

An Operator's Guide to Multiplantm

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Welcome, Fortune System User

This package contains everything you need to learn how to use Multiplan. Before you begin, use the checklist below to determine if your package is complete.

- A plastic template strip (slipped between the binder rings)
- An Operator's Guide to Multiplan
- Multiplan Reference Guide
- Multiplan reference card (available soon)

In the back of the binder is a plastic sheet with three pockets that contain:

- Master disk
- Training disk
- Fortune Systems software registration card

If any item is missing from your binder, contact your Fortune Systems dealer for a replacement before you proceed with your training.

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Introducing Multiplan

Before you begin your training, you need to know more about Multiplan and how to use your Fortune 32:16. Some of the procedures covered in this part are ones that you'll use frequently.

In the following pages, you'll learn these things about Multiplan:

- The capabilities and advantages of Multiplan
- How Multiplan is organized
- What training involves
- How the keyboard is arranged and what keys you'll be using
- How to start up your Fortune 32:16, get to Multiplan, and leave it
- What makes up a worksheet

1 An Overview of Multiplan

Many tasks in business involve the use of paper, pencil, a typewriter, and frequently a calculator. You may use these tools every day to prepare information for your business -- a budget in the form of a spreadsheet, for example. A spreadsheet shows information in rows and columns. The check register in your checkbook is a type of spreadsheet since it lists the checks and deposits across in rows and the amounts down in columns.

For many people, the term spreadsheet implies recording financial information. In Multiplan you can do much more than prepare financial information, so the term worksheet is used.

Instead of working with paper and pencil, you work with the Fortune 32:16 display and keyboard. You'll see your information immediately on the screen, and you can print it out easily. Instead of using a calculator for computations, you decide what needs to be added and Multiplan does the rest -- on the screen as you're watching.

WHAT MULTIPLAN CAN DO

Multiplan is versatile. Besides directing Multiplan to perform some routine calculations, you can set up complex and detailed comparisons and bring information from outside worksheets into the one you're using. For instance:

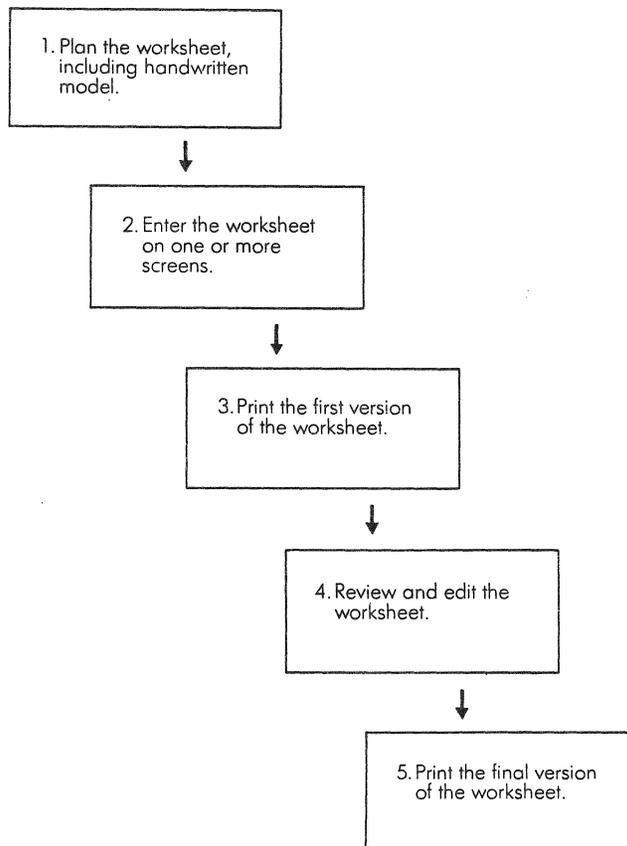
- Office managers can create and manage record keeping tools such as short mailing lists, and office furniture and equipment records.
- Accountants can consolidate financial statements.
- Corporate finance officers can evaluate performance by creating statements to analyze financial ratios.
- Sales managers can track commissions owed and paid.
- Advertising managers can monitor costs of advertising campaigns.
- Production managers can schedule production and forecast sales and inventory shortages.
- Corporate planners can project income, cash, receivables, inventory, and staff requirements.

The Multiplan Cycle

The cycle for using Multiplan in your business is similar to the cycle many people use to plan, prepare, and complete handwritten information. This cycle is easier with Multiplan because you can make changes, review the results, decide if you want your revisions, and even change your mind at the last minute without using erasers or correction fluid and recalculating.

The cycle shown below illustrates what you do when you start on a new worksheet. To speed your training, you'll skip the first step because the worksheets are provided for you. The last part of this guide is a review of the cycle with detailed information of planning a worksheet, including creating a model.

The Multiplan Cycle



You'll follow the Multiplan cycle during your training.

2 Your Multiplan Training

As you proceed through this guide there will be times when you need to stop and begin again later. It's important to complete the chapter you're working on. Then you can return later to continue your training.

In learning how to use Multiplan, you'll need to purchase some supplies, and learn about the training disk and its use, how to use the keyboard and correct mistakes, and how to follow the procedure charts that show you how to use Multiplan. You'll also learn some new terms like cell, edit cursor, and window.

Supplies You Will Need

If you already have some supplies for your computer, check the list below to make sure you have the right things for each step of your training. The list identifies the items you need and suggests how much to buy.

- Printer paper. Check your printer manual to determine what kind of paper you can use in your printer. You will probably want to use continuous forms paper. Since each sheet is attached to the next one along the bottom edge, you can print page after page without changing the paper. Most continuous paper comes in a carton with a specified number of sheets, usually 3,000. You should purchase at least enough paper to complete the training, about 500 sheets.
- Printer ribbons. Your printer manual will identify the type of printer ribbons you need. Buy several.
- Flexible disks. You will need some blank 5 1/4" flexible disks, one to duplicate your training disk, another one to save information on, and the others to use for your future work. Purchase at least five flexible disks.
- Disk labels. You'll need to label each disk you use to identify what it contains. Many stationery stores carry labels especially made for flexible disks. You may also be able to buy the labels where you buy the disks. If you can't find this type, any 1" x 2" labels will do. Purchase enough labels for twice as many disks as you buy.

Using and Backing Up the Training Disk

Your training disk includes some sample worksheets for you to use throughout this guide. These worksheets include familiar things like: an invoice, balance due log, cash flow projections, and profit/loss projections.

