formulas or @functions that evaluate to strings.

start-number can be any positive integer or 0. *start-number* represents the offset number of a character in *original-string*.

n can be any positive integer or 0.

You can perform several procedures with @REPLACE:

- By making *n* equal the number of characters in *original-string*, you can replace the entire *original-string* with *new-string*.
- By specifying a position at the end of *original-string* as *start-number*, you can append *new-string* to *original-string*.
- By making *n* equal 0, you can insert a new string.
- By making *new-string* an empty string, you can delete a string.

Lotus-DM counts punctuation and spaces as characters in @REPLACE. If you use @REPLACE to append or insert strings, remember to include the necessary punctuation and spaces.

Examples

@REPLACE("January",0,3,"Febr") = February

@REPLACE("January",10,0," February") = January February

@REPLACE(CELL,@FIND("-",CELL,0),1,"/") replaces the label in CELL, 4-24, with 4/24.

@RIGHT

@RIGHT(*string*,*n*) returns the last *n* characters in *string*.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

n can be any positive integer or 0. If *n* is 0, the result of @RIGHT is an empty string. If *n* is greater than or equal to the length of *string*, @RIGHT returns the entire *string*.

Lotus-DM counts punctuation and spaces as characters in @RIGHT.

@RIGHT is useful for copying only part of a label to another cell.

Examples

@RIGHT("Average Daily Balance",7) = Balance

@RIGHT(B3,5) = Sales when B3 contains the label January Sales.

@ROUND

@ROUND(x,n) rounds the value x to n places.

x can be any value. n can be any integer from -15 to 15.

If n is positive, Lotus-DM rounds x to n digits to the right of the decimal point. If n is negative, Lotus-DM rounds x to the positive n th power of 10. For example, if n is -2, Lotus-DM rounds x to the nearest hundred. If n is 0, Lotus-DM rounds x to an integer.

NOTE If you want to display values with a specific number of decimal places but want Lotus-DM to calculate those values to their full precision, set Range Format or Worksheet Format to Fixed. Do not use @ROUND.

Examples

@ROUND(134.578,2) = 134.58

@ROUND(134.578,0) = 135

@ROUND(134.578,-2) = 100

@ROWS

@ROWS(*range*) counts the number of rows in *range*.

range can be any range name or address.

You can use @ROWS to find the length of a range you want to print.

Example

@ROWS(SCORES) = 43 if SCORES is the range B3..B45.

@S

@S(*range*) returns the entry in the first cell in *range* as a label: if the cell contains a label, @S returns that label; if the cell contains a value, @S returns an empty string.

range can be any range name or address.

Example

@S(B3) = Sales if B3 contains the label Sales.

@SECOND

@SECOND(*time-number*) returns the seconds in *time-number* as an integer from 0 to 59. For an explanation of time numbers, see "Date and Time @Functions" earlier in this chapter.

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time-number can be any decimal value from .000000 (midnight) to .999988 (11:59:59 PM). Usually, another time @function supplies *time-number*.

Examples

@SECOND(0.333) = 31 because 0.333 is the time number for 7:59:31.

@SECOND(@TIME(11,15,45)) = 45 because 45 is the *seconds* argument for @TIME(11,15,45).

@SIN

@SIN(*x*) calculates the sine of an angle (*x*) measured in radians.

x can be any value.

(NOTE) To convert degrees to radians, multiply the degrees by @PI/180.

Examples

@SIN(.883) = 0.772646

@SIN(35*@PI/180) = 0.573576

@SLN

@SLN(*cost*,*salvage*,*life*) calculates the straight-line depreciation allowance of an asset for one period.

cost represents the amount paid for the asset. *cost* can be any value.

salvage represents the estimated value of the asset at the end of its life. *salvage* can be any value.

life represents the number of periods it will take to depreciate the asset to its salvage value. *life* can be any value except 0.

Straight-line depreciation divides the depreciable cost (the actual cost minus the salvage value) evenly over the useful life of an asset. The useful life is the number of periods (typically years) over which an asset is depreciated.

@SLN uses the following formula to calculate straight-line depreciation:

$$\frac{(c - s)}{n} \quad \text{where: } \begin{array}{ll} c &= \text{cost of the asset} \\ s &= \text{salvage value of the asset} \\ n &= \text{useful life of the asset} \end{array}$$

Example

You have an office machine worth \$10,000. The useful life of this machine is 10 years, and the salvage value in 10 years will be \$1,200. You want to calculate yearly depreciation expense, using the straight-line method.

@SLN(10000,1200,10) returns \$880, the yearly depreciation allowance.

@SQRT

@SQRT(x) calculates the positive square root of x .

x can be any positive value or 0.

Examples

@SQRT(@INT(25.768)) = 5 because @INT(25.768) = 25.

@SQRT(-2) = ERR because x is negative.

@STD

@STD(*list*) calculates the population standard deviation of the values in *list*.

list can contain one or more numbers, numeric formulas, references to ranges that contain numbers or numeric formulas, or any combination of numbers, formulas, and references to ranges.

Standard deviation measures the degree to which individual values in a list vary from the mean (average) of all values in the list. The lower the standard deviation, the less individual values vary from the mean, and the more reliable the mean. A standard deviation of 0 indicates that all values in the list are equal.

Population standard deviation is most accurate when the number of observations is large.

(NOTE) Standard deviation is the square root of variance (@VAR).

List				Title rows			
C45	(F2)	(W15)	@STD	(C3...C43)			READY
1	A			B	C		D
2				Test Scores	Test Scores		
37				Group A	Group B		
38				700	690		
39				520	680		
40				600	720		
41				700	700		
42				650	630		
43				640	600		
44				570	730		
45	Standard deviation of test scores:			61.04	43.89		
46							

Figure 17-10 Calculating the standard deviation of test scores with @STD

@STD uses the n (biased) method to calculate standard deviation of population data, with the following formula:

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$$\sqrt{\frac{\sum (v_i - avg)^2}{n}} \quad \text{where: } \begin{array}{ll} n & = \text{number of items in list} \\ v_i & = \text{the } i\text{th item in list} \\ avg & = \text{average of values in list} \end{array}$$

Example

In Figure 17-10, @STD(C3..C43) = 40.03, the population standard deviation of the test scores in C3..C43.

@STRING

@STRING(*x*,*n*) converts the value *x* into a string with *n* decimal places.

x can be any value.

n can be any integer from 0 to 15.

NOTE @STRING ignores any formatting characters included in *x*. For example, if A7 contains the formatted value \$45.23, @STRING(A7,2) returns the string 45.23.

Examples

@STRING(1.23587,0) = the string 1.

@STRING(20%,1) = the string 0.2.

@STRING(B3,0)&"•"&B4 returns the string 100 Kilsyth Road if B3 contains the value 100 and B4 contains the label Kilsyth Road.

NOTE Each • (bullet) represents one space.

@SUM

@SUM(*list*) sums the values in *list*.

list can contain one or more numbers, numeric formulas, references to ranges that contain numbers or numeric formulas, or any combination of numbers, formulas, and references to ranges.

Example

@SUM(C5..C11) = the sum of the values in range C5..C11.

@SYD

@SYD(*cost*,*salvage*,*life*,*period*) calculates the sum-of-the-years'-digits depreciation allowance of an asset for a specified *period*.

cost represents the amount paid for the asset. *cost* can be any value.

salvage represents the value of the asset at the end of its life. *salvage* can be any value.

life represents the number of periods (typically years) it will take to depreciate the asset to its salvage value. *life* can be any value greater than or equal to 1.

period represents the time period for which you want to find the depreciation allowance. *period* can be any value greater than or equal to 1.

The sum-of-the-years'-digits method accelerates the rate of depreciation, so that more depreciation expense occurs in earlier periods than in later ones. The depreciable cost is the actual cost minus the salvage value.

@SYD uses the sum-of-the-years'-digits method to calculate depreciation as follows:

$$\frac{(c - s) * (n - p + 1)}{(n * (n + 1) / 2)} \quad \text{where:} \quad \begin{array}{ll} c & = \text{cost of the asset} \\ s & = \text{salvage value of the asset} \\ n & = \text{calculated useful life of the asset} \\ p & = \text{period for which depreciation is being calculated} \end{array}$$

Example

You have an office machine worth \$10,000. The useful life of the machine is 10 years, and the salvage value in 10 years will be \$1,200. You want to use the sum-of-the-years'-digits method to calculate depreciation expense for the fifth year.

@SYD(10000,1200,10,5) returns \$960, the depreciation allowance for the fifth year.

@TAN

@TAN(*x*) calculates the tangent of an angle (*x*) measured in radians.

x can be any value.

(NOTE) To convert degrees to radians, multiply the degrees by @PI/180.

Examples

@TAN(.52) = 0.572561

@TAN(35*@PI/180) = 0.700207

@TERM

@TERM(*payments*,*interest*,*future-value*) calculates the number of payment periods in the term of an investment necessary to accumulate a *future-value*, assuming *payments* of equal value, when the investment earns a periodic *interest* rate.

payments can be any value except 0.

interest can be any value greater than -1.

future-value can be any value.

Lotus-DM assumes that calculations made with @TERM use an investment that is an ordinary annuity (payments at the end of each period).

@TERM uses the following formula to calculate the payment term:

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$$\frac{\ln(1 + (fv * int / pmt))}{\ln(1 + int)}$$

where: pmt = periodic payment
 fv = future value
 int = periodic interest rate
 \ln = natural logarithm

Examples

You deposit \$2,000 at the end of each year into a bank account. The account earns 7.5% a year, compounded annually, and you want to determine how long it will take to accumulate \$100,000.

@TERM(2000,0.075,100000) returns 21.5, the number of years it will take to accumulate \$100,000 in your account.

If you made payments at the beginning of each year, you would calculate the amount for an annuity due. To calculate the number of payment periods in an annuity due, use the formula @TERM(payment,interest,future value/(1+interest)).

For example, @TERM(2000,0.075,100000/(1+0.075)) = 20.8, the number of years it would take to accumulate \$100,000 if you made deposits at the beginning of each year.

You can calculate the term necessary to pay back a loan by using @TERM with a negative *future value*. For example, you want to know how long it will take to pay back a \$10,000 loan at 10% yearly interest, making payments of \$1,174.60 per year.

@ABS(@TERM(1174.6,0.1,-10000)) = 20 years to pay back the loan.

@TIME

@TIME(hour,minutes,seconds) returns the time number for the specified *hour*, *minutes*, and *seconds*. For an explanation of time numbers, see "Date and Time @Functions" earlier in this chapter.

hour can be any integer from 0 (midnight) to 23 (11:00 PM).

minutes and *seconds* can be any integers from 0 to 59.

Use @TIME to enter times as time numbers that Lotus-DM can use in time-arithmetic calculations; for example, to keep track of elapsed time.

NOTE To format time numbers, select Range Format Date.

Example

You want to determine a consultant's payment based on the number of hours the consultant worked. The formula (@TIME(13,0,0)-@TIME(9,15,0))*95*24 calculates the amount due on a given day by subtracting the start time (9:15 AM) from the stop time (1:00 PM) and multiplying the result by an hourly rate of \$95.00. The result is \$356.25.

@TIMEVALUE

@TIMEVALUE(*time-string*) returns the time number for *time-string*. For an explanation of time numbers, see "Date and Time @Functions" earlier in this chapter.

@TIMEVALUE is similar to **@TIME** in that it generates the time number that corresponds to a particular time of day. The difference is that **@TIME** uses three values (*hour*, *minutes*, and *seconds*) as arguments, and **@TIMEVALUE** uses a single string as its argument.

time-string must be displayed in one of the four Lotus-DM time formats, and must be enclosed in double quotes. For more information on time formats, see "Format" in Chapter 11.

Examples

@TIMEVALUE("3:5 PM") = 0.628472

@TIMEVALUE("3:12:00 PM") = 0.633333

@TRIM

@TRIM(*string*) removes leading, trailing, and consecutive spaces from *string*.

string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

Use **@TRIM** to control spacing during data entry or to combine strings that have unknown spacing.

Examples

@TRIM(" 45 3/8") = 45 3/8

@TRIM(" 500 South St.") = 500 South St.

@TRUE

@TRUE returns the logical value 1 (true).

Use **@TRUE** with @functions such as **@IF** and **@CHOOSE** that require a logical value of 1 (true). You can use either **@TRUE** or any nonzero value in formulas that evaluate logical conditions, but **@TRUE** makes the formula easier to read.

Example

@IF(A6>500,**@TRUE**,**@FALSE**) = 1 when A6 contains a value greater than 500.

@UPPER

@UPPER(*string*) converts all lowercase letters in *string* to uppercase.

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string can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string.

Examples

@UPPER("Account Number") = ACCOUNT NUMBER

@UPPER(B2) = WARNING if B2 contains the label warning.

@VALUE

@VALUE(*string*) converts a *string* to its corresponding value. *string* can be a literal string, a range address, cell address, or range name that contains a label, or a formula or @function that evaluates to a string. *string* can resemble a standard number (456.7), a number in scientific format (4.567E2), a mixed number (45 7/8), or a formatted number (\$32.85).

If *string* is a blank cell or empty string, @VALUE returns 0. If *string* contains non-numeric characters, @VALUE returns the value ERR.

@VALUE ignores leading and trailing spaces in *string*; however, if *string* contains spaces separating symbols from the numbers (such as \$ 32.85 or £ 56.20), @VALUE returns the value ERR.

NOTE You cannot perform calculations within a *string* argument in @VALUE; however, you can create formulas with @VALUE.

Use @VALUE when you want to convert a string that contains numbers into values that can be used in mathematical calculations.

Examples

@VALUE(B3) = 49.75, if B3 contains the label 49 3/4.

@VALUE("85%") = .85

@VALUE("22"+"20") = 0, but @VALUE("22")+@VALUE("20") = 42.

@VAR

@VAR(*list*) calculates the population variance of the values in *list*.

list can contain one or more numbers, numeric formulas, references to ranges that contain numbers or numeric formulas, or any combination of numbers, formulas, and references to ranges.

Variance is a measure of the degree to which individual values in a list vary from the mean (average) of all the values in the list. The lower the variance, the less individual values vary from the mean, and the more reliable the mean. A variance of 0 indicates that all values in the list are equal.

The results of @VAR are most accurate when the number of observations is large.

NOTE Variance is the square of standard deviation (@STD).

@VAR uses the n (biased) method to calculate variance with the following formula:

$$\frac{\sum (v_i - avg)^2}{n} \quad \text{where:} \quad \begin{array}{ll} n & = \text{number of items in list} \\ v_i & = \text{the } i\text{th item in list} \\ avg & = \text{average of values in list} \end{array}$$

Example

In Figure 17-11, @VAR(B3..B43) in B45 returns 963.44, the population variance of the test scores in B3..B43.