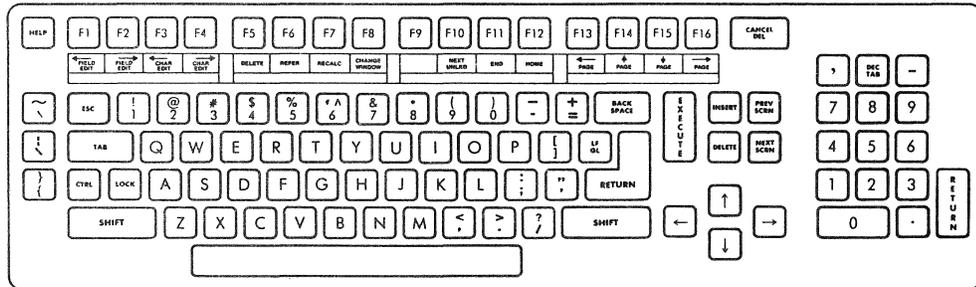
Making backups is the process of preserving a copy of information on a flexible disk. This is analagous to keeping copies of your financial statements. The benefit of this procedure is that you can return to all your previous work, if you need to, to use worksheets over again without figuring them out another time.

For this training you will back up your training disk before you copy it onto your system, which assures that the disk will be complete and unused for someone else later. You will learn to do this in the next chapter of this guide.

The Keyboard

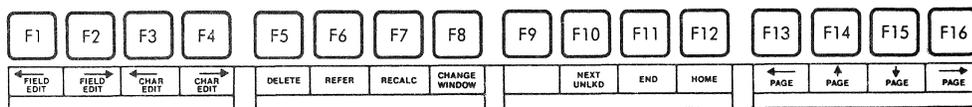
The keyboard on your Fortune 32:16 looks similar to a typewriter. But, you can do many more things with it because it has special keys to use with Multiplan's unique capabilities.

The following illustration shows the Fortune 32:16 keyboard with the template in place.



FUNCTION KEYS

The function keys are located on the top row of your keyboard above the template. The first five keys move the edit cursor, the bright rectangle at the bottom of the Multiplan screen. The edit cursor is used on the command lines, the third and fourth lines from the bottom of the screen. The last nine keys control the cell pointer, the bright rectangle on the upper part of the screen. (The sixth key, which is blank on the template, has no use in Multiplan.)



Key

Description



Moves the edit cursor backward on the command lines, highlighting one set of characters, or field, at a time without changing or erasing anything or adding spaces.



Moves the edit cursor forward a field at a time.

Key

Description



Moves the edit cursor backward a character at a time without changing anything.



Moves the edit cursor forward one character at a time without changing anything.



Deletes whatever character or field on the command line that is covered by the edit cursor.



Changes a relative reference to an absolute reference and can be used to put named cells into a formula.



Manually recalculates all formulas on a worksheet.



Moves the pointer from one window on the screen to the next.



Moves the pointer to the next cell that hasn't been locked.



Moves the pointer to the last active cell on the worksheet.



Moves the pointer to the cell in the top left corner of the worksheet -- home position.



Scrolls the screen to the left an entire page.



Scrolls the screen upward an entire page.



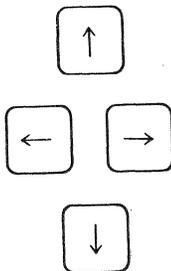
Scrolls the screen downward by a page.



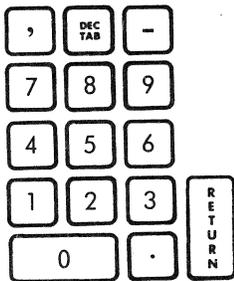
Scrolls the screen to the right a page at a time.

OTHER KEYS YOU CAN USE

<u>Key</u>	<u>Description</u>
(HELP)	Gives you information about any command you select.
CANCEL DEL	Stops whatever function you are doing and returns you to the command line.
E X E C U T E	Indicates that you want a certain command to be performed.
BACK SPACE	Moves the edit cursor to the left. Used to correct typos before the Execute key is pressed.
RETURN	Moves the edit cursor over the command lines and between the fields (options) of a particular command.
(SPACE BAR)	Moves the edit cursor through choices on the command line. Also adds spaces in text.
(TAB)	Performs the same functions as (RETURN).



Arrow keys, also called direction or cursor keys, control the movement of the cell pointer: up, down, left, or right.



The numeric keypad duplicates a calculator keypad, making it convenient to type numbers. Comma, hyphen, and period keys are also located here.

Using Procedure Charts

Procedure charts outline the sequence of steps you follow to learn Multiplan. No matter what Multiplan feature you use, the charts will always be written in the same format.

To use a procedure chart, begin at step 1 and read the Screen Says column, as shown in the illustration. If nothing important has changed on the screen, this column may be blank.

!Step!	Screen Says	!
!	!	!
! 1 !	! COMMAND: Alpha... !	!

Then read the text in the You Type column. This shows which keys to press or what text to type. Keys are enclosed like this: (EXECUTE). Here's a guide to the way keys are indicated and how to use them.

You Type instructions

What you do

gr 5 (EXECUTE)

Type the characters "gr5" and then press (EXECUTE).

(4) 

Press the  key four times. A number in parentheses before a key indicates the number of times you should press the key.

The Comments column explains what has happened. Comments will appear only when they are necessary for better understanding.

For step 2, return to the Screen Says column, where you'll see the results of your actions. It may show you a screen message such as Press Y to confirm, other information, or it may remain the same when the screen does not change between steps.

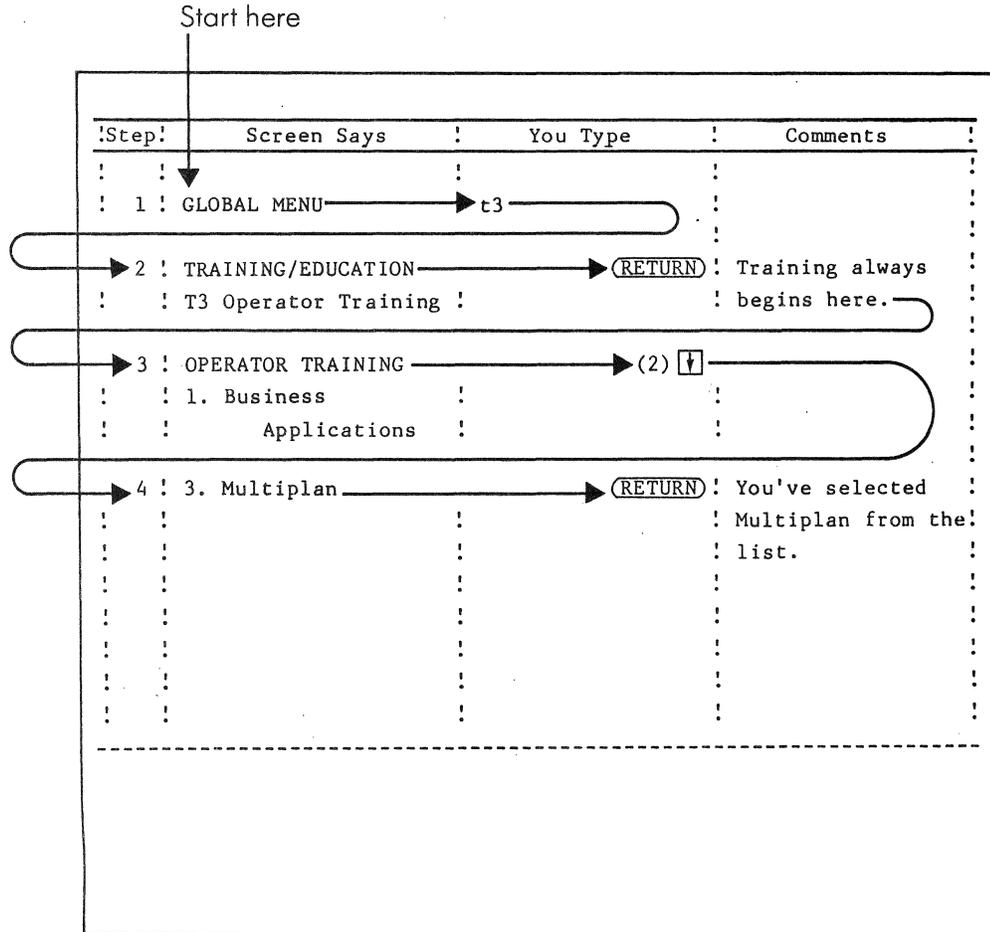
IMPORTANT THINGS TO REMEMBER

Each procedure chart builds on what you learned in the preceding one. Be sure to follow the procedure chart exactly. Press the keys

and type what's shown, including any spaces in the text to avoid errors. Always use numerals for numbers, never spell them out (44, not forty-four). If the chart shows capital letters, type them that way rather than lower case.

Certain letters may be typed lower or upper case. These are (R) for row, (C) for column, command names and function names. You will learn more about each of these later.

Spacing is also variable, except in some formulas where spaces are necessary. Again, follow the example in the procedure chart to ensure success.



Follow this path when using a procedure chart.

3 Getting Started

Now that you know some of the capabilities of Multiplan, you're probably eager to learn the specific procedures that will allow you to take advantage of the system's features. This chapter will familiarize you with how to use your Fortune 32:16, move to Multiplan, and back out again.

Starting up Your Fortune 32:16

Begin with the obvious: plug in the system. Do this with the power on/off switch in the off position. For your safety, and the protection of the system, use a three-pronged electrical outlet that fits the connector.

Now push in the white dot on the switch to set the power switch to on. Test the airflow with your hand to make sure that the fan is operating.

First, you'll see the cursor blinking on the screen. Then the message "Fortune Systems 32:16 Please Wait," with the "Please Wait" blinking, appears and the numbers 1 through 9 show below that. When you see "Please set the current date and time, then press (RETURN)" the system is ready for you to begin.

This beginning process is called logging onto the system. When you do this, you set the current date and time and establish your account. Use the following procedure to log onto your system.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	!	!	!	!
!	1 ! Please set the cur-	!	! Notice how the	!
!	! rent date and time,	!	! cursor moves as	!
!	! the press (RETURN)	!	! you type, and	!
!	!	!	! skips over the	!
!	! Today's date is ...	! (The date-in	! slashes.	!
!	!	! mm/dd/yy format)	!	!
!	!	! (RETURN)	!	!
!	!	!	!	!
!	2 ! Current time is ...	! (Current time)	! The cursor moves	!
!	!	!	! as you type, and	!
!	!	! (RETURN)	! skips over the	!
!	!	!	! colon. You must	!
!	!	!	! type an A or a P	!
!	!	!	! for am or pm.	!
!	!	!	!	!
!	3 ! Date set to ...	!	! The time is dis-	!
!	! Is this correct (y/n)!	! y	! played in the 12-	!
!	!	!	! hour notation.	!
!	!	!	! If you type n	!
!	!	!	! (RETURN), you can	!
!	!	!	! return to step 1	!
!	!	!	! and begin again.	!

:Step:	Screen Says	You Type	Comments
:	:	:	:
:	: Checking your	:	: The dots blink
:	: files	:	: while the system
:	:	:	: checks the files.
:	:	:	:
:	: File check	:	: If any other
:	: successful...	:	: message appears,
:	:	:	: get help.
:	:	:	:
: 4	: Type in your name	:	: Type in "manager"
:	: and press (RETURN)	: manager (RETURN)	: for your name so
:	:	:	: that you can go
:	:	:	: on to the next
:	:	:	: procedure. Later,
:	:	:	: after Multiplan
:	:	:	: and the training
:	:	:	: disk are installed
:	:	:	: and copied, you'll
:	:	:	: log in with your
:	:	:	: own name.
:	:	:	:
: 5	: ___% of the available	:	: This message is
:	: space is in use.	:	: very important.
:	: FORTUNE SYSTEMS	:	: Keep your disk no
:	: GLOBAL MENU	:	: more than 80% full
:	:	:	: to avoid any
:	:	:	: problems.

DISK SPACE

The available disk space message you saw in the previous procedure is an important number to keep track of. During the training in this guide, unless you have other applications on your Fortune system or other people using it, your disk usage probably won't exceed 90%. However, if you DO have other applications on your system that others are using, you need to check this message each time you see it. Later in this guide you'll learn how to remove documents from your disk and save them on flexible disks to make more room.

BEING THE MANAGER

One thing you did in the preceding pages was to log in as manager. The manager is the only account name that allows you to use the Product Maintenance selection on the global menu. The system manager is responsible for keeping track of account names and administering the space usage of a Fortune system. For further information on account names and system management, consult Understand Your Fortune System.

The Global Menu

Now that you have logged in, you can see the global menu which is the first full screen display you'll see each time you log in. The global menu is the menu for the entire Fortune system and a copy of it is shown below. It lists all the application software and utilities available for the Fortune system.