List		Title rows	
B46	(F2) [W12] @VAR(B38..B44)		READY
A	B	C	D
1	Test Scores	Test Scores	
2	Group A	Group B	
38	600	690	
39	620	680	
40	600	720	
41	600	700	
42	650	630	
43	640	600	
44	670	730	
46	Variance from average in test scores:	681.63	1926.53
47			

Figure 17-11 Calculating the population variance of test scores with @VAR

@VLOOKUP

@VLOOKUP(*x,range,column-offset*) finds the contents of the cell in a specified column of a **vertical lookup table**. A vertical lookup table, as shown in Figure 17-12, is a range whose values are in ascending order in the first column.

@VLOOKUP compares the value x to each cell in the first column of the table. When Lotus-DM locates a cell in the first column that contains the value x (or the value closest to, but not larger than, x) it moves across that row the number of columns specified by *column-offset* and returns the contents of that cell.

x can be any value greater than or equal to the first value in *range*. If x is smaller than the first value in *range*, @VLOOKUP returns the value ERR. If x is larger than the last value in *range*, @VLOOKUP stops at the last cell in the column and returns the contents of the cell as the answer.

range represents the location of the vertical lookup table. *range* can be any range name or address.

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column-offset represents an offset number. An offset number corresponds to the position the column occupies in *range*. The first column has an offset number of 0, the second an offset number of 1, and so on. *column-offset* can be zero or any positive integer less than or equal to the number of columns in *range* minus 1. For example, if *range* contains 20 columns, the largest number you can use for *column-offset* is 19.

Use @VLOOKUP to find entries in a table, such as a tax or a sales commissions table.

Examples

Figure 17-12 shows a tax table. @VLOOKUP(35050,A3..E6,3) in D9 returns \$11,339, the tax you would pay if your income was \$35,050 and you were a Status 3 taxpayer. @VLOOKUP(35150,A4..E6,1) in D11 returns \$9,263, the amount of tax you would pay if your income was \$35,150 and you were a Status 1 taxpayer. \$35,150 does not appear in the first column of the table, so @VLOOKUP stops at row 6, because \$35,100 is the value closest to, but not larger than, \$35,150.

First column		Table range			
D9	(C0)	@VLOOKUP(35050,A3..E6,3)			READY
	A	B	C	D	E
1			TAX TABLES		
2					
3	Income	Status 1	Status 2	Status 3	Status 4
4	\$35,000	\$9,219	\$7,265	\$11,315	\$8,5
5	\$35,050	\$9,241	\$7,282	\$11,339	\$8,5
6	\$35,100	\$9,263	\$7,298	\$11,364	\$8,5
7					
8					
9	@VLOOKUP(35050,A3..E6,3) =====>			\$11,339	
10					
11	@VLOOKUP(35150,A3..E6,1) =====>			\$9,263	
12					

Figure 17-12 Calculating tax payments with a vertical lookup table

@YEAR

@YEAR(*date-number*) returns the year in *date-number* as an integer from 0 (1900) to 199 (2099). For an explanation of date numbers, see "Date and Time @Functions" earlier in this chapter.

date-number can be any integer from 1 (January 1, 1900) to 73050 (December 31, 2099).

@YEAR(20181) = 55 because 20181 is the date number for April 2, 1955.

@YEAR(@NOW) = the number for the current year.

(NOTE) Add 1900 to the result of an @YEAR calculation to convert it into a four-digit year. For example, @YEAR(20181)+1900 returns 1955.

Appendices

Part Outline

Appendix A Running Lotus-DM from DOS

Appendix B Character Set

Appendix C Task Summary

Appendix D Memory Management

Appendix E Sample Applications

Appendix F Customer Assurance Plan

Appendix A

Running Lotus-DM from DOS

This appendix provides information on installing the runtime version of Lotus-DM. Lotus-DM is a spreadsheet program designed to run under the Tandy DeskMate graphical user interface. The runtime version of Lotus-DM is a stand-alone version that runs on personal computers supported by DeskMate.

NOTE If you have DeskMate 3 in ROM, running Lotus-DM from the Desktop gives you more available memory (approximately 96K) for your worksheets than running Lotus-DM from DOS.

Installing Lotus-DM Runtime on a Diskette System

Follow the instructions in this section to install Lotus-DM on a diskette system.

1. Place the Runtime Disk in drive A and close the door.
2. Type **A:** and press **ENTER** to change to drive A.
3. Type **install** at the system prompt.
If you have 5.25" disks, insert the System Disk into drive A when the program prompts you to insert the disk with the Install.PDM file.
4. You see an information screen. Press **ENTER** when you finish reading the screen.
5. You see an information screen. After you read it, press **ENTER**, and you see the Licensee Information dialog box.
6. Type your first name and last name.

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You can type up to 30 characters. If you make a typing mistake, use BACKSPACE to erase characters to the left of the cursor. Or, to insert new characters, move the cursor to the appropriate place and then type the new characters.

7. Press TAB or ↓ to move to the Your Company's Name field and type your company's name.

If you don't have a company name, type your name again. You can type up to 30 characters.

8. Do one of the following:
 - Press ENTER to confirm the information you typed.
 - Press ESC to cancel the information you typed and exit without installing Lotus-DM.

You see the Final Confirmation information box that shows you the information as it will be recorded on the System Disk if you continue with the installation.

9. Do one of the following:
 - If you are sure that you have provided the correct information, press ENTER. The information will be permanently recorded on the System Disk and Lotus-DM will display this information every time you start Lotus-DM. You will not be able to change the names once they are recorded.
 - If this is not the information you want to record on the System Disk, press ESC to end the Install program. Any information you have typed will be deleted and you must follow Steps 1 through 10 again to run the Install program.
10. When the Install program is complete, you see the Install Complete information screen. Press ENTER.

NOTE If you see the message "Insert the disk with COMMAND.COM", insert your DOS disk in drive A and press any key to continue.

11. To start Lotus-DM from the DOS prompt, insert the Runtime disk in drive A.
12. Type Lotus-DM and press ENTER.

When the system prompts you for the Lotus-DM.PDM file, insert the System disk in drive A and press ENTER.

Installing Lotus-DM Runtime on a Hard-Disk System

Follow the instructions in this section to install Lotus-DM on a hard-disk system.

1. Place the Runtime Disk in drive A and close the door.
2. Type A: and press ENTER to change to drive A.
3. Type **install** at the system prompt.

If you have 5.25" disks, insert the System Disk into drive A when the program prompts you to insert the disk with the Install.PDM file.

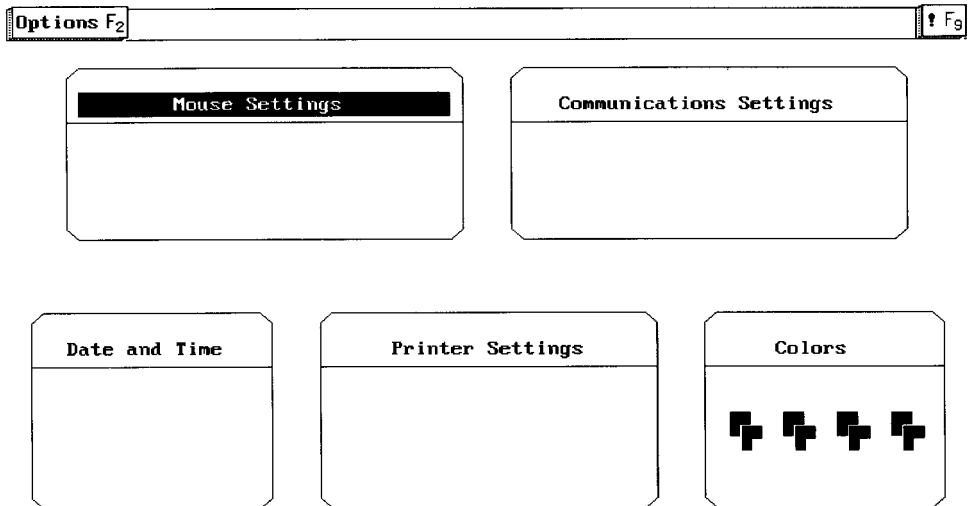
4. You see an information screen. Press ENTER when you finish reading the screen.
5. You see an information screen. After you read it, press ENTER, and you see the Licensee Information dialog box.
6. Type your first name and last name.
You can type up to 30 characters. If you make a typing mistake, use BACKSPACE to erase characters to the left of the cursor. Or, to insert new characters, move the cursor to the appropriate place and then type the new characters.
7. Press TAB or ↓ to move to the Your Company's Name field and type your company's name.
If you don't have a company name, type your name again. You can type up to 30 characters.
8. Do one of the following:
 - Press ENTER to confirm the information you typed.
 - Press ESC to cancel the information you typed and exit without installing Lotus-DM.You see the Final Confirmation information box that shows you the information as it will be recorded on the System Disk if you continue with the installation.
9. Do one of the following:
 - If you are sure that you have provided the correct information, press ENTER. The information will be permanently recorded on the System Disk and Lotus-DM will display this information every time you start Lotus-DM. You will not be able to change the names once they are recorded.
 - If this is not the information you want to record on the System Disk, press ESC to end the Install program. Any information you have typed will be deleted and you must follow Steps 1 through 11 again to run the Install program.
10. You see the Specify Directory dialog box. Either accept the default path displayed (C:\Lotus-DM) or type the path you want Lotus-DM copied into.
A **path** identifies the location of a file by showing the disk drive letter, directory, and subdirectory the file is in. For example, given the path C:\LotusDM\DATA\STATS.WK1, the file STATS.WK1 is located in a subdirectory named DATA within a directory named Lotus-DM on drive C.
The Lotus-DM files are copied to the specified directory. The Install program will tell you what disks to insert during the copying process.

NOTE

 If you press ESC to cancel the Install program after completing this step, you must run the Install program to copy the disks to the directory. You can not enter your name or company name again, as it has already been recorded on the System Disk.
11. When the Install program is complete, you see the Install Complete information screen. Press ENTER.
12. To start Lotus-DM from the DOS prompt, change to the subdirectory where you installed Lotus-DM.
13. Type Lotus-DM and press ENTER.

Using the Setup Accessory

Lotus-DM uses the DeskMate Setup accessory to define your systems options (e.g., mouse, printer, colors). To access the Setup accessory, press F10. You see the Setup screen. This screen shows your current DeskMate settings.

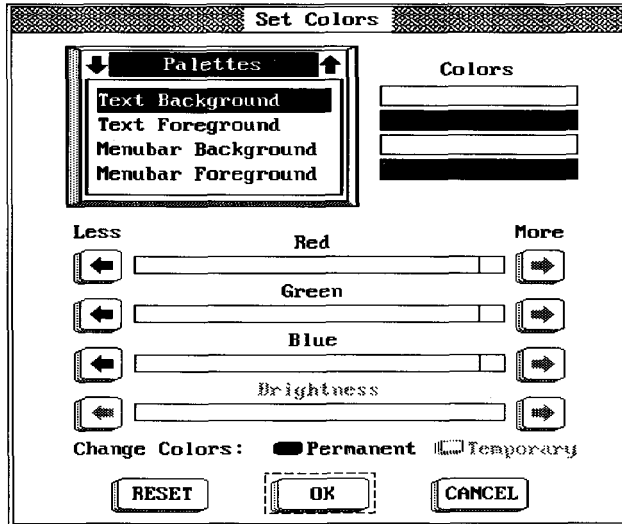


Communications Settings

You do not need to access this option because Lotus-DM does not support communications.

Color Settings

If your monitor supports more than one color palette, you can change the colors and intensity that all or part of your screen displays. Select Colors from the Options (F2) pull-down menu to see the Set Colors dialog box.



Select an option that corresponds to the part of the screen where you would like to have a different color.

Text Background Select Text Background if you want to change the color of the background for text only.

Text Foreground Select Text Foreground if you want to change the color of the text only.

Menubar Background Select Menubar Background if you want to change the color of the background for menus only.

Menubar Foreground Select Menubar Foreground if you want to change the color of the text on menus.

Colors To change the colors, adjust the Red, Green, and/or Blue color bars to create the depth of color you want. Move the cursor to the right side (More) of the color bar to increase the depth of the color. Move the cursor to the left side (Less) of the color bar to reduce the depth of the color. The color of the selected screen area changes as you move the cursor along the color bar.

(NOTE) The degree of changes you can make to a color bar is based on the number of colors your monitor can display.

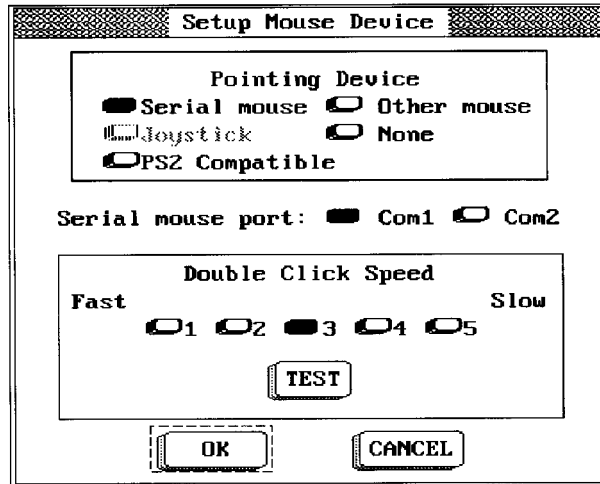
Intensity To change the color intensity, adjust the brightness bar. Move the cursor to the right (More) side to make colors brighter. Move the cursor to the left side (Less) to make colors dimmer. The intensity of the colors displayed changes as you move the cursor along the brightness bar.

(NOTE) If your monitor does not support this option, the brightness bar is shadowed and you can not change the settings.

Select OK to implement the color changes. Select RESET to change colors back to the setting when you first entered the Setup accessory. Select CANCEL to exit without making any changes.

Mouse Settings

If you plan on using a pointing device, such as a mouse or a joystick, you must define settings for it. Select Mouse from the Options (F2) pull-down menu to see the Setup Mouse Device dialog box.



Pointing Device Specify the type of pointing device you are using. You can select Serial Mouse, Joystick, PS2 Compatible, Other Mouse, or None.

If you select a Serial Mouse, specify the communications port (COM1 or COM2) your mouse is connected to in the Serial mouse port field.

(NOTE) The PS2 compatible selection is only available on microchannel computers.