Examine the global menu for a minute. Notice that it is divided into six areas. Each area contains a list for a category of applications available for use on your Fortune system. Multiplan is in the PROFESSIONAL TOOLS category in the upper middle section. In the following pages you'll be using selections from the SYSTEM TOOLS and TRAINING/EDUCATION areas.

When you add an application to your Fortune system, that name becomes bright on the global menu. You'll see this happen in the next few pages when you copy Multiplan onto your system.

HOW TO USE THE GLOBAL MENU

To the left of each selection on the global menu is a code that identifies the selection. To make a selection, type the code, which consists of a letter and a numeral, and press (RETURN). If the selection is available on your system, you may see a list of choices on the screen.

FORTUNE SYSTEMS GLOBAL MENU		
<u>BUSINESS APPLICATIONS</u>	<u>PROFESSIONAL TOOLS</u>	<u>ELECTRONIC OFFICE TOOLS</u>
B1 Business Systems	P1 Multiplan	E1 FOR:WORD
B2 Business Surveys	P2 Color Graphics	E2 Record Processing
B3 Business Graphics	P3	E3 Automated Calendar
B4	P4	E4
B5	P5	E5
B6	P6	E6
<u>COMMUNICATIONS</u>	<u>TRAINING/EDUCATION</u>	<u>SYSTEM TOOLS</u>
C1 Async	T1 Topic Introduction	S1 System Utilities
C2 Bisync	T2 Amusements	S2 System Management
C3 Local Network	T3 Operator Training	S3 Languages
C4 X.25	T4 C.A.I. Training	S4 TOOL
C5 SNA/SDLC	T5 Demonstrations	S5 Product Maintenance
C6	T6	S6
Store name and phone Enter selection and press (RETURN) :		Press (HELP) for assistance

The global menu lists your available applications.

Step	Screen Says	You Type	Comments
	This flexible disk is labelled: Multiplan 1000772-01 Volume 1 (date)		This message tells you what the disk contains. If you inserted the training disk by mistake, take it out now and put it in the Master Disk.
5	Proceed with installation? (y/n)	y	
	Copy phase of Multiplan installation in progress...		
	Menu update phase of Multiplan installation in progress....		This process brightens the Multiplan selection on the global menu.
	Multiplan installation successfully completed.		
6	Press <u>RETURN</u> for menu selection or select ahead		
	PRODUCT MAINTENANCE SELECTION:		
			Multiplan is now installed on your hard disk. Go on to the next procedure to install the training documents.

Installing the Multiplan Training Disk

To help you learn about Multiplan, we've included a training disk with worksheets on it. We'll be referring to them in the procedure charts and you'll work with them throughout this guide. Through the training, you can become comfortable with the keyboard, learn where the special keys are, and learn how to communicate with Multiplan through commands. Each worksheet is designed so you can perform particular actions on it that will help you build upon your skills. Don't worry about making mistakes; that's part of the training process. The documents on the training disk will not be seen by anyone other than you.

Once you are familiar with how Multiplan works, you'll be using all the features and functions on your own worksheets.

Now you are ready to install the training disk. Locate the Training Disk in the plastic pocket in the back of the binder and remove it with its envelope. Be logged in as manager, then use the procedure below.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 1 !	! FORTUNE SYSTEMS -	!	! s5	!	! (RETURN)	! To install an
!	! GLOBAL MENU	!	!	!	!	! application, use
!	!	!	!	!	!	! s5 from the global!
!	!	!	!	!	!	! menu.
!	!	!	!	!	!	!
!	! Product Maintenance	!	!	!	!	!
!	!	!	!	!	!	!
! 2 !	! PRODUCT MAINTENANCE	!	! i	!	!	!
!	! SELECTION:	!	!	!	!	!
!	!	!	!	!	!	!
! 3 !	! Install a product	!	!	!	!	! This selection is
!	!	!	!	!	!	! highlighted on
!	!	!	!	!	!	! the menu.
!	!	!	!	!	!	!
! 4 !	! Fortune Systems	!	!	!	!	! (RETURN)
!	! Corporation	!	!	!	!	!
!	! Product Maintenance	!	!	!	!	!
!	!	!	!	!	!	!
!	! Please insert	!	!	!	!	! Open the flexible
!	! flexible disk	!	!	!	!	! disk drive door
!	! volume 1. Press	!	!	!	!	! and insert the
!	! (RETURN):	!	!	!	!	! Master Disk.

!Step!	Screen Says	You Type	Comments
5	This flexible disk is labelled: Multiplan Training Files 1000772-01 Volume 1 (date)	(RETURN)	This message tells you what the disk contains.
6	Proceed with installation? (y/n)	y (RETURN)	
	Copy phase of Multiplan Training Files in progress....		
	Menu update phase of Multiplan Training Files in progress....		This process brightens the training selection on the global menu.
	Multiplan Training Files installation successfully completed.		
7	Press (RETURN) for menu selection or select ahead	(RETURN)	
	PRODUCT MAINTENANCE SELECTION:		The training doc- uments are now in place. Go on to the next pro- cedure to make copies of both Multiplan and the training files.

Copying Your Disks

Make a copy of your application software and training information from your hard disk now. You should always have a backup copy of your master disk and training disk in case of an operator or machine error.

You still need to be logged with the manager account name. At the end of this procedure you'll log out, and log back in again with your own account name.

Get out two blank disks and a disk label for each one. The disks must be formatted before you begin backup. Refer to Meet Your Fortune System or use the procedure in Preparing an Archive Disk in part 6 of this guide.

:Step:	Screen Savs	You Type	Comments
:	:	:	:
:	: FORTUNE SYSTEMS	:	:
:	: GLOBAL MENU	:	:
:	: SYSTEM TOOLS	:	:
:	:	:	:
: 1	: S5 Product	: s5	: (RETURN)
:	: Maintenance	:	:
:	:	:	:
:	: PRODUCT MAINTENANCE	:	:
: 2	: Backup existing	: b	: (RETURN)
:	: product	:	:
:	:	:	:
:	: PRODUCT SELECTION	:	:
:	: MENU	:	:
:	: Enter selection and	:	:
:	: press (RETURN):	:	:
:	:	:	:
: 3	: Multiplan	: p1	: (RETURN) Selects Multiplan
:	:	:	: from the list of
:	: Fortune Systems	:	: applications.
:	: Corporation Product	:	:
:	: Maintenance	:	:
:	:	:	:
: 4	: Do you want to back-	:	:
:	: up Multiplan? (y/n):	: y	: (RETURN)

!Step!	Screen Says	You Type	Comments
5	Please label a blank flexible disk: Multiplan 1000772-01 Volume 1 (date)		Put this information on a disk label with the word "backup" and attach it to the disk. This identifies the disk for you.
	Insert the disk into drive #0. Press <u>RETURN</u> :		Open the disk drive door and put in the disk. Be sure to use an empty disk.
6		<u>RETURN</u>	
	Flexible disk being formatted.		Messages report to you about the copy process.
	Flexible disk file system being installed.		
	Copy phase....		
	Multiplan backup is successfully completed. Press <u>RETURN</u> for menu or select ahead.		
7		<u>RETURN</u>	
	FORTUNE SYSTEMS GLOBAL MENU		Go back to step 1 of this procedure and do the same thing for the training disk. This time, type in PLT when you are asked "Enter Selection & Press <u>RETURN</u> ."