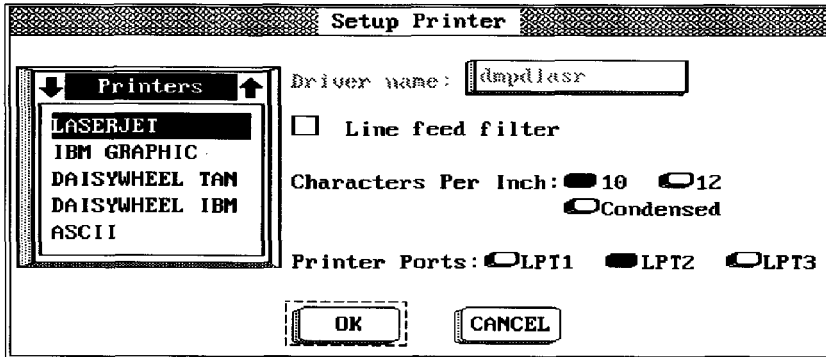
Double Click Speed Specify the speed you want to use for double-clicking in the Double Click Speed field.

To see how your mouse works with the speed you specified, double-click the TEST button.

Select OK to implement your mouse settings, or CANCEL to exit without making any changes.

Changing the Printer Settings

If you plan to use a printer, you must tell Lotus-DM what type of printer you are using. Select Printer from the Options (F2) pull-down menu to see the Setup Printer dialog box.



Printers Select the name of your printer from the Printers list box. The following printers are supported:

- Diablo® 360
- HP® LaserJet®
- IBM® Daisywheel
- IBM DMP 106, DMP 130, 132, 133, DMP 430, DMP 440, DMP Graphic
- IBM Proprinter™ II, Proprinter XL24
- Tandy Daisywheel, DWP 230, DWP 520

If your printer is not listed, or does not emulate one of the printers listed, select the generic printer driver ASCII.

Line Feed Filter When you select a printer, the Line feed filter field displays an X if this option is on, or is empty if the option is off. You do not have to change the Line feed filter setting unless you are having trouble printing from Lotus-DM (e.g., the printer is double spacing, or is printing lines on top of each other).

Characters Per Inch Specify the number of characters per inch you want your printer to print. You can specify 10, 12, or 16.7 (condensed print).

Printer Port Specify the printer port on the back of your computer that your printer is connected to. You can specify LPT1, LPT2, or LPT3.

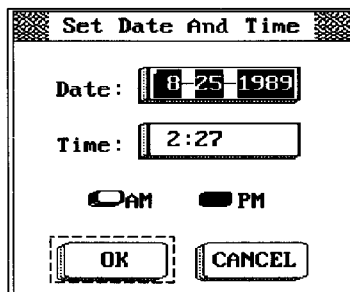
Select OK to implement the printer settings, or CANCEL to exit without making any changes.

Date and Time Settings

Use this command to set the date and/or time.

Select Date and Time from the Options (F2) pull-down menu to display the Set Date And Time dialog box.

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Type the date in the Date field using the format *mm dd yyyy* (mm=month, dd=day, yy=year). For example, to enter July 24 1988 you would type 07 24 1988.

Type the time in the time field using the format *hh:mm:ss* (hh=hours, mm=minutes, ss=seconds). For example, to enter 10:45:15 you would type 10:45:15. You do not have to type the seconds if you don't want to.

Select AM or PM to complete setting the time.

Select OK to set the data and time, or CANCEL to exit without making any changes.

Leaving the Setup Accessory

To exit the Setup accessory and return to the DeskMate desktop, select Exit from the Options (F2) pull-down menu. You see the DeskMate desktop.

NOTE You can also exit the Setup accessory by pressing ESC.

Appendix B

Character Sets

Lotus-DM uses a subset of the Lotus International Character Set (LICS) and ASCII (IBM Code Page 437) to display, store, and print characters. You can use LICS and ASCII codes to produce characters that are not on your keyboard. This appendix describes how to use LICS and ASCII codes, and also includes a table that lists the characters that Lotus-DM supports and their descriptions, LICS and ASCII codes, and compose sequences that produce them.

Producing Characters

There are three methods you can use to produce characters that are not on your keyboard: the Lotus-DM @CHAR @function, compose sequences with keystrokes, and compose sequences with ASCII codes.

NOTE If you are using the DeskMate printer drivers to print your work, using @CHAR or compose sequences may have unpredictable results.

@CHAR

You can produce any LICS character using @CHAR with the LICS code for the character. For example, to produce the plus-or-minus sign (\pm), you would find the LICS code for the plus-or-minus sign, 177, in the table, and enter @CHAR(177) in your worksheet.

Compose Sequences with Compose (ALT-F1)

A compose sequence is a series of keystrokes you use to enter a character that is not on your keyboard. You can enter these characters by pressing COMPOSE (ALT-F1) and the appropriate keystrokes. For example, to enter the character £, you can press COMPOSE (ALT-F1) and type L=.

Compose Sequences with ASCII Codes

You can use ASCII codes to produce any ASCII (IBM Code Page 437) character. To compose ASCII characters, press ALT and then enter the character's ASCII code using the numeric keypad on the right side of the keyboard.

NOTE Make sure you press NUM LOCK before you enter the ASCII character. You can tell if NUM LOCK is on if the NUM LOCK light on the numeric keypad is lit.

Converting Characters

A .WK1 file from 1-2-3 Releases 1A, 2, 2.01 and 2.2 can be retrieved into Lotus-DM; however, the file may contain some LICS characters that are not supported by Lotus-DM. If a 1-2-3 character is not supported, Lotus-DM displays a character that is the closest equivalent in its character set.

You can use the full range of Lotus-DM commands to work on any .WK1 file. Any cells that contain nonsupported characters retain those characters unless you edit the cell. Once you edit the cell, the nonsupported character is replaced by one from the Lotus-DM character set. When you save the file, the Lotus-DM character is saved. If you make no changes to the nonsupported character cell, the 1-2-3 character is saved in the file.

LICS Table

This section lists the characters that Lotus-DM supports, as well as their ASCII and LICS codes, and compose sequence (if any).

NOTE Codes 0 through 31 are DeskMate characters; codes 32 through 127 are common across all character sets.

Character	Description	LICS	Compose sequence	ASCII
	Space	32		
!		33		
"		34		
#		35		
\$		36		
%		37		
&		38		
'	Apostrophe	39		
(40		
)		41		
*		42		
+		43		
,	Comma	44		
-		45		
.	Period	46		
/		47		
0		48		
1		49		
2		50		
3		51		
4		52		
5		53		
6		54		
7		55		
8		56		
9		57		
:		58		
;		59		
<		60		
=		61		
>		62		
?		63		
@		64		

(continued)

B-4 Character Sets

Character	Description	LICS	Compose sequence	ASCII
A		65		
B		66		
C		67		
D		68		
E		69		
F		70		
G		71		
H		72		
I		73		
J		74		
K		75		
L		76		
M		77		
N		78		
O		79		
P		80		
Q		81		
R		82		
S		83		
T		84		
U		85		
V		86		
W		87		
X		88		
Y		89		
Z		90		
[91	((
\		92	//	
]		93))	
^		94	v v	
_		95		
'	Open single quote	96		
a		97		

(continued)

Character	Description	LICS	Compose sequence	ASCII
b		98		
c		99		
d		100		
e		101		
f		102		
g		103		
h		104		
i		105		
j		106		
k		107		
l		108		
m		109		
n		110		
o		111		
p		112		
q		113		
r		114		
s		115		
t		116		
u		117		
v		118		
w		119		
x		120		
y		121		
z		122		
{		123	(-	
		124	^/	
}		125)-	
~	Tilde	126	--	
DEL		127		
'	Upper grave accent	128	' <space>	96
'	Upper acute accent	129	' <space>	39
^	Upper circumflex accent	130	^ <space>	94 (caret)

(continued)

B-6 Character Sets

Character	Description	LICS	Compose sequence	ASCII
~	Upper tilde	132	~ <space>	126
	Null	133		254
	Null	134		254
	Null	135		254
	Null	136		254
	Null	137		254
	Null	138		254
	Null	139		254
	Null	140		254
	Null	141		254
	Null	142		254
	Null	143		254
ı	Ordinal indicator	150	_ <space>	95
	Unknown character (display only)	153		254
	Hard space (display only)	154	<space> <space>	249
f	Dutch guilder	160	f f	159
ı	Inverse exclamation mark	161	!!	173
¢	Cent sign	162	c , c/ , C , or c/	155
£	Pound sign	163	L= , l= , L- , or l-	156
¥	Yen sign	165	Y= , y= , Y- , or y-	157
Pt	Pesta sign	166	P T , P t , or p t	158
♀	Feminine Ordinal	170	a _ or A _	166
«	Angle quote left	171	< <	174
π	Lower pi	173	P l , p i , or P i	227
≥	Greater than or equal to	174	> =	242
÷	Divide sign	175	: -	246
°	Degree sign	176	^ 0	248
±	Plus or minus	177	+ -	241
²	Superscript 2	178	^ 2	253
μ	Micro	181	/ u	230
·	Middle dot	183	^ .	249
º	Masculine ordinal	186	o _ or O _	167

(continued)

Character	Description	LICS	Compose sequence	ASCII
»	Angle quote right	187	> >	175
$\frac{1}{4}$	Fraction one-quarter	188	1 4	172
$\frac{1}{2}$	Fraction one-half	189	1 2	171
≤	Less-than-or-equals	190	= <	243
¿	Inverse question mark	191	? ?	168
Ä	Uppercase A with umlaut	196	A "	142
Å	Uppercase A with ring	197	A *	143
Æ	Uppercase A with ligature	198	A E	146
Ç	Uppercase C with cedilla	199	C ,	128
É	Uppercase E with acute	201	E '	144
Ñ	Uppercase N with tilde	209	N ~	165
Ö	Uppercase O with umlaut	214	O "	153
Ü	Uppercase U with umlaut	220	U "	154
ß	Lowercase German sharp s (eszet)	223	s s	225
à	Lowercase a with grave	224	a '	133
á	Lowercase a with acute	225	a '	160
â	Lowercase a with circumflex	226	a ^	131
ä	Lowercase a with umlaut	228	a "	132
å	Lowercase a with ring	229	a *	134
æ	Lowercase ae with ligature	230	a e	145
ç	Lowercase c with cedilla	231	c ,	135
è	Lowercase e with grave	232	e '	138
é	Lowercase e with acute	233	e '	130
ê	Lowercase e with circumflex	234	e ^	136
ë	Lowercase e with umlaut	235	e "	137
ì	Lowercase i with grave	236	i '	141
í	Lowercase i with acute	237	i '	161
î	Lowercase i with circumflex	238	i ^	140
ï	Lowercase i with umlaut	239	i "	139

(continued)

B-8 Character Sets

Character	Description	LICS	Compose sequence	ASCII
ñ	Lowercase n with tilde	241	n ~	164
ò	Lowercase o with grave	242	o ´	149
ó	Lowercase o with acute	243	o ´	162
ô	Lowercase o with circumflex	244	o ^	147
ö	Lowercase o with umlaut	246	o "	148
ù	Lowercase u with grave	249	u ´	151
ú	Lowercase u with acute	250	u ´	163
û	Lowercase u with circumflex	251	u ^	150
ü	Lowercase u with umlaut	252	u "	129
ÿ	Lowercase y with umlaut	253	y "	152
	Empty character	255		255

Appendix C

Task Summary

This appendix provides a summary of tasks and compares the Lotus 1-2-3 Release 2.01 and Lotus-DM commands you use to complete them. It is organized by category, with the task listed in the first column, the Lotus 1-2-3 Release 2.01 command used to accomplish the task in the center column, and the Lotus-DM command used to accomplish the same task in the last column.

For example, to sort rows of data in 1-2-3 Release 2.01 the command sequence is /Data Sort. In Lotus-DM the command sequence is Data (F7) Sort. For more information on how each Lotus-DM command, refer to the appropriate section in *Reference*.

Task	1-2-3 Release 2.01	Lotus-DM
Analyzing Data		
Break up lines of data into individual cell entries	/Data Parse	Data (F7) Parse Setup, Data (F7) Parse
Calculate frequency distribution of numbers in a range	/Data Distribution	Data (F7) Distribution
Convert formulas into values	/Range Value	Range (F5) Value
Graph data	/Graph	Graph View (CTRL-F10)

(continued)

C-2 Task Summary

Task	1-2-3 Release 2.01	Lotus-DM
Invert matrix (range) of numbers	/Data Matrix Invert	Data (F7) Matrix Invert
Multiply two matrices (ranges) of numbers	/Data Matrix Multiply	Data (F7) Matrix Multiply
Perform linear regression	/Data Regression	Data (F7) Regression
Sort rows of data	/Data Sort	Data (F7) Sort
Tabulate effect of changing values of formula(s)	/Data Table	Data (F7) Table
<i>Changing Appearance of the Worksheet</i>		
Change alignment of specific labels	/Range Label-Prefix	Range (F5) Label
Change appearance of specific numbers	/Range Format	Range (F5) Format
Change default alignment of labels	/Worksheet Global Label-Prefix	Worksheet (F4) Label Prefix
Change default appearance of numbers	/Worksheet Global Format	Worksheet (F4) Format
Change default column width	/Worksheet Global Column Width	Worksheet Column (CTRL-W)
Change width of specific column	/Worksheet Column Set-Width	Worksheet Column (CTRL-W)
Copy data from one part of the worksheet to another	/Copy	Edit Copy Range (CTRL-C)
Display formulas instead of values	/Range Format Text	Range Format (CTRL-F)
Erase entire worksheet	/Worksheet Erase	File (F2) New
Erase specific data	/Range Erase	Range (F5) Erase
Hide columns	/Worksheet Column Hide	Worksheet (F4) Column
Hide ranges	/Range Format Hidden	Range (F5) Format
Insert blank rows or columns	/Worksheet Insert	Worksheet (F4) Insert/Delete
Keep row of column headings on screen	/Worksheet Titles	Worksheet (F4) Titles
Move data within a worksheet	/Move	Edit Move Range (CTRL-M)
Rearrange a section of text	/Range Justify	Range (F5) Justify
Redisplay hidden columns	/Worksheet Column Display	Worksheet Column (CTRL-M)
Remove rows or columns	/Worksheet Delete	Worksheet (F4) Insert/Delete

(continued)

Task	1-2-3 Release 2.01	Lotus-DM
Split screen into two windows	/Worksheet Windows	Function not available
Suppress display of values equal to zero	/Worksheet Global Zero	Worksheet (F4) Suppress Zero
Use non-USA format	/Worksheet Global Default Other International	Worksheet (F4) International
Erase a file	/File Erase	File (F2) Delete
Copying Data		
Copy data, switching rows and columns	/Range Transpose	Range (F5) Transpose
Copy formulas so that copy consists of values only	/Range Value	Range (F5) Value
Incorporate data from a text (ASCII) file	/File Import	File (F2) Import
Incorporate data from another worksheet file	/File Combine	File (F2) Combine
Graphing Data		
Add descriptive text to graph	/Graph Options Legend; /Graph Options Titles	Graph (F6) Legends; Graph (F6) Titles
Display graph on the screen	/Graph View	Graph View (CTRL-F10)
Display graph (.PIC) file list	/File List Graph	File (F2) List
Label data points	/Graph Options Data-Labels	Graph (F6) Data Labels
Overlay graph with horizontal and/or vertical lines	/Graph Options Grid	Graph (F6) Grids
Print or plot a graph	The PrintGraph program	Graph (F6) PrintGraph
Save graph file for printing later with PrintGraph	/Graph Save	Graph (F6) Save
Select the data to graph	/Graph X, A-F	Graph (F6) Ranges
Specify appearance of line and XY graph data	/Graph Options Format	Graph (F6) Options
Specify appearance of X and Y axis scales	/Graph Options Scale	Graph (F6) X Format, Y Format, Scaling
Specify graphing settings	/Graph Options	Graph (F6) Options
Specify the kind of graph	/Graph Type	Graph (F6) Type
Use named sets of graph settings	/Graph Name	Graph Name (CTRL-E)

(continued)

C-4 Task Summary

Task	1-2-3 Release 2.01	Lotus-DM
Loading Data		
Incorporate text (ASCII) file into worksheet	/File Import	File (F2) Import
Incorporate all or part of another worksheet file into current worksheet	/File Combine	File (F2) Combine
Load worksheet file	/File Retrieve	File (F2) Open
Printing Your Work		
Advance printer paper one line	/Print Printer Line	Not available
Advance printer paper one page	/Print Printer Page	Not available
Begin printing	/Print Printer (or File) Go	File (F2) Print
Change current printing settings	/Print Printer (or File) Options	File (F2) Page Setup, Page Layout
Change default printing settings for future sessions	/Worksheet Global Default Printer	DeskMate Setup (F10)
Insert a page break	/Worksheet Page	Worksheet (F4) Page Break
Print cell formulas instead of values	/Print Printer (or File) Options Other Cell-Formulas	File (F2) Page Layout
Print only certain columns	/Worksheet Column Hide	Worksheet (F4) Format
Remove current printer settings	/Print Printer (or File) Clear	File (F2) Page Setup, Page Layout
Send worksheet data to a text (ASCII) file	/Print File	File Print (CTRL-P)
Set header/footer for printed page	/Print Printer (or File) Options Header/Footer	File (F2) Page Layout
Set margins for printed page	/Print Printer (or File) Options Margins	File (F2) Page Setup
Set paper to top-of-page	/Print Printer Align	Not available
Specify range to print	/Print Printer (or File)	File Print (CTRL-P)
Protecting Data		
Assign password to a worksheet file	/File Save	File (F2) Save As
Check protection status of worksheet	/Worksheet Status	Worksheet (F4) Protection
Remove protection from specific cells	/Range Unprotect	Worksheet (F4) Protection

(continued)

Task	1-2-3 Release 2.01	Lotus-DM
Restrict cell pointer movement to unprotected cells	/Range Input	Range (F5) Protect
Turn protection on or off	/Worksheet Global Protection	Worksheet (F4) Protection
<i>Saving Your Work</i>		
Extract and save part of worksheet	/File Xtract	File (F2) Xtract
Save a graph so you can print it later	/Graph Save	Graph (F6) Save
Save entire worksheet	/File Save	File Save (CTRL-S)
Save your work in a text (ASCII) file	/Print File	File (F2) Print
<i>Using a Database</i>		
Cancel database settings	/Data Query Reset	Data (F7) Query
Control movement of cell-pointer during data entry	/Range Input	Not available
Copy selected records	/Data Query Extract	Data (F7) Query
Copy selected records, eliminating duplicates	/Data Query Unique	Data (F7) Query
Delete selected records	/Data Query Delete	Data (F7) Query
Highlight selected records	/Data Query Find	Data (F7) Query
Sort records	/Data Sort	Data (F7) Sort
Specify ranges of database	/Data Query Input/Criterion/Output	Data (F7) Query
<i>Working with Files</i>		
Check how much disk space is available for files	/File List	Worksheet (F4) Status
Display name of files in current directory	/File List	File (F2) List
Save default setting in configuration file	/Worksheet Global Default Update	Worksheet (F4) Directory
Specify directory to look for files in current session	/File Directory	File (F2) Directory
Specify directory to look for files in future session	/Worksheet Global Default Directory Update	Worksheet (F4) Directory

(continued)

C-6 Task Summary

Task	1-2-3 Release 2.01	Lotus-DM
Working with Labels		
Change alignment of specific labels	/Range Label	Range (F5) Label
Name a range using existing labels	/Range Name Labels	Range (F5) Name Labels
Rearrange a range of labels	/Range Justify	Range (F5) Justify
Working with Named Ranges		
Delete a range name	/Range Name Delete	Range Name (CTRL-N)
Delete all range names	/Range Name Reset	Range Name (CTRL-N)
List all range names	/Range Name Table	Range Name (CTRL-N)
Name a range	/Range Name Create	Range Name (CTRL-N)
Working with Numbers		
Analyze distribution of values in range	/Data Distribution	Data (F7) Distribution
Change column width if number displays as asterisks	/Worksheet Global Format	Worksheet Column (CTRL-W)
Convert formulas to values	/Range Value	Range (F5) Value
Display recalculation setting	/Worksheet Status	Worksheet (F4) Status
Specify how and when formulas are recalculated	/Worksheet Global Recalculation	Worksheet (F4) Recalc
Suppress display of values equal to zero	/Worksheet Global Zero	Worksheet Suppress Zero (CTRL-Z)
Tabulate effect of changing values on formula(s)	/Data Table	Data (F7) Table
Miscellaneous		
Display amount of memory remaining	/Worksheet Status	Worksheet (F4) Status
Display worksheet settings	/Worksheet Status	Worksheet (F4) Status
Leave program	/Quit	File (F2) Exit, ESC
Copy items to clipboard	Not available	Edit Copy (CTRL-INS)
Use Calculator, Phone List, Corkboard, Month, Alarm, To Do List	Not available	DeskMate Setup (F10)

Appendix D

Memory Management

While you are working with Lotus-DM, your computer maintains a copy of the current file in a temporary storage area, called **memory**. Many factors affect the amount of memory Lotus-DM uses: the capacity of your hardware, the size of your operating system and other memory-resident programs, the structure of your current file, and the type of data you enter in your current worksheet.

This appendix explains how your computer stores information, how Lotus-DM uses memory, how to check the available memory, and what to do when you're running out of memory.

How Your Computer Stores Information

Memory is your computer's temporary storage area: it is where a Lotus-DM worksheet resides while you are working on it. The data in memory is lost when you retrieve another worksheet, end a Lotus-DM session, or turn off your computer. To store this data for future use, you must save it on a hard disk or a diskette. Disk storage is permanent storage; it is not the same as memory.

Both memory and disk storage are measured in bytes, with one kilobyte (1K) equal to 1,024 bytes. A computer with 640K of memory has 640 kilobytes, or 655,360 bytes, of temporary storage.

How Lotus-DM Uses Memory

Lotus-DM allocates memory in blocks, dividing each worksheet column into blocks of four cells each. For example, cells D1, D2, D3, and D4 make up one block. Each cell requires 4 bytes to store the cell address and uses additional bytes for any data within the cell. If you enter formatting information or data in any *one* cell within a block, Lotus-DM reserves memory for all *four* cells, using at least 16 bytes. This four-cell block is then considered **active**. If you enter data in any blank cell within this block, you do not use any extra memory for the cell, just for the data.

The following are examples of the amount of memory used by typical worksheet entries beyond that used by the cell address:

- Integers (-32767 to 32767) do not use any additional memory.
- Blank formatted cells do not use any additional memory.
- Labels use the same number of bytes as the number of characters in the label, including the label prefix, plus one byte, with a minimum of 6 bytes.
- Numbers that include decimals always use 8 bytes.
- Range names use 34 bytes, regardless of the length of the name.
- Graph names use 464 bytes, regardless of the graph options you have selected.
- Formulas vary depending on their complexity. Simple formulas, for example, 1+2, take approximately 20 to 30 bytes.

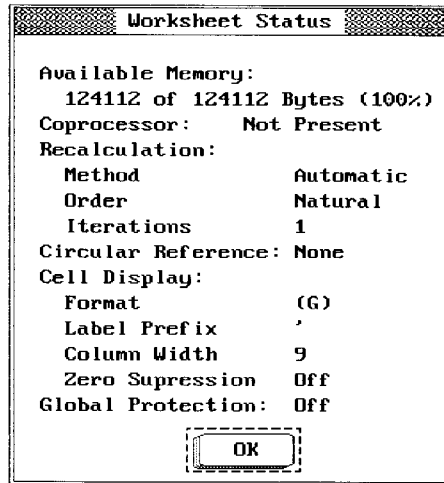
Note that most cell entries do not use much memory. When you combine a range of cells with settings — when you name a range or a graph — or when you use formulas, you use far more memory.

Lotus-DM uses additional memory when you select File Page Setup or Worksheet Page Setup, when you print with File Print, and when you copy a graph from Graph View to the clipboard using Edit Copy.

How to Check the Available Memory

To check how much memory is available for a worksheet, select Worksheet Status. You see the Worksheet Status information box, which shows the available memory.

In this example, the first number in the Available Memory field (124112) indicates how much memory is free for the current worksheet; the second number (124112) indicates the total amount of memory reserved for the current worksheet. Lotus-DM indicates the amount of free memory as a percentage of the total.



If you check these settings when you have a blank worksheet on the screen, the second number represents the amount of memory available, taking into account the following demands on memory:

- Your operating system
- Any memory-resident programs
- DeskMate
- Any DeskMate application in memory
- Lotus-DM

After you enter data in the worksheet, check the available memory again: the first number, the amount of free memory, will have decreased. The difference between the two numbers represents the amount of memory that is currently being used by your worksheet alone.

What to Do When You're Running Out of Memory

A highlighted MEM status indicator on the edit panel at the top of your screen is usually the first indication of a potential memory problem. Lotus-DM automatically displays MEM when the amount of available memory is below 4,096 bytes. When you see MEM, use File Save immediately to save the current worksheet. If you continue to enter data in the worksheet, you will eventually run out of memory.

D-4 Memory Management

You risk losing some or all of your work when you run out of memory. Use the following memory-saving techniques to protect your work, especially when you are using large worksheet files:

- Erase unnecessary data.
- Reorganize your worksheet.
- Exit other DeskMate applications.
- Unload memory-resident programs.

The following sections describe these techniques. If you try all of these techniques and you still do not have enough memory for your worksheet, you should consider upgrading your computer's memory capacity to 640K (if you do not already have 640K).

To determine how much memory your computer has, use your DOS CHKDSK command. When you type `chkdsk` at the DOS prompt, you see information about the storage capacity of your disk. Toward the end of the list, you see how many bytes of memory are installed. If your computer already has 640K of memory, the line reads "655360 bytes total memory." If, however, the line displays a different number, then you do not have 640K of memory. To determine the number of kilobytes of memory, divide the number displayed by 1,024. For example, if the line reads "524288 bytes total memory," divide 524,288 by 1,024. The result is 512, which means your computer has 512K of memory.

See your system owner's manual for more information on upgrading your hardware.

Erase Unnecessary Data

Often, cells contain unnecessary data or formatting information, which can use a significant amount of memory. You can regain this memory by locating and eliminating unnecessary cell entries.

To find unnecessary data or formatting information, you need to identify the **active area** of your worksheet. The active area is the rectangular area between cell A1 and the **last active cell**, the lowest and rightmost nonblank cell in the worksheet. With the cell pointer in cell A1, press `END HOME` to move to the lower right corner of the active area. If this area is larger than you expected, your worksheet probably contains unnecessary or unintended entries. Use the following techniques to erase unneeded data:

- Use Range Erase to delete any data you no longer need in the worksheet.
- Use Range Format Default to reset the formatting information for any cells with unused format settings.
- Use File Xtract to create a new file that contains only the entries you need, if you have unneeded data scattered throughout your worksheet. Then retrieve the new file with File Open.

- Use Range Name Delete and Graph Name Delete to delete any range names or named graphs that are no longer useful.
- Use Range Value to convert formulas that do not change as you use your worksheet to their values. Note, however, that by doing this you lose the formulas permanently.

When you finish, save the worksheet again and then use File Open to retrieve it. Select Worksheet Status to check the amount of memory left.

Reorganize Your Worksheet

If you enter data vertically in a column, Lotus-DM reserves memory for all the cells from the first block that contains data to the last block that contains data in the same column. For example, if you enter data in cell A1 and in cell A8192, Lotus-DM reserves memory for all the blocks between block A1..A4 and block A8189..A8192, even though the intervening blocks are blank.

To reduce memory usage, arrange your worksheets horizontally as much as possible and make sure you do not have large gaps between data in the same column. Once you rearrange your data, use Worksheet Insert/Delete to remove blank columns and rows from the active area.

When you finish, save the worksheet again and then use File Open to retrieve it. Select Worksheet Status to check the amount of memory left.

Exit Other DeskMate Applications

Running other DeskMate applications can also reduce the amount of memory available to run Lotus-DM. If you run another DeskMate application and then select DeskMate Setup Task Switch to run Lotus-DM, the DeskMate application remains in memory while you work with Lotus-DM. This reduces the *total* memory available to run Lotus-DM. To remove the other application from memory, select File Exit to exit the current Lotus-DM session and return to the DeskMate application. Then select File Exit to exit the application and remove it from memory. With the DeskMate application removed from memory, you can run Lotus-DM with more available memory.

If you switch to another DeskMate application after you start Lotus-DM, you reduce the amount of *free* memory available for your session. To remove the DeskMate application from memory, switch back to the application and select File Exit. When you return to Lotus-DM, you have more free memory to work with.

You run Lotus-DM's utility programs, PrintGraph and Translate, with an automatic task switch command. To reduce the amount of memory used when you switch to a utility program, exit Lotus-DM and start the utility program from the DeskMate desktop. Select PGRAPH.PDM to run PrintGraph from the desktop; select TRANS-LAT.PDM to run Translate.