Step	Screen Says	You Type	Comments
			Now you need to move out of the global menu to log in again with your own name.
8		CANCEL	
9	Type in your name and press RETURN	newuser RETURN	Type "newuser" for your name to give yourself an account name.
10	Type in your new account name and press RETURN	(account name) RETURN	Use any account name you want, your last name is a good choice.
11	Do you want a password (y/n)?	n RETURN	Don't use a password now.
12	Your new account has been created. Press RETURN to try it out.		Now you'll go back to the beginning and log in with your account name.
13	Type in your name and press RETURN	(account name) RETURN	You must type the account name exactly as you did in step 10.
14	__ % of the available space is in use. GLOBAL MENU		Notice that you see this message each time you log in. Now you're ready to go on and do your training.

Selecting Multiplan for Training

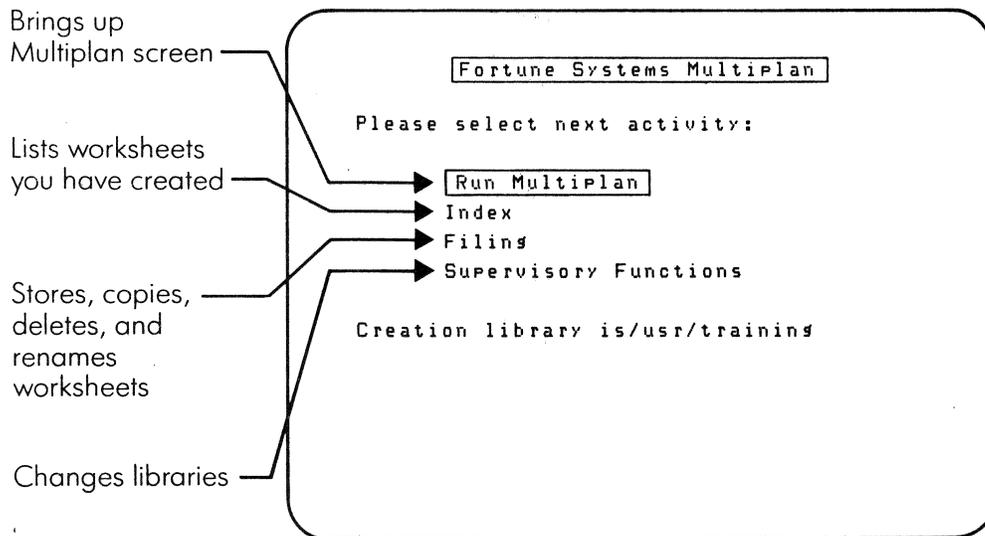
Now you're ready to move from the global menu to Multiplan to do your training. The procedure below will show you how to choose operator training. The process of choosing operator training also allows you to use the worksheets you copied from the training disk.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! GLOBAL MENU	! t3	!
!	!	!	!
! 2 !	! TRAINING/EDUCATION	!	! Training always
!	! T3 Operator Training	!	! begins here.
!	!	!	!
! 3 !	! OPERATOR TRAINING	!	!
!	! 1. Business	!	!
!	! Applications	!	!
!	!	!	!
! 4 !	! 3. Multiplan	!	! You've selected
!	!	!	! Multiplan from the
!	!	!	! list.
!	!	!	!
!	! Fortune Systems	!	! This is the
!	! Multiplan	!	! Multiplan menu.
!	! Run Multiplan	!	!
!	!	!	!

The Multiplan Menu Screen

The Multiplan menu is the first screen displayed after the global menu. Everything you want to do in Multiplan begins here. The menu lists activities you can choose from to perform Multiplan functions.

Different activities are available to use depending on whether you want to work on the Multiplan screen or perform some maintenance activities.



Multiplan offers a variety of activities.

Multiplan offers a variety of activities.

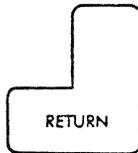
The Cursor

Notice that on the Multiplan menu screen the line for Run Multiplan has a bright rectangle around it. This is called a cursor. The letters inside it are displayed dark on a light background instead of light on a dark background, like the other characters on the screen. This is called reverse video. The activity you want is marked by the cursor. You can move the cursor to the any selection on the menu in a number of ways. Try moving the cursor from activity to activity with each one of the following keys to find the most comfortable one for you to use.

Key you press

What it does

(SPACE BAR)



Moves the cursor from the top to the bottom of the list, one item at a time. It jumps back to the top again after reaching the bottom of the list.

Does the same thing as the space bar.



Moves the cursor up one choice at a time.



Moves the cursor down one choice at a time.

R Run Multiplan
I Index
F Filing
S Supervisory
 Functions

Moves the cursor to the activity that starts with same letter. You can type the letters in either capitals or lower case.

The Execute key is another important key when using the Multiplan menu. Once you have positioned the cursor over the activity you want, press (EXECUTE) to move to the appropriate screen.