D-6 Memory Management

You can further reduce the amount of memory used with PrintGraph by taking the following steps when you save graphs in Lotus-DM and when you specify image settings in PrintGraph:

- Change the display mode to Color with Graph Options before you save a graph in a graph file. When you print the graph, though, the hatch patterns will differ from what you see on the screen.
- Specify the same font file for all text in the printed graph with File Font 1 and File Font 2 in PrintGraph.
- Select smaller fonts for the printed graph. Of the fonts supplied by DeskMate, MODERN.FNT is the smallest font, followed by ROMAN.FNT, then GOTHIC.FNT.
- Use fewer characters of text in the graph.

Using a printer sometimes reduces the amount of available memory. To remove a printer driver from memory, exit DeskMate and begin your Lotus-DM session again. See your DeskMate manual for more information on switching between applications, exiting applications, and exiting DeskMate.

Unload Memory-Resident Programs

Running memory-resident programs reduces the amount of memory available for worksheet data. When working on a large worksheet, consider unloading such programs before you start to use Lotus-DM.

Sometimes you may not be aware that other programs are running concurrently. Check your AUTOEXEC.BAT file in your DOS core directory to see if any other programs load automatically when you start your computer. To avoid conflicts with large worksheets, edit the AUTOEXEC.BAT file so memory-resident programs do not start automatically.

See your DOS manual or system owner's guide for more information on unloading memory-resident programs.

Appendix E

Sample Applications

This appendix provides sample applications designed to increase your understanding of the power and flexibility of Lotus-DM by providing specific examples of different ways to use Lotus-DM to manage and analyze data. Each sample application presents a problem and describes a Lotus-DM template that can help you solve the problem. (A **template** is a worksheet that is ready to accept specific data because formulas, labels, and cell formats have been set up for you.) You can experiment with each template by entering data and seeing the results.

The appendix is for users who have a basic familiarity with Lotus-DM features and terminology, and who want ideas about how to use Lotus-DM to solve problems in their own work settings. If you are not familiar with Lotus-DM features and terminology, refer to the *User's Guide* and Chapter 8 in *Reference* before you try working through the applications described in this appendix.

Before You Start

Before you use the sample applications, you should follow the instructions in *Getting Started* to install Lotus-DM on your computer system. The templates described in this appendix are on the Sample Files Disk that came in your Lotus-DM package.

- If you have a hard-disk system, you should have copied the contents of the Sample Files Disk to a directory on your hard disk during installation.

E-2 Sample Applications

- If you have a two-diskette system, you should have created a backup copy of the Sample Files Disk during installation.

To use the template for a particular sample application, start Lotus-DM. If you have a two-diskette system, insert the backup Sample Files Disk in to one of your computer's diskette drives. Be sure to change the current drive and/or directory to the one that contains the sample worksheet files. Finally, retrieve the template file you want to use.

For instructions on using the template, refer to the appropriate section in this appendix. Each section describes one sample application. You can work through the sample applications in any order you like.

Home-Buying Power Analysis

Suppose you are thinking of buying a home for the first time. You are currently making a monthly rent payment for your apartment and you don't think you can afford to spend more than this on a monthly mortgage payment. Before you begin shopping for a house, you want to know how expensive a house you can afford based on that monthly payment and the various loan options available to you.

Lotus-DM can help you play what-if through the use of formulas. Formulas allow you to enter and change certain information and see the effects of each change on calculations.

The home-buying power analysis template calculates the price of the house and the amount of the land you can afford, and the down payment you will need to by a house that costs that much. These calculations are based on the following information, which you supply:

- Amount of the monthly mortgage payment you want to make
- Percentage of the total cost of the home required as a down payment
- Annual percentage rate (APR) of the loan
- Term of loan or loan period (in years)
- Number of payments per year

Note the following before you begin using the template:

- Because you have not entered data in Table 1 for Lotus-DM to use in its calculations, the formulas in Table 2 all display ERR. When you enter data for each item in Table 1, Lotus-DM will recalculate the formulas and display the appropriate values based on what you entered.

- To preserve the formulas that perform the calculations, this worksheet has been protected. The cells in which you will enter data are unprotected. (You will notice that Lotus-DM displays data in unprotected cells in a different color, font, or in a brighter intensity, depending on the type of monitor you have.) If you try to delete, move, copy, or enter data in a protected cell, Lotus-DM displays an error message.

This template example assumes you have entered \$900 as your ideal monthly payment, the down payment the bank requires is 10% of the total cost of the home, the loan has an interest rate of 11% over 30 years, and you make 12 payments per year.

Table 2 shows the results of calculations Lotus-DM makes based on this information. To try out other scenarios, you can change the information in Table 1. If, for example, you lower the interest rate to 9%, you will see that you can afford a more expensive house. Instead of being able to buy a house that costs \$105,006, you can afford a house that costs \$124,281.

Opening the File

Follow the steps below to open the worksheet file containing the home-buying power analysis template.

(NOTE) Make sure the drive and/or directory containing the sample worksheet files that came with Lotus-DM is the current directory.

Select File Open. Next, press TAB to move the cell pointer to the Open File field in the dialog box. Type HOMEBUY.WK1 in the Open File field and press ENTER.

You see a screen of information that describes the template. After you read the screen press HOME to begin using the template.

Entering Data in Table 1

The following table describes the items you enter in the worksheet.

Table E-1

Item	Address	Meaning
Monthly payment you can afford	F5	Estimated monthly mortgage payment only. (Do not include items such as taxes and insurance.)
Percent down payment	F6	Percentage of total cost of home to be used as down payment, entered as a whole number (not a decimal).
Annual interest rate of loan	F7	Estimated annual interest rate for mortgage, entered as a whole number (not a decimal).
Term of loan in years	F8	Number of years over which you will pay off the loan.

The formulas in the template assume that you plan to make 12 payments per year.

Entering Data in Table 2

The following table explains the meanings of items in Table 2.

Table E-2

Item	Address	Meaning
Price of house you can afford	F14	Estimated purchase price, based on the data you entered in Table 1.
Amount of loan you will need	F16	Estimated loan amount, based on the data you entered in Table 1.
Down payment you will need	F18	Estimated down payment, based on the data you entered in Table 1.

Printing Your Work

Follow the steps below to print a copy of your work.

NOTE To print your work, you must have installed a printer using DeskMate Setup (F10). Also, make sure that the printer you selected is turned on, properly connected, and ready to print (on-line).

Select File Print (CTRL-P). Next, specify A1..G20 in the Print Range field in the dialog box and select OK.

Lotus-DM prints a copy of your work.

Changing the Template

Although this example is set up for mortgage calculations, you can use it to try out what-if scenarios for any large purchase requiring a loan, such as a car.

Before you attempt to customize the template by changing labels, cell formats, formulas, and so on, read the following information.

- Before you make any changes to this template, be sure to make a backup copy of the file.
- To change data in protected cells, turn off worksheet protection. Once you make the necessary changes, turn on worksheet protection to avoid writing over information you want to protect.
- If you move cells or insert rows or columns, be sure to check the formulas in F14, F16, and F18 to make sure they work correctly.

Saving Your Work

You should save this file under a different name each time you perform a mortgage analysis. For example, you can name the first analysis you perform MORT1.WK1, the second MORT2.WK1, and so on. That way, you will have a separate record of each work session and preserve the original template.

To save your work select File Save As. Next, specify the file name and select OK.

Business Days Calculator

Suppose you are supervising a project and you need to determine how many working days can be scheduled between the start and end date of the project. Because your company has manufacturing plants in Canada, Europe, and the United States, you want to allow for local holidays in each country. You also want to account for weekends, because all the plants are closed on Saturdays and Sundays.

Lotus-DM can help you perform the necessary calculations through the use of built-in formulas called @functions. The date @functions allow you to work specifically with dates.

The business days calculator template automatically subtracts Saturdays and Sundays from the total number of business days between the start and end dates you specify. If you also list the holidays that fall within the period, Lotus-DM determines the day of the week on which each holiday falls and subtracts the holidays from the total number of business days.

Opening the File

Follow the steps below to open the worksheet file containing the business-days calculator template.

NOTE Make sure the drive and/or directory containing the sample worksheet files that came with Lotus-DM is the current directory.

Select File Open. Next, press TAB to move the cell pointer to the Open File field in the dialog box. Then type BUSDAYS.WK1 in the Open File field and press ENTER.

You see a screen of information that describes the template. After you read the screen press HOME to begin using the template.

Note the following before you begin using the template:

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- To preserve the formulas that perform the calculations, this worksheet has been protected. The cells in which you will enter data are unprotected. (You will notice that Lotus-DM displays data in unprotected cells in a different color, font, or in a brighter intensity, depending on the type of monitor you have.) If you try to delete, move, copy, or enter data in a protected cell, Lotus-DM displays an error message.

The example used for this template assumes you have entered March 27, 1989 as the start date for the project and May 31, 1989 as the end date. The holiday table contains seven entries. Rows 9 and 11 on the first screen show the results of the calculations Lotus-DM makes based on the information you provide.

Entering the Data

To use this application, you need to enter the start and end dates for the period you want to analyze. Then list the holidays that occur during this period. The following tables describe the data you enter in the worksheet and what they mean.

Table E-3 Start and end dates

Item	Address	Meaning
Month	C5, C6	A number (1-12) that represents the month of the start and end dates for the period to be analyzed.
Day	D5, D6	A number (1-31) that represents the day of the start and end dates for the period to be analyzed.
Year	E5, E6	A two-digit number that represents the year of the start and end dates for the period to be analyzed. If you enter the year 2000 or after, the number will be a three-digit number. For example, the year 2000 will be 100, 2001 will be 101, and so on.

Completing the Holiday Table

To exclude certain dates from the total number of business days calculated, enter them as holidays in the holiday table. Press TAB to move to the holiday table.

Then type the names of holidays and dates you want to exclude from the calculation. If you enter a long list of holidays, the labels Name of Holiday, Date, and Day of the Week remain on the screen as you move to the lower rows of the holiday table. A horizontal title has been set at A3. For this reason, the cell pointer moves to A3 (instead of A1) when you press HOME.

The following table explains the items you enter and what they mean.

Table E-4 Holidays

Item	Address	Meaning
Holiday	I3..I27	The name of the holiday.
Date	K3..K27	The date of the holiday. Enter each date in the following format: @DATE(<i>year,month,day</i>)

Interpreting the Results

Once you enter the period to be analyzed and the dates to be excluded from the calculation, Lotus-DM calculates the number of business days in the period. Press BACKTAB (SHIFT-TAB) to examine the calculation.

The following table explains the results of the calculation and what they mean.

Table E-5 Results

Item	Address	Meaning
Start and end date inclusive	D9	Number of business days in the period, including the first and last days of the period you specified.
Only end date inclusive	D11	Number of business days in the period, including only the last day of the period you specified.

Changing the Template

Before you attempt to customize the template by changing labels, cell formats, formulas, and so on, read the following information.

- Before you make any changes to this template, be sure to make a backup copy of the file.
- To change data in protected cells, turn off worksheet protection. Once you make the necessary changes, turn on worksheet protection to avoid writing over information you want to protect.
- If you move cells or insert rows or columns, be sure to check the formulas in D9 and D11 and in column M to make sure they work correctly.
- To change the display of dates in a range, use Range Format.

Saving Your Work

You should save this file under a different name each time you perform a date analysis. For example, you can name the first analysis you perform DATE1.WK1, the sec-

E-8 Sample Applications

ond DATE2.WK1, and so on. That way, you will have a separate record of each work session and preserve the original template. To save your work select File Save As. Next, specify the file name and select OK.

Employee Payroll Summary

Suppose you often need to prepare paychecks for personnel not covered by your customary payroll system. For example, you may want to issue a bonus to a regular employee, pay a contract employee, or pay an employee who was recently hired.

Lotus-DM can help you perform the necessary calculations through the use of formulas. In addition, Lotus-DM lets you print copies of the payroll summary so you can keep a copy of the record on file.

The employee payroll summary template calculates the amount of paycheck deductions and generates a printed record of an employee's deductions.

Opening the File

Follow the steps below to open the worksheet file containing the payroll summary template.

NOTE

Make sure the drive and/or directory containing the sample worksheet files that came with Lotus-DM is the current directory.

Select File Open. Next, press TAB to move the cell pointer to the Open File field in the dialog box. Then type EMPPAY.WK1 in the Open File field and press ENTER.

You see a screen of information that describes the template. After you read the screen press HOME to begin using the template.

Note the following before you begin using the template:

- Because you have not entered data for Lotus-DM to use in its calculations, the formulas in the template display ERR. When you enter payroll data, Lotus-DM will recalculate the formulas and display the appropriate values based on your data.
- To preserve the formulas that perform the calculations, this worksheet has been protected. The cells in which you enter data are unprotected. (Notice that Lotus-DM displays data in unprotected cells in a different color, font, or in a brighter intensity, depending on the type of monitor you have.) If you try to delete, move, copy, or enter data in a protected cell, Lotus-DM displays an error message.

Entering the Data

The following tables describe the data you enter in the worksheet and what they mean.

Employee Information

The following table lists the employee information you need to enter.

Table E-6 Employee information

Item	Address	Meaning
Employee name	B3	Name of employee receiving the paycheck.
Employee SSN	B4	Employee's Social Security number.
Period ending	B5	The last day of the pay period. Enter this date in the following format: @DATE(year,month,day)

Components of Gross Pay

The following table lists the various types of compensation that make up the gross amount of pay.

Table E-7 Gross pay components

Item	Address	Meaning
Salary	B9	Gross amount of regular salary (for exempt employees).
Number of hours	B11	The number of hours worked (if the employee is paid by the hour).
Hourly rate	B12	Amount employee is paid per hour (if the employee is paid by the hour).
Commissions	B13	Gross amount of commissions (if any).
Overtime	B14	Amount of overtime pay (if any).
Shift differential	B15	Gross amount of shift differential (if any).

Pretax Deductions

The table below lists the items that are deducted from the gross amount of pay, before taxes are deducted. You can enter these as a dollar amount (in column B) or as a percentage (in column C).

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Table E-8 Pretax deductions

Item	Address	Meaning
Deduction #1	B22 or C22	First pretax payroll deduction (if any).
Deduction #2	B23 or C23	Second pretax payroll deduction (if any).

Tax Deductions

The following table lists the withholding taxes that are deducted from the gross amount of pay, after pretax deductions. You can enter these as a dollar amount (in column B) or as a percentage (in column C).

Table E-9 Tax deductions

Item	Address	Meaning
Federal tax	B30 or C30	Amount of federal withholding tax to be deducted.
FICA	B31 or C31	Amount of FICA (if any) to be deducted.
State tax	B32 or C32	Amount of state withholding tax to be deducted.
Local tax	B33 or C33	Amount of local withholding tax (if any) to be deducted.
Other 1	B34 or C34	Other employee payroll taxes (if any).
Other 2	B35 or C35	Other employee payroll taxes (if any).

Voluntary Deductions

The following table lists the items that are deducted after taxes. Voluntary deductions include items such as contributions to a Christmas club, charitable contributions, payroll deductions for purchasing savings bonds, and so on. You can enter these as dollar amounts (in column B) or as percentages (in column C).

Table E-10 Voluntary deductions

Item	Address	Meaning
Deduction #1	B42 or C42	First voluntary payroll deduction (if any).
Deduction #2	B43 or C43	Second voluntary payroll deduction (if any).

Printing Your Work

Follow the steps below to print a copy of your work.

- NOTE** To print your work, you must have installed a printer using DeskMate Setup (F10). Also, make sure that the printer you selected is turned on, properly connected, and ready to print (on-line).

Select File Print (CTRL-P). Next, specify A1..E47 in the Print Range field in the dialog box and select OK.

Lotus-DM prints a copy of your work.

Changing the Template

Before you attempt to customize the template by changing labels, cell formats, formulas, and so on, read the following information.

- Before you make any changes to this template, be sure to make a backup copy of the file.
- To change data in protected cells, turn off worksheet protection. Once you make the necessary changes, turn on worksheet protection to avoid writing over information you want to protect.
- If you move cells or insert rows or columns, be sure to check the formulas to make sure they work correctly.

Saving Your Work

You should save this file under a different name each time you perform a payroll calculation. For example, you can name the first calculation PAYROLL1.WK1, the second PAYROLL2.WK1, and so on. That way you will have a separate record of each work session and preserve the original template.

To save your work select File Save As. Next, specify the file name and select OK.

Accounts Receivable Journal

Suppose it is your job to send invoices to customers for the services and products your company provides. Managing the payment of invoices is an important part of tracking cash flow and monitoring the financial state of a company. You want to know at a glance which unpaid invoices are seriously overdue.

Using a database to organize the invoices, Lotus-DM can help you calculate how many days an unpaid invoice is past due and keep totals of overdue invoices for each period.

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The accounts receivable journal template evaluates the age of an account and adds the unpaid balance to the appropriate total each time you enter a new record in the database.

Opening the File

Follow the steps below to open the worksheet file containing the payroll summary template.

NOTE Make sure the drive and/or directory containing the sample worksheet files that came with Lotus-DM is the current directory.

Select File Open. Next, press TAB to move the cell pointer to the Open File field in the dialog box. Then type ACCTREC.WK1 in the Open File field and press ENTER.

You see a screen of information that describes the template. After you read the screen press HOME to begin using the template.

Unlike the other templates, the accounts receivable journal template is not protected. This allows you to use the Data commands in Lotus-DM with this template. When using this template, be careful not to alter or write over formulas accidentally.

Entering the Data

The following instructions explain how to enter data in each section of the worksheet.

Aging Report Date

This date is used to calculate the age of each invoice. To enter the date move the cell pointer to C3. Then type the date of the report in the format @DATE(year,month,day), and press ENTER.

Aging Periods

The following table describes the items you enter for Aging Periods.

Table E-11 Aging periods

Item	Address	Meaning
Start/end day — current period	A8, B8	First and last day, respectively, of the period in which an unpaid account is still current.
Start/end day — period 1 past due	A9, B9	First and last day, respectively, of the first period in which an account is past due.
Start/end day — period 2 past due	A10, B10	First and last day, respectively, of the second period in which an account is past due.

(continued)

Item	Address	Meaning
Start/end day — period 3 past due	A11, B11	First and last day, respectively, of the third period in which an account is past due.
Current — not yet due	C8	Reminds you of periods when accounts are not yet due.
Period 1 action	C9	Action to be taken during the first period in which an account is past due.
Period 2 action	C10	Action to be taken during the second period in which an account is past due.
Period 3 action	C11	Action to be taken during the third period in which an account is past due.

Customer Records

When you enter the records with unpaid accounts, Lotus-DM calculates the overdue amounts. The following table shows the fields in the database, their locations, and what they mean.

Table E-12 Database fields

Field	Column	Meaning
Invoice	A	The identification number of the unpaid invoice (entered as a label).
Date	B	The date on which the invoice was first sent to the customer (entered as an @DATE formula).
Customer	C	The name of the customer to whom the invoice is issued.
Amount	D	The amount of the invoice.
Paid?	E	The status of the invoice (Y if paid, N if unpaid).

Interpreting the Results

The formulas in columns F through I calculate the age of each unpaid account and add together the totals for each period. The figures in row 22 tell you what percentage of your total accounts receivable falls into each category.

Table E-13 Results

Field	Column	Meaning
0-30 Days	F	The account is less than 30 days old.
31-60 Days	G	The account is 31-60 days old.
61-90 Days	H	The account is 61-90 days old.
91-120 Days	I	The account is 91-120 days old.

Printing Your Work

Follow the steps below to print a copy of your work.

NOTE To print your work, you must have installed a printer using DeskMate Setup (F10). Also, make sure that the printer you selected is turned on, properly connected to your printer, and ready to print (on-line).

Select File Print (CTRL-P). Next, specify A1..I23 in the Print Range field in the dialog box and select OK. Lotus-DM prints a copy of your work.

Changing the Template

Because the employee information is entered in a Lotus-DM database, you can use Data Sort and Data Query to sort and search for employee records. For more information on using Lotus-DM database tables, see Chapter 14 in *Reference*.

Before you attempt to customize the template by changing labels, cell formats, formulas, and so on, read the following information.

- Before you make any changes to this template, be sure to make a backup copy of the file.
- To change data in protected cells, turn off worksheet protection. Once you make the necessary changes, turn on worksheet protection to avoid writing over information you want to protect.
- If you move cells or insert rows or columns, be sure to check the formulas to make sure they reference the correct cells.

Saving Your Work

You should save this file under a different name each time you perform an accounts receivable analysis. For example, name the first calculation JOURNAL1.WK1, the second JOURNAL2.WK1, and so on. That way you will have a separate record of each work session and preserve the original file. To save your work select File Save As. Next, specify the file name and select OK.

Lease/Purchase Cost Comparison

Suppose you are in charge of operations for a company. You learn that you can lease a computer for \$2,000 a month or purchase one for \$20,000. Is it cheaper to lease the computer or purchase it?

This example explains how to use the lease/purchase cost comparison template, which can help you compare the costs of leasing a piece of equipment to those of buying it.

To use this template, you need to complete the summary of present values.

Lotus-DM calculates the cost of purchasing the asset and displays the cost in B7.

Lotus-DM also calculates the cost of leasing the asset and displays the cost in B8. A row of < (less-than symbols) appears next to the lower cost. To see the effect of these costs for each payment period, you can examine the payment schedule to see the cost comparison.

Opening the File

Follow the steps below to open the worksheet file containing the lease/purchase cost comparison template.

NOTE Make sure the drive and/or directory containing the sample worksheet files that came with Lotus-DM is the current directory.

Select File Open. Next, press TAB to move the cell pointer to the Open File field in the dialog box. Then type LEASE.WK1 in the Open File field and press ENTER.

You see a screen of information that describes the template. After you read the screen press HOME to begin using the template.

Note the following before you begin using the template:

- Because you have not entered data for Lotus-DM to use in its calculations, the formulas in the template display ERR. When you enter the cost comparison data, Lotus-DM will recalculate the formulas and display the appropriate values based on what you entered.
- To preserve the formulas that perform the calculations, this worksheet has been protected. The cells in which you enter data are unprotected. (Notice that Lotus-DM displays data in unprotected cells in a different color, font, or in a brighter intensity, depending on the type of monitor you have.) If you try to delete, move, copy, or enter data in a protected cell, Lotus-DM displays an error message.

Entering the Data

To use this template, you need to enter information regarding the lease, asset to be leased, the lessee, and the financing. The following tables explain the items you enter and what they mean.

Lease Information

The following table lists the data you will enter.

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Table E-14 Data for lease/purchase cost comparison

Item	Address	Meaning
Lease payment	B11	Periodic payment according to lease contract.
Origination fee	B12	One-time payment for lease contract.
Term of lease	B13	Length of lease in years.
Purchase at end	B15	Does the contract include the option to purchase? (Enter 1 if the contract includes the option, or 0 if the contract does not include the option.)

Asset Characteristics

The following table lists the characteristics of the asset.

Table E-15 Asset characteristics

Item	Address	Meaning
Purchase price (end)	B18	Cost of purchasing asset.
Salvage value	B19	Expected value at time asset is disposed of.
Maintenance	B20	Cost of maintaining asset.
Maintenance infl. rate	B21	Inflation rate for maintenance costs.

Lessee Information

The next table lists the characteristics of the company leasing or purchasing the asset.

Table E-16 Lessee information

Item	Address	Meaning
Marginal tax rate	D11	Lessee's marginal tax rate.
Cost of capital	D12	Cost of funds used to finance capital investment.
Depr. term (3,5,7,10)	D14	Term of depreciation in years (enter 3, 5, 7 or 10 years).

Financing Information

The following table lists the characteristics of the financing arrangements.

Table E-17 Financing

Item	Address	Meaning
Borrow or pay cash?	D19	Do you intend to finance the asset by borrowing or paying cash? (Enter 1 if you intend to borrow or 0 if you intend to pay cash.)
Purchase amount	D20	Amount it would cost to purchase the asset.
Term	D21	Term of loan in years (if you intend to borrow).
Rate	D22	Interest rate of loan (if you intend to borrow).
Payment	D23	Required monthly payment (if you intend to borrow).
Interest % after tax	D24	After-tax interest rate (if you intend to borrow).

Examining the Schedule of Payments

The schedule summarizes the costs of each option for each payment period. Press TAB to examine the schedule of payments.

The following tables explain the items in the schedule and what they mean.

The Ownership Alternative

The following table explains the items in this category.

Table E-18 Owning

Item	Address	Meaning
Interest expense	G4..P4	Interest costs of financing purchase by loan.
Depreciation	G5..P5	Depreciation expense for each period.
Maintenance	G6..P6	
Salvage value	G7..P7	Salvage value of item for each period.
Total deductible costs	G8..P8	Total tax-deductible costs for each period.
Tax savings	G9..P9	Tax savings for each period.
Principal repayment	G11..P11	Amount of loan principal repaid in each period.
Actual cash outflow (Pr+Int+Maint+Slvg-Tax Saving)	G13..P13	The sum of principal plus interest plus salvage value minus the tax savings for each period.
Present value of outflow	G14..P14	Present value of outflow of funds for each period.

The Lease Alternative

The following table explains the items in this category.

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Table E-19 Leasing

Item	Address	Meaning
Actual lease payment	G17..P17	Amount of lease payment for each period.
Purchase price at end of lease	G18..P18	Purchase price of item at the end of the lease contract.
Present value of lease payment	G19..P17	Present value of least payment for each period.

Printing Your Work

Follow the steps below to print a copy of your lease/purchase cost comparison.

NOTE To print your work, you must have installed a printer using DeskMate Setup (F10). Also, make sure that the printer you selected is turned on, properly connected to your computer, and ready to print (on-line).

Select File Print (CTRL-P). Next, specify A1..P20 in the Print Range field in the dialog box and select OK.

Lotus-DM prints a copy of your work.

Changing the Template

Before you attempt to customize the template by changing labels, cell formats, formulas, and so on, read the following information.

- Before you make any changes to this template, be sure to make a backup copy of the file.
- Do not insert rows in the template. Inserting rows in the worksheet will change the schedule, and the formulas in the template may not work as you expect.
- To insert additional periods in the schedule, copy the formulas in column 10. The formulas will be automatically adjusted.
- To change data in protected cells, turn off worksheet protection. Once you make the necessary changes, turn on worksheet protection to avoid writing over information you want to protect.

Saving Your Work

You should save this file under a different name each time you perform a lease/purchase cost comparison. For example, you can name the first analysis you perform LEASE1.WK1, the second LEASE2.WK1, and so on. That way, you will have a separate record of each work session and preserve the original template. To save your work select File Save As. Next, specify the file name and select OK.

Appendix F

Customer Assurance Plan

Thank you for purchasing the license for Lotus-DM. Lotus Development Corporation has a strong commitment to customer service and product support, offering support services to registered users to help ensure that they get the maximum benefits from their Lotus product.

To become a registered user, complete the registration card that came in your Lotus-DM package, affix the warranty registration bar code label to the registration card, and send the card to Lotus.

Registered users are entitled to the following Lotus support services:

- Product Upgrade Plan
- Product Support
- Product Replacement Plan
- Transfer of License

Each Lotus support service is described below. Read the descriptions carefully to determine which service you should contact for assistance.

Product Upgrade Plan

Lotus may introduce new releases of this product that incorporate additional features and capabilities. The Lotus Product Upgrade Plan lets registered users take advantage of these enhancements.

F-2 Customer Assurance Plan

Under the Product Upgrade Plan, Lotus offers the following benefits to registered users of this product:

- Notification of new releases
- Eligibility for special prices on new releases

A Product Upgrade Plan generally begins approximately three to four weeks after a new product is available.

For further information on the Product Upgrade Plan, call (617) 623-5680 from 8:30 AM to 8:00 PM (EST) Monday through Friday.

Proof of License
Lotus-DM

Remove the upgrade bar-code label from the bottom of your Lotus-DM package and affix it here.

Product Support

Both your computer dealer and Lotus offer you continuing support in the form of telephone advice and other assistance. If you have difficulty using the program or if it does not operate as described, do the following:

1. Consult the documentation that accompanies the product. It contains answers to most users' questions. Also, check to see if the program supports your operating system and hardware.
2. Consult your technical resource person or computer dealer.
3. Call Lotus Product Support at 617-253-9150, from 8:30 AM to 8:00 PM (EST) Monday through Friday.

In Canada, Lotus Product Support is available in English and French at (416) 979-9412 from 8:30 AM to 8:00 PM (EST) Monday through Friday.

Before you call, gather all information relating to the problem. This makes it easier for the Product Support specialist to assist you.

Transfer Of License

You may transfer the software to another party if the other party agrees to the terms and conditions of the Lotus License Agreement and completes and returns a Transfer of License Form to Lotus. You can get a Transfer of License Form by writing to the following address:

Lotus Development Corporation
55 Cambridge Parkway
Cambridge, MA 02142
Attn: Transfer of License

If you transfer the software, you must at the same time transfer the documentation and all copies of the disks and delete any copies of the software from your hard disk.