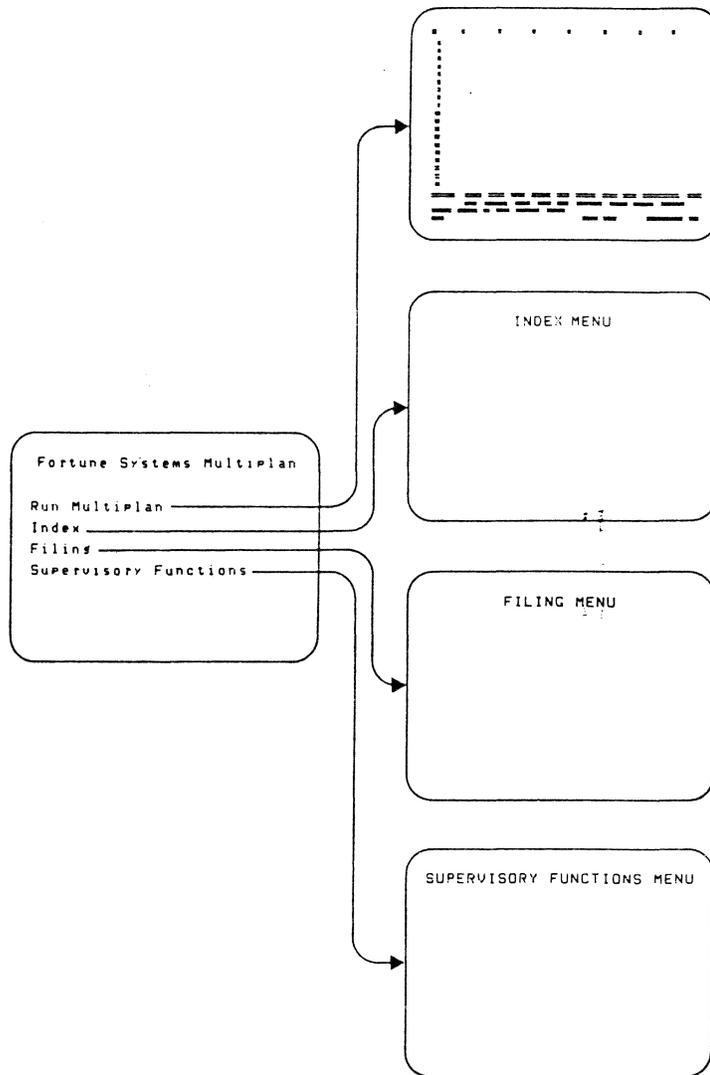
Screens Get You to Work

Multiplan's screens allow you to progress from one activity to another giving choices of activities. Move from one to another until you reach the screen where you want to work.

Take a quick look at some screens.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! Fortune Systems	! (SPACE BAR)	! Moves the cursor
! !	! Multiplan	! !	! down.
! !	! Run Multiplan	! !	! !
! !	! !	! !	! !
! 2 !	! Index	! (EXECUTE)	! This is the index
! !	! !	! !	! menu screen.
! !	! !	! !	! !
! 3 !	! INDEX MENU	! (CANCEL)	! Returns to the
! !	! !	! !	! Multiplan menu.
! !	! !	! !	! !
! 4 !	! Fortune Systems	! s	! Moves the cursor
! !	! Multiplan	! !	! to another menu
! !	! Run Multiplan	! !	! selection.
! !	! !	! !	! !
! 5 !	! Supervisory Functions!	! (EXECUTE)	! This is the super-
! !	! !	! !	! visory functions
! !	! !	! !	! menu.
! !	! !	! !	! !
! 6 !	! SUPERVISORY FUNCTIONS!	! (CANCEL)	! Returns to the
! !	! !	! !	! Multiplan menu.
! !	! !	! !	! !
! 7 !	! Fortune Systems	! (EXECUTE)	! Brings up the
! !	! Multiplan	! !	! Multiplan screen.
! !	! Run Multiplan	! !	! You'll see this
! !	! !	! !	! more later.

Now that you see the Multiplan screen, spend some time looking at it. The upper portion, numbered along the left side and the top, is where you will see your worksheet as you build it. The lower portion, the last four lines on the screen, shows you the Multiplan commands, messages from Multiplan, and information about the current status of your work.



Multiplan's screens get you to work.

Exit and Return

Besides moving into Multiplan you need to know how to leave and return. This is a process that you'll be doing regularly as you use the application.

LEAVING MULTIPLAN

Follow the steps below to leave Multiplan training.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! (Multiplan screen)	! qy	! Chooses QUIT com-	!
!	!	!	! mand and yes to	!
!	!	!	! confirm it. Re-	!
!	!	!	! turns to the Mul-	!
!	!	!	! tiplan menu.	!
!	!	!	!	!
! 2 !	! Fortune Systems	!	! (CANCEL)	!
!	! Multiplan	!	!	!
!	! Run Multiplan	!	!	!
!	!	!	!	!
! 3 !	! GLOBAL MENU	!	!	!
!	!	!	!	!

RETURNING TO MULTIPLAN

When you want to return to your training, follow these steps.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! GLOBAL MENU	! t3	!	!
!	!	!	!	!
! 2 !	! TRAINING/EDUCATION	!	! (RETURN)	! Chooses training.
!	! T3 Operator Training	!	!	!
!	!	!	!	!
! 3 !	! OPERATOR TRAINING	!	! (2) ↓	!
!	! 1. Business	!	!	!
!	! Applications	!	!	!
!	!	!	!	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 4 !	! 3. Multiplan	!	! (RETURN)	!	! You have chosen	!
!	!	!	!	!	! the Multiplan	!
!	!	!	!	!	! menu.	!
!	!	!	!	!	!	!
!	! Fortune Systems	!	!	!	!	!
!	! Multiplan	!	!	!	!	!
!	! Run Multiplan	!	!	!	!	!
!	!	!	!	!	!	!

Deleting the Training Information

After you have completed your operator training, remove the training models from your Fortune 32:16. Since you no longer need this information, it can be deleted from your computer, making room for your day-to-day operating files.

Complete the procedure below to delete the training models. You must be logged in as "manager" to do this procedure.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	! FORTUNE SYSTEMS	!	!	!	!	!
!	! GLOBAL MENU	!	!	!	!	!
! 1 !	! S5 Product	!	!	!	! To delete your	!
!	! Maintenance	!	s5	(RETURN)	! training database,	!
!	!	!	!	!	! begin by selecting	!
!	!	!	!	!	! s5 from the global	!
!	!	!	!	!	! menu.	!
!	!	!	!	!	!	!
!	! PRODUCT MAINTENANCE	!	!	!	!	!
! 2 !	! Delete existing	!	d	(RETURN)	!	!
!	! product	!	!	!	!	!
!	!	!	!	!	!	!
!	! PRODUCT SELECTION	!	!	!	!	!
!	! MENU	!	!	!	!	!
! 3 !	! Enter selection and	!	!	!	!	!
!	! press (RETURN)	!	plt	(RETURN)	! Type plt to indi-	!
!	!	!	!	!	! cate Multiplan	!
!	!	!	!	!	! Training Files.	!
!	!	!	!	!	!	!
!	! Do you want to delete	!	!	!	!	!
!	! Multiplan Training	!	!	!	!	!
!	! Files (y/n)	!	!	!	!	!
!	!	!	!	!	!	!
! 4 !	!	!	y	(RETURN)	! Press n if you	!
!	! File removal	!	!	!	! have made a	!
!	! phase.....	!	!	!	! mistake. When	!
!	! Menu update	!	!	!	! this step is	!
!	! successful	!	!	!	! finished, you will	!
!	!	!	!	!	! no longer be able	!
!	!	!	!	!	! to use the train-	!
!	!	!	!	!	! ing documents	!
!	!	!	!	!	!	!
!	!	!	!	!	!	!
!	! GLOBAL MENU	!	!	!	!	!