Product Replacement Plan

This Lotus product has a limited warranty for 90 days, as specified in the Lotus License Agreement. To replace defective disks or documentation free of charge during the warranty period, complete the Replacement Order Form in this appendix. Send the defective item, the Replacement Order Form, and proof of purchase to

Lotus Development Corporation
55 Cambridge Parkway
Cambridge, MA 02142
Attn: Replacement Department

If a disk becomes damaged after the warranty expires, Lotus will replace it for a \$25.00 replacement charge, while inventory is available. A disk that a customer damages at any time also requires a payment of \$25.00. Send the damaged disk along with a completed Replacement Order Form and \$25.00 to the above address.

Lotus suggests that you send your defective or damaged items by insured mail. Lotus is not responsible for disks or documentation lost in transit.

For further information on the Product Replacement Plan, call (617) 623-6572 from 8:30 AM to 8:00 PM (EST) Monday through Friday, excluding holidays.

CAUTION

Lotus does not replace products or parts thereof that are lost, stolen, or destroyed beyond recovery. Check your insurance for coverage of software products.

Replacement Order Form

To order a replacement for a defective disk or documentation during the 90-day limited warranty period, follow these steps:

1. Complete and return your Warranty Registration Card if you have not already done so.
2. Enclose the defective or damaged item with the following form in an envelope.
3. Enclose the receipt showing that you purchased the product within the 90-day limited warranty period.

To replace a disk that is not defective but becomes damaged while inventory is available following purchase, follow steps 1 and 2 above, and enclose a payment of \$25.00 per disk.

Send to: Lotus Development Corporation
55 Cambridge Parkway
Cambridge, MA 02142
Attn: Replacement Department

Lotus suggests you send your defective or damaged disk by insured mail. Lotus is not responsible for disks lost in transit.

Please print or type:

Date _____ / _____ / _____
 Mo. Day Yr.

Name _____
 Last First (M.I.)

Title _____ Department _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone () _____

I enclose check or money order in the amount of _____

For Customer Service use only:

_____ Version _____ Release _____ Description _____

_____ ☐ Warranty

_____ ☐ Check Amount

Glossary

The glossary defines terms specific to Lotus-DM. It does not define DeskMate terms, terms common to the computer industry, or terms specific to a certain Lotus-DM command. If you do not see a term you are looking for in the glossary, refer to the index or your DeskMate manual.

absolute cell address See *absolute reference*.

absolute range name See *absolute reference*.

absolute reference In a formula, a cell address that always refers to the same cell, or a range name or address that always refers to the same range, even if you copy or move the formula. In an absolute cell address, a \$ (dollar sign) precedes the column letter and row number (e.g., \$A\$4). In an absolute range name, a \$ precedes the range name (e.g., \$INTEREST). For example, to calculate the effects of a constant interest rate on varying principal amounts, you can create a formula that uses an absolute cell address to refer to the cell that contains the interest rate. See also *mixed cell address* and *relative reference*.

accelerator key A combination of keystrokes that invokes a command, bypassing the pull-down menu. For example, CTRL-S is the accelerator key that invokes File Save.

active area The area bounded by A1 and the lowest and rightmost nonblank cell in the active area. See also *nonblank cell*.

address See *cell address* and *range address*.

anchor To make a cell the corner from which you highlight a range. Anchor a cell

by moving the cell pointer to the cell and pressing SHIFT-ENTER or by clicking the cell.

anchor cell The cell in which you begin to highlight a range in POINT mode. See also *anchor*.

argument A string, value, location (range name, range address, or cell address), or condition that provides information to an @function. Arguments are what @functions act on. The arguments follow the @function name in parentheses and are separated by argument separators. For example, @SUM(B3..B25,D3..D25) has two arguments: B3..B25 and D3..D25.

argument separator A punctuation mark that sets off one argument from another in an @function and one range from another in some commands.

arithmetic operator See *operator*.

ASCII (American Standard Code for Information Interchange) Standard character set many computers and communications devices use. See Appendix B for a complete list of characters supported by Lotus-DM.

ASCII file A file that contains only ASCII characters. See also *text file*.

@function A built-in formula that performs a specific calculation. For example, the formula @SUM(B2..B15) uses the @SUM

G-2 Glossary

@function To add the numbers in cells B2 through B15. @Function is pronounced "at function." See also *argument*.

attributes Settings you specify for the font you use to print. Attributes are normal (roman), bold (dark), underline, and italic (slanted).

bar graph A graph that compares related data at a given point in time by representing the data as bars along the x-axis. Each bar represents one value in the y-axis range.

blank cell A cell that contains no visible data, but may include range formats and label prefixes. See also *nonblank cell*.

border See *print border*.

cancel To abandon a command before completing it.

cell The intersection of a column and a row in a worksheet where you can enter information. See also *cell address*.

cell address The location of a particular cell in a worksheet, identified by a column letter and row number (e.g., A25 or B36). See also *absolute reference*, *mixed cell address*, *range address*, and *relative reference*.

cell format The way Lotus-DM displays values on the screen. A number's cell format may differ from its value as entered; for example, the entry 25.451 may appear as \$25.45, 2545%, or 25.4, depending on its cell format.

cell pointer The highlight that indicates the current cell in the worksheet.

cell reference The address or the range name of a cell used in a formula. Cell references can be absolute, relative, or mixed. See also *absolute reference*, *mixed cell address*, and *relative reference*.

character set The set of letters, numbers, and special characters available for use in a program. Lotus-DM uses a subset of ASCII and LICS. See Appendix B for a complete list of characters supported by Lotus-DM. See also *ASCII* and *LICS*.

circular reference The result of a formula that refers to itself, either directly or indirectly. For example, a circular reference occurs if you enter the formula +B1+1 in cell B1.

click Press and release the left mouse button.

collating sequence See *sort order*.

column A vertical block of cells in a worksheet that is one cell wide and runs the entire length of the worksheet. For example, column B contains cells B1 through B8192. A worksheet contains 256 columns. In a database table, a column is called a field. See also *field*.

column headings See *column letters*.

column letters The letters A through IV in the horizontal worksheet border. Each letter or pair of letters identifies one column (e.g., column A or column BC).

column width The number of characters that Lotus-DM displays in a column. The default column width is 9 characters, but you can assign a column any width from 1 to 240 characters.

command An instruction you give Lotus-DM. To issue a command, you select it from a pull-down menu. See also *main menu* and *pull-down menu*.

command menu See *main menu*.

compose sequence A series of key-strokes beginning with COMPOSE (ALT-F1) that you use to produce a character that is not on your keyboard. See also *ASCII* and *LICS*.

concatenate To join strings with a string formula. The string formula + "Sales" & "&"Totals" concatenates the text inside the quotation marks to produce the label Sales Totals. (In the example, the • [bullet] represents a space.)

configuration settings The settings that Lotus-DM uses when it loads its program files. The Lotus-DM configuration settings control certain worksheet formats and are stored in the Lotus-DM configuration file (LOTUS-DM.CNF). For information on configuration settings for your DeskMate system, refer to the DeskMate manual.

current cell The highlighted cell in the worksheet.

current directory The directory that Lotus-DM automatically uses during the current session to save, read, or list files. The current directory can be the default directory or a directory that you specify through File Directory.

current graph The graph that appears when you select Graph View. The current graph uses the specified graph settings. See also *graph settings*.

current mode The mode whose name appears as the mode indicator as you work in Lotus-DM.

current worksheet The worksheet you are currently working in.

cursor The blinking underscore that shows the position of the next character to be specified in the edit panel or in a dialog box field, or the highlight you use to select a menu item. See also *cell pointer*.

cursor-movement keys Keys that control the movement of the cursor in the edit panel, menus, and dialog boxes.

data Information you enter in a worksheet. Types of data include labels, values, range formatting information, and label prefixes.

database A collection of database tables.

database table A worksheet range consisting of related data organized in rows and columns. A database table comprises fields, field names, and records.

The columns in the range are fields, each of which contains a specific type of information. The rows in the range are records, which contain an entry for each field. The first row contains the field names. For example, a company's employee database table might contain fields such as Last Name, First Name, Job Title, and so on. Each record contains information about one employee.

A database table differs from a data table, which is a special Lotus-DM structure used with Data Table commands when performing "what-if" analyses.

data labels The labels you assign to bars or points within a graph.

data table A special structure that Lotus-DM uses with Data Table when performing "what-if" analyses.

Date format The way Lotus-DM displays a date on the screen. The Date format sets the display of date numbers. Table G-1 lists the five Date formats.

Table G-1 Date formats

Date Format	Example
D1DD-MMM-YY	18-Nov-89
D2DD-MMM	18-Nov
D3MMM-YY	Nov-89
D4Long International	11/18/89
D5Short International	11/18

date number A number from 1 to 73050 that corresponds to each date from January 1, 1900 (date number 1) to December 31, 2099 (date number 73050).

default directory The directory Lotus-DM automatically uses when you start Lotus-DM. To change the default directory, use Worksheet Directory, followed by Worksheet Update. See also *current directory*.

default setting A setting Lotus-DM automatically uses until you change it. For example, the default column width (9) remains the same until you change it with Worksheet Column. Some default settings are saved with the worksheet; others are saved in the Lotus-DM configuration file and are automatically used for all future worksheets. See also *configuration settings*.

defined range name A range name that is associated with a range address.

delimited text file An ASCII file that contains delimiters, which are characters that separate the data within a row. A delimiter is a , (comma), : (colon), ; (semicolon), or space. You can import a delimited text file into Lotus-DM.

directory A subdivision of a disk. You can create and name a directory and store related files in it when you save the files on a disk; this makes the files easier to find.

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directory name The name of a directory. A \ (backslash) separates the directory names in a path from each other and from the file name. For example, in C:\LOTUS-DM\FEBRUARY\BUDGET.WK1, the drive is C:, the directory names are LOTUS-DM and FEBRUARY, and the file name is BUDGET.WK1.

disk A magnetic storage medium for your files, such as a 5.25" or 3.5" disk or a hard disk.

DOS Disk Operating System. See *operating system*.

double-click Press and release the left mouse button twice rapidly.

drag Press the mouse button and hold it down while you move the arrow across the screen.

drive A piece of computer hardware that holds a disk, reads data stored on a disk into memory, and saves new data from memory on a disk.

drive name The two characters (a letter and a colon) that identify the disk drive. For example, C: is the name of drive C, the hard disk drive on a computer.

edit panel The third line from the top of the Lotus-DM screen. The edit panel contains the current cell's address, the current cell's contents, the status indicators, and the mode indicators.

elevator box The box on a scroll bar that marks your relative position in the worksheet. See also *scroll bar*.

entire-sheet selector icon The icon you click with the mouse to select the entire active area of a worksheet. The icon is located at the intersection of the column and row headings in the upper left corner of the worksheet.

entry Data entered in a cell. Every entry is a label, a value, range formatting information, or a label prefix.

error message A message that appears on the screen when Lotus-DM detects a mistake or cannot perform a task. See also *ripple-through effect*.

extension A . (period) followed by up to three characters, at the end of a file name. When Lotus-DM creates a file, it automatically adds the extension .WK1 to worksheet files, .PIC to graph files, and .PRN to text files. You can override these extensions by entering your own extension when you save a file.

field In a database table, a labeled column that contains the same kind of information for each record. For example, the Last Name field contains all the last names in a database table. A database table can contain up to 256 fields. Fields can contain either labels or values.

field names Labels in the first row of a database table that identify the kind of information appearing in the column below. The field names must be unique for each field within a database table. For example, an employee database table usually contains field names such as First Name, Last Name, and Employee Number. See also *field*.

file A named collection of data saved on disk. With Lotus-DM, you save a worksheet in a worksheet file, text in ASCII format in a text file, and graphs in a graph file.

file name The name you give to a file when you use File Save As. Lotus-DM file names can contain eight characters including letters, numbers, and the - (hyphen) and _ (underscore) characters. See also *extension*.

font A typeface that Lotus-DM uses in printing files or graph text and for displaying graph text on the screen.

font file A file that stores font settings. Font files have the .FNT extension.

footer A line of text Lotus-DM prints above the bottom margin of each page.

formula An expression that performs a calculation in a worksheet. A Lotus-DM formula can include @functions, and can be a numeric formula, a string formula, or a logical formula. See also *@function*.

frame The box around a graph.

@function A built-in formula that performs a specific calculation. For example, the formula @SUM(B2..B15) uses the @SUM @function to add the numbers in cells B2 through B15. @Function is pronounced "at function." See also *argument*.

function keys Keys F1 through F10 on your keyboard. The function keys perform special functions when used individually or in combination with CTRL.

global setting A setting Lotus-DM uses for an entire worksheet.

graph file A file that stores a Lotus-DM graph for use with PrintGraph and other programs. Graph files have the .PIC file extension.

graph settings The options you specify when creating a graph, such as graph type, titles, scaling, and ranges. You can save graph settings to use again with new data.

grid lines The lines that extend from side to side and top to bottom within a graph frame. Also the lines that you see on your worksheet display that delineate cells. You can turn the display of worksheet grid lines on or off.

hard disk A permanent magnetic storage medium that has a much greater storage capacity than a 5.25" or 3.5" disk and is usually built into a computer.

hatch pattern The pattern of lines that distinguishes one bar from another in bar graphs and one slice from another in pie charts.

header A line of text that Lotus-DM prints above the top margin of each page.

Help A series of context-sensitive screens that describe Lotus-DM. To get help with the Lotus-DM feature you are using, press HELP (F1 or CTRL-F1).

highlight To move the cursor to a menu item or a field in a dialog box, or to move the cell pointer to a cell or range in the worksheet. Lotus-DM displays the highlighted item, field, cell or range in a contrasting color or, on a monochrome monitor, in a brighter intensity.

horizontal scroll bar See *scroll bar*.

icon A symbol that represents an activity. Lotus-DM has two icons: the entire-sheet selector icon and the last active cell icon.

indicator A highlighted word or abbreviation that provides information about certain keys or activities in Lotus-DM. There are two types of indicators: status and mode. The indicators appear on the right side of the edit panel. See also *mode indicator* and *status indicator*.

insert Move existing text to the right as you type new text; add a new row above the selected row; or add a new column to the left of the selected column.

iterations The number of times Lotus-DM recalculates formulas when the recalculation method is Rowwise or Columnwise or when the worksheet contains a circular reference.

label Any entry that begins with a letter or a label prefix.

label alignment The way a label appears in a cell: left-aligned, right-aligned, centered, or repeating across the cell. Label prefixes control label alignment. See also *label prefix*.

label prefix One of the four characters that control the alignment of a label in a cell. You use label prefixes to indicate that you are entering a label and to specify its alignment. You must use a label prefix with entries that begin with a number or with + (# . @ or \$ (or the default currency symbol) if you want Lotus-DM to treat them as labels. Table G-2 lists the label prefixes.

Table G-2 Label prefixes

Label Prefix	Alignment	Placement in Cell
'	Left-aligned	LABEL
^	Centered	LABEL
"	Right-aligned	LABEL
\	Repeating	LABELLABELLABELLAB

landscape orientation A page setting that rotates a worksheet, range, or graph 90° to print sideways on the page.

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last active cell The lowest and rightmost nonblank cell in the worksheet. See also *nonblank cell*.

last active cell icon The icon you click with the mouse to move to the last active cell in the worksheet. The icon is located at the intersection of the vertical and horizontal scroll bars in the lower right corner of the screen.

legend A guide to the symbols, lines, hatch patterns, or colors in a graph. The legend appears beneath the graph.

LICS (Lotus International Character Set)

A Lotus character set of which Lotus-DM uses a subset. See Appendix B for a complete list of characters supported in Lotus-DM.

line graph A graph that plots changes in one or more values over time. Each range of values appears as a line.

literal string Text (letters, numbers, punctuation marks, spaces, and special characters) enclosed in quotation marks. Literal strings are used in string formulas and @functions.

logical formula A formula that evaluates a condition by using a logical operator or a logical @function. A logical formula results in a value that you can use in other calculations (1 for true, 0 for false). For example, the formula `+A2>8` returns 1 (true) when the value in A2 is greater than 8; it returns 0 (false) when the value in A2 is 8 or less.

logical operator An operator you use in a logical formula to evaluate equality or inequality. Table G-3 lists the logical operators.

Table G-3 Logical operators

Logical Operator	Meaning
=	Equal to
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<>	Not equal to
#AND#	Logical AND
#NOT#	Logical NOT
#OR#	Logical OR

long label A label that is longer than a cell's column width. If the cell to the right is blank, the long label appears to extend into the next column. If the cell to the right is not blank, Lotus-DM displays only as many characters as fit within the column width. Even if it cannot display or print the entire label, Lotus-DM stores the entire label.

In Data Parse Setup, a long label is a cell of up data imported from another product that you must parse in order to use.

long value A value that is longer than the cell's column width. Lotus-DM displays and prints a long value in scientific notation when possible; otherwise, a long value is displayed or printed as a series of asterisks. Lotus-DM uses and stores the actual value. To display the actual value, increase the column width.

Lotus-DM error Any action that causes Lotus-DM to display an error message on the screen and change the mode indicator to ERROR.

Lotus-DM program directory The directory that contains the Lotus-DM program files.

main menu The list of Lotus-DM pull-down menus that appears on the left side of the menu bar. See also *pull-down menu*.

memory The temporary storage area in which a computer holds both programs and data. For example, the Lotus-DM worksheet you see on the screen is in memory. When you save a worksheet, you make a permanent copy of it in a file on disk.

menu See *main menu* and *pull-down menu*.

menu bar The second line from the top of the Lotus-DM screen. The menu bar contains the Lotus-DM main menu and the DeskMate Setup Accessory.

mixed cell address In a formula, a cell address that is part relative and part absolute. A \$ (dollar sign) precedes the absolute column letter or row number in the mixed cell address. For example, if a formula in cell B2 contains the cell address A\$1 and

you copy the formula to cell G8, the cell address becomes F\$1. See also *absolute reference* and *relative reference*.

mixed reference See *mixed cell address*.

mode The state in which you can perform a particular process in Lotus-DM. For example, when Lotus-DM is in READY mode it is ready to accept entries or commands. When Lotus-DM is in POINT mode you can specify a range. See also *mode indicator*.

mode indicator The indicator located in the upper right corner of the edit panel that describes the mode, or state, Lotus-DM is in. The six mode indicators are EDIT, ERROR, LABEL, POINT, READY, and VALUE.

named graph A graph and its settings that you have named. When you retrieve a named graph, its settings become the current graph settings.

nonblank cell A cell that contains data, range formats, or label prefixes. See also *blank cell*.

numeric formula A mathematical expression that uses arithmetic operators and/or @functions and that results in a number.

numeric symbol The + - @ . (or \$ prefix that informs Lotus-DM that the entry is a value. See also *operator*.

offset number The number, in some @functions, that corresponds to the position of a specified row, column, or character. The first row, column, or character always has an offset number of zero.

open To read a Lotus-DM file from a disk into memory, making it the current file. Opening a file replaces the previously current file.

operating system A collection of programs that manages memory and other programs (such as Lotus-DM) that run on your computer.

operator A symbol you use in a formula to indicate the operation to be performed or the relationship between two values. Lotus-DM uses logical operators, the string operator (&), and the standard arithmetic

operators: + (addition), - (subtraction), * (multiplication), / (division), and ^ (exponentiation).

order of precedence The order in which Lotus-DM performs arithmetic operations in a formula.

orientation The way a worksheet, range, or graph prints on a page. The worksheet, range, or graph prints either from top to bottom (portrait orientation) or sideways across the page (landscape orientation).

overwrite Write over existing data with new data. You can overwrite data in a cell or a range by typing over it or by copying data to the cell or the range. A file can also overwrite another file if you save both files with the same file name and extension.

page settings Settings you specify in PrintGraph to determine the position of a graph on the printed page.

path The drive, directory, and subdirectory (if there is one) where a file is stored. For example, in C:\LOTUS-DM\BUDGET.WK1, C:\LOTUS-DM\ is the path for the file BUDGET.WK1.

picture file format (.PIC) One of two graph file formats available in Lotus-DM. You can print a graph with the PrintGraph program if you save it in picture file format.

pie chart A graph that compares parts to the whole. In a pie chart, each value in the A data range is a slice of the pie. The size of each slice corresponds to the percentage of the total each value represents.

point Move the mouse arrow to an item on the screen.

pointer See *cell pointer*.

pointer-movement keys Keys that control the movement of the cell pointer in the worksheet area.

portrait orientation A setting you specify to print an image from top to bottom, rather than sideways, across the page.

precedence number A number that represents the order in which Lotus-DM performs operations in a formula. The lower the precedence number, the earlier Lotus-DM performs the operation.

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print border Rows or columns that Lotus-DM prints on every page as a border above and/or to the left of each print range.

print file A text file you create with File Print. Print files contain data and embedded printer codes, but no graphs or formatting. Print files have the .PRN file extension. You can print a print file (on screen and on most printers) from the operating system with the COPY command. See your DOS manual for information on the COPY command.

print settings The options you specify for printing a worksheet, range, or graph. Special fonts, margins, headers, footers, and character spacing might be included in the print settings. See also *graph settings*.

protect To prevent changes to a range or worksheet.

pull-down menu The list of commands that Lotus-DM displays when you select an item from the main menu. See also *command* and *main menu*.

range Any rectangular block of cells—a single cell, a row or a column, parts of several rows and columns, or an entire worksheet.

range address The location of a range in a file. A range address consists of the cell addresses of any two diagonally opposite corner cells of the range, separated by one or two periods (e.g., A12..C20).

range name A name you specify that identifies a range in the current worksheet. A range name can have up to 15 characters. You can use range names instead of range addresses in formulas and commands. See also *defined range name* and *undefined range name*.

read To copy a file from disk into memory. See also *memory*.

recalculation Calculation of formulas in the current worksheet using the latest cell values.

recalculation method One of two ways Lotus-DM recalculates formulas in the current worksheet. Automatic recalculates for-

mulas every time you enter data in a cell; Manual recalculates formulas only when you press CALC (CTRL-F9).

recalculation order One of three orders Lotus-DM uses to recalculate formulas in the current worksheet. Natural recalculates any values on which a particular formula depends before recalculating that formula, Columnwise recalculates column by column, and Rowwise recalculates row by row.

record A one-row collection of information about one item in a database table. The first row of a database table contains field names; all other rows contain records. Each record contains information about one particular item in the database table. A database table can contain up to 8191 records. See also *field names*.

relative cell address See *relative reference*.

relative reference In a formula, a reference to a cell or a range that changes when you copy the formula. The reference can be an address or range name. A relative cell address, for example, refers to the relative position of the original cell to the original formula. In cell D1, the cell address A1 refers to the value in the cell three columns to the left. If you copy the cell address to cell E2, Lotus-DM still uses the value in the cell three columns to the left—cell B2. If you do not want a cell or range address to change when you copy it, use an absolute reference. See also *absolute reference* and *mixed cell address*.

repeating label A label that repeats across the entire width of a cell. You create a repeating label with the \ (backslash) label prefix. For example, entering \- in a cell prints a succession of hyphens across the cell.

reset To clear a setting or group of settings or to restore default settings.

ripple-through effect When one formula depends on another formula that evaluates to ERR or NA, the first formula also results in ERR or NA. This is called the ripple-through effect. When you correct the formula that evaluates to ERR or provide the unavailable value to the formula that contains NA, the results of dependent formulas also change.

row A horizontal block of 256 cells in a worksheet. A row is one cell high and runs across the entire width of the worksheet. For example, row 4 contains cells A4..IV4. There are 8192 rows in a worksheet. In a database table, a row is called a record. See also *record*.

row headings See *row numbers*.

row numbers The numbers 1 through 8192 in the vertical worksheet border. Each number identifies one row.

save To copy a worksheet from memory to a file on disk.

scale indicator An indicator that shows the order of magnitude along a scaled axis in a graph.

screen What appears on the monitor during a Lotus-DM session. Screen also refers to the part of the computer's monitor through which you view your data.

scroll bar A bar that has arrows at either end and an elevator box. The arrows at either end of the bar indicate the direction in which to scroll for information that is not currently on the screen. You scroll the information by clicking the scroll arrows or dragging the elevator box.

There are two scroll bars on the Lotus-DM spreadsheet display: a vertical scroll bar along the right edge of the display and a horizontal scroll bar across the bottom of the display. List boxes also have a vertical scroll bar along their right edges.

See also *elevator box*.

scrolling Moving a worksheet horizontally or vertically on the screen. To scroll a worksheet with the keyboard, use ↑, ↓, →, ←, PGUP, PGDN, BIG RIGHT (CTRL-→), and BIG LEFT (CTRL-←). To scroll a worksheet using the mouse, use the vertical and horizontal scroll bars. See also *scroll bar*.

select To choose a pull-down menu, command, or option using one of the following three methods:

- Highlight the item and press ENTER.
- Type the first letter of the item and press ENTER.
- Press the appropriate function key or accelerator key.

Also, to specify a range by highlighting cells in the worksheet.

skip factor A number that controls the labels displayed along the unscaled x-axis.

sort To arrange the records in a database table in a particular order, determined by the contents of one or more fields. For example, you can sort records in an employee database table alphabetically by last name or chronologically by date of hire. See also *sort order*.

sort order The order Lotus-DM uses for letters, blank cells, symbols, and numbers, when you use Data Sort. Lotus-DM sorts data in ascending (A through Z, 0 through 9) or descending (Z through A, 9 through 0) order.

specify To provide data in a dialog box field or identify a range of cells.

spreadsheet A tool used in financial analysis and modeling that establishes mathematical and logical relationships among numbers and formulas that appear in rows and columns. The Lotus-DM worksheet can be used as an electronic spreadsheet. See also *worksheet*.

stacked bar graph A graph that compares values by stacking sections of bars one on top of the other. A stacked bar graph displays a bar for each item on the x-axis. Each bar comprises differently hatched or colored sections, each of which represents a value in one of the data ranges.

status indicator The indicator located on the right side of the edit panel that describes a certain key or condition. For example, Lotus-DM highlights the CIRC indicator when you have a circular reference, or Lotus-DM highlights the END indicator when you pressed END and need to complete the key combination by pressing the second key. The four status indicators are: CIRC, MEM, CALC, and END. See also *mode indicator*.

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string One or more characters treated as a label. A literal string contains text—letters, numbers, punctuation marks, or other characters—enclosed in quotation marks.

string formula A formula that manipulates strings. The string formula + "Yearly •" & "Sales" combines the text inside the quotation marks to produce the label Yearly Sales. (In the example, the • [bullet] represents a space.) String formulas use the string operator (&) and/or @functions.

string operator The & (ampersand) is the only operator used in string formulas. The ampersand joins, or concatenates, two strings.

subdirectory A subdivision of a directory.

text file A file in ASCII format. You can create a text file in Lotus-DM. See also *print file*.

Time format The way Lotus-DM displays time on the screen. The Time format sets the display of time numbers. Table G-4 lists the four Time formats.

Table G-4 Time formats

Time Format	Example
1 HH:MM:SS AM/PM	8:45:23 PM
2 HH:MM AM/PM	8:45 PM
3 Long International	20:45:23
4 Short International	20:45

time number Decimal values that correspond to times from midnight (time number 0.000000) through 11:59:59 PM (time number 0.999988).

title line The first line at the top of the Lotus-DM screen. The title line contains the current date and time, the product name (Lotus-DM) and current file name, and Help (F1).

undefined range name A range name not assigned to a range.

value A number or a formula that evaluates to a number, or a range name, range address, or cell address that contains a number or a formula that evaluates to a number.

variable A part of a formula for which differing values can be substituted.

vertical scroll bar See *scroll bar*.

what-if analysis Calculations that test the effect of using a number of differing values in formulas to determine potential outcomes of different situations.

wild-card character The * (asterisk) or the ? (question mark) in a file name, used to represent any single character (?) or any number of sequential characters (*) when listing files.

worksheet The Lotus-DM electronic spreadsheet. A worksheet contains 256 columns and 8192 rows. You use the worksheet to enter and manipulate data, create graphs, and manage database tables. See also *spreadsheet*.

worksheet area Section of the screen that contains the worksheet display, the column heading area, the row heading area, the entire-sheet selector icon, the vertical and horizontal scroll bars, and the last active cell icon. The worksheet area is the largest section of the screen.

worksheet file A file that stores a Lotus-DM worksheet. Unless you provide a different extension, Lotus-DM assigns the .WK1 extension to the file name when you save the file.

x-axis The bottom line of a graph frame.

x-axis range The range of worksheet labels (in line, bar, and stacked bar graphs) or values (in XY graphs) plotted against the x-axis in a graph.

XY graph A graph that shows correlations between two types of numeric data. An XY graph is the only Lotus-DM graph that uses a scaled x-axis.

y-axis The left line of a graph frame.

y-axis range A range of worksheet values plotted against the y-axis in line, bar, stacked bar, and XY graphs.

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