Selecting Multiplan After Training

Once you have completed your Multiplan training you'll be ready to develop worksheets of your own. At that time use the following procedure to enter Multiplan. The training models will remain accessible to new users who should enter Multiplan through training, as you learned earlier.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! GLOBAL MENU	! pl	! <u>EXECUTE</u>	! Selects Multiplan !
!	!	!	!	! from the Profes- !
!	!	!	!	! sional Tools cate- !
!	!	!	!	! gory. !
!	!	!	!	!
! 2 !	! Fortune Systems	!	!	! This is the Multi- !
!	! Multiplan	!	!	! plan menu. !
!	! Run Multiplan	!	!	!

Turning Off Your Fortune 32:16

When you have completed your day's work, you may want to turn off your Fortune 32:16 completely. DO NOT just turn it off. You must follow a procedure called shutdown to do it correctly and avoid damage to your Fortune system or to your documents. This is especially important if you have a multiuser system. Use this procedure to shutdown your system.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! FORTUNE SYSTEMS	!	s2	!	(RETURN) ! Chooses System	!
!	! GLOBAL MENU	!		!	! Management.	!
!	!	!	!	!	!	!
!	2 ! SYSTEM MANAGEMENT	!	30	!	(RETURN) ! Use the Shutdown	!
!	!	!	!	!	! computer	!
!	!	!	!	!	! selection.	!
!	!	!	!	!	!	!
!	! Fortune Systems 32:16!	!	!	!	! The screen warns	!
!	! Shut Down (takes	!	!	!	! you that any other!	!
!	! about 30 seconds) ...!	!	!	!	! people using your	!
!	!	!	!	!	! system concur-	!
!	!	!	!	!	! rently will also	!
!	!	!	!	!	! be shutdown.	!
!	!	!	!	!	!	!
!	3 ! Do you want to	!	yes	!	(RETURN) ! Enter yes if you	!
!	! continue?	!	!	!	! want to shutdown.	!
!	!	!	!	!	!	!
!	! Software shut down	!	!	!	!	!
!	! starting, please wait!	!	!	!	!	!
!	! Software shut down	!	!	!	!	!
!	! complete	!	!	!	!	!
!	! Hardware shut down	!	!	!	!	!
!	! starting, please wait!	!	!	!	!	!
!	! Hardware shut down	!	!	!	!	!
!	! complete	!	!	!	!	!
!	! Please turn the	!	!	!	! You can now turn	!
!	! Fortune 32:16 off	!	!	!	! the switch to off.!	!

4 A Multiplan Sampler

Before you begin your training take a sneak preview of some of Multiplan's capabilities. In this section you'll look at a sample worksheet and use HELP, Multiplan's built-in tutor. You'll manipulate the sample worksheet to see what some of Multiplan's features can do.

When You Need Help

Your training disk contains descriptions of all Multiplan commands, or directions. You can display this information on the screen by pressing the help key which is located at the upper left corner of the keyboard.

To view information about a command on the screen, simply select the command and press HELP. If you are already using a command, you can still get help by pressing HELP. After viewing the command description, press R for Resume or CANCEL to go back to your work.

The bottom portion of the HELP screen has a new set of commands or choices. These are used only with the HELP command and work as follows:

<u>Press</u>	<u>For</u>	<u>Explanation</u>
a	Application	Lists common problems and solutions.
c	Commands	Explains the use of Multiplan commands.
e	Editing	Explains the use of editing keys.
f	Formulas	Lists Multiplan functions and their uses.
d	Keyboard	Explains key functions on other keyboards.
n	Next	Goes to the next page of HELP.
p	Previous	Goes to the previous page of HELP.
r	Resume	Returns to the worksheet
s	Start	Goes to the first page of HELP.

Try this procedure, while you have the "eds" worksheet on your screen. You'll look at the descriptions of a few commands. Don't hesitate to experiment with the Help key. Read the help information on all the commands. Notice how you can cancel a command at any time by pressing CANCEL, which is located to the right of the upper row of keys.

<u>!Step!</u>	<u>Screen Says</u>	<u>! You Type</u>	<u>! Comments</u>	<u>!</u>
!	!	!	!	!
! 1 !	! COMMAND: Alpha...	! c	! Typing c chooses	!
!	!	!	! the COPY command.	!
!	!	!	!	!

Tailoring a Worksheet

In this guide you'll learn to use many Multiplan features to tailor a worksheet to fit your requirements. The formatting features, for example, allow you to create clear, legible, and graphically pleasing results.

To see some examples of Multiplan's features, use the procedure below. You'll use some commands to do this. Later you'll learn more about the commands. Be sure to follow this procedure exactly. Notice how the changes you make show the information more clearly.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: Alpha ...	! cd	! You've chosen the ! ! COPY DOWN command.!
! 2 !	! COPY DOWN number of ! ! cells: Starting ! ! at: R7C5	! 11 <u>EXECUTE</u>	! See how the ! ! average sales for ! ! each month is ! ! shown in column 5.!
! 3 !	! COMMAND: Alpha...	! (3) 	! Moves the cell ! ! pointer, the ! ! bright rectangle, ! ! to the left. !
! 4 !		! wb	! Now you're using ! ! the WINDOW BORDER ! ! command. !
! 5 !	! WINDOW change border ! ! in window number: 1 !	! <u>EXECUTE</u>	! A line is drawn ! ! around the ! ! worksheet. !
! 6 !	! COMMAND: Alpha ...	! wst	! You've selected ! ! the WINDOW SPLIT ! ! TITLES command. !
! 7 !	! WINDOW SPLIT TITLES: ! ! # of rows: 6 ! ! # of columns: 1 !	! <u>EXECUTE</u>	! The worksheet ! ! divides into 4 ! ! enclosed sections.!

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 8 !	! COMMAND: Alpha...	! (8) ↓	! The information	!
!	!	!	! for September	!
!	!	!	! moves onto the	!
!	!	!	! screen. Press	!
!	!	!	! the down arrow	!
!	!	!	! several times to	!
!	!	!	! see this happen	!
!	!	!	! again.	!
!	!	!	!	!
! 9 !	! COMMAND: Alpha...	! q	! Leave the work-	!
!	!	!	! sheet.	!
!	!	!	!	!
! 10 !	! QUIT	!	!	!
!	! Enter Y to confirm	! y	!	!
!	!	!	!	!
!	! Fortune Systems	!	!	!
!	! Multiplan	!	!	!
!	! Run Multiplan	!	!	!
!	!	!	!	!



The Basics

When you use Multiplan, you'll want to create worksheets that successfully tackle the record keeping problems you need to solve. To do this, you first need a solid understanding of designing models, commands, and other tools provided by the application.

In Part 2, you'll learn to build worksheets that fit your needs and to perform the most basic Multiplan operations, using the worksheets provided on the training disk. You'll learn

- About modeling concepts
- About Multiplan's screen
- How to load a worksheet
- How to use the cell pointer
- About the command lines and the information they contain
- How to enter characters and numbers on the screen
- How to use the edit cursor
- How to add and recalculate figures
- How to print your worksheets

5 Using Multiplan

Multiplan worksheets are developed from models which are designed to solve a problem. A model identifies a business problem, its elements and those factors you can control, and visually represents this. The Multiplan worksheet can show you the "what if" result of changing certain elements or factors. To build your models in Multiplan, you will use a grid structure called a worksheet and the commands. You may find models in business, in this manual, or you may design your own.

In the following procedures, you will examine modeling concepts, look more closely at Multiplan's screen format (worksheet, command lines), and load a sample worksheet.

1	2	3	4	5	
1	HONEST ED'S AUTORAMA				
2					
3	SALES ANALYSIS FOR 1982				
4					
5	MONTH	TOTAL SALES	% CHANGE	# CARS	AVG PRICE
6	=====				
7	January	\$273978.45	0%	165	\$1660.48
8	February	\$195297.52	-29%	182	\$1073.06
9	March	\$265132.97	36%	134	\$1978.60
10	April	\$277367.08	5%	206	\$1346.44
11	May	\$256397.89	-8%	145	\$1768.26
12	June	\$298937.73	17%	233	\$1282.99
13	July	\$327938.36	10%	255	\$1286.03
14	August	\$397637.66	21%	263	\$1511.93
15	September	\$427887.24	8%	259	\$1652.07
16	October	\$402925.24	-6%	261	\$1543.77
17	November	\$493843.44	23%	284	\$1738.89
18	December	\$529922.29	7%	311	\$1703.93

This sample worksheet solves the problem of record keeping, totaling, and averaging car sales. It also shows the percent of change month to month.

How Models Relate to Worksheets

A worksheet is the end result of a problem solution called a model in Multiplan. You develop models as you define a problem and the steps toward its solution.

These are the steps for developing a problem situation into a Multiplan worksheet.

- 1 Define the problem situation. Decide what problem you wish to solve using Multiplan. Be clear and concise. Remember, you don't have to solve all your problems on one worksheet. You may choose, for example, budgeting. You control your home budget by monitoring income and expenses. Defining these lets you see what happens to your budget if you use money for a special project.
- 2 Set goals for the model. In order to be effective, a Multiplan model must be focused on specific goals. These goals should be related to the factors you have control over. For example, a business controls its budget by controlling the number of people hired, and by changing the time of hiring. By defining controls, you can ask "what if" questions of Multiplan and can get the answers you need.
- 3 Look at the elements of the problem. Think the problem through and define the key elements. For example, some important problems of budgeting are cash inflow and outflow.
- 4 Consider the background of the problem. What has been left out in the past that makes this a problem today? Was company growth thoroughly considered in past budgeting?
- 5 Write down your thoughts on these topics. Keep track of your ideas as you work. Some ideas may be useful in other models.

- 6 Organize the worksheet. Consider and choose how rows and columns will correspond to the elements of the problem. Also, consider the mathematical formulas to use in solving the problem. You may decide, for example, to put your various income and expense categories in separate columns. You will need a formula that will add inflow and subtract outflow.

Once you have defined the problem, write down its elements and the formulas needed to solve it. Then draw a rough sketch of the way you want the finished sheet to look. Your model is now complete. It's time to create the Multiplan worksheet.

Honest Ed's Autorama

Sales Analysis for 1982

<u>Month</u>	<u>Total Sales</u>	<u>% Change</u>	<u># Cars</u>	<u>Avg Price</u>
Jan	\$273978.45	-	165	
Feb	\$195297.52		182	
Mar	\$265132.97		134	

1 HONEST ED'S AUTORAMA 2 3 4 5

2 =====

3

4 SALES ANALYSIS FOR 1982

5 =====

6 MONTH TOTAL SALES % CHANGE # CARS AVG PRICE

7 =====

8 January \$273978.45 - 165 \$1660.48

9 February \$195297.52 -28.72% 182 \$1073.06

10 March \$265132.97 \$0.36 134 \$1978.60

11 April \$277367.08 \$0.04 206 \$1346.44

12 May \$256397.89 -7.56% 145 \$1768.26

13 June \$298937.73 \$0.17 233 \$1282.99

14 July \$327938.36 \$0.10 255 \$1286.03

15 August \$397637.66 \$0.21 263 \$1511.93

16 September \$427887.24 \$0.08 259 \$1651.29

17 October \$402925.24 \$0.08 259 \$1651.29

18 November \$402925.24 \$0.08 259 \$1651.29

19 December \$402925.24 \$0.08 259 \$1651.29

Models contain ideas that become Multiplan worksheets.

How the Screen Is Organized

There are two parts to the Multiplan screen, and they are used for different purposes. The top part of the screen is the display area -- your view of the worksheet. The bottom part of is the control area, showing the available commands and their prompts, where the pointer is located, and other useful information.

THE DISPLAY AREA

The visual representation of your model in Multiplan is the worksheet. Multiplan worksheets have a maximum of 255 rows and 63 columns. The rows and columns form a grid structure. Because the screen is a window on the whole worksheet, it shows only a portion of the grid. The screen is automatically positioned at the top left corner of the worksheet. As you progress, you will learn how to view the rest of the sheet.

The grid concept lets you put information into imaginary boxes on the screen. Each intersection of a row and column in the grid forms a box called a cell.

ROWS AND COLUMNS

There are initially 19 numbers down the left side of the screen and 7 numbers across the top. The numbers at the top show where the columns are located. The numbers along the left side show where the rows are located. The number of columns on the screen can vary from 2 to 15, depending on column width.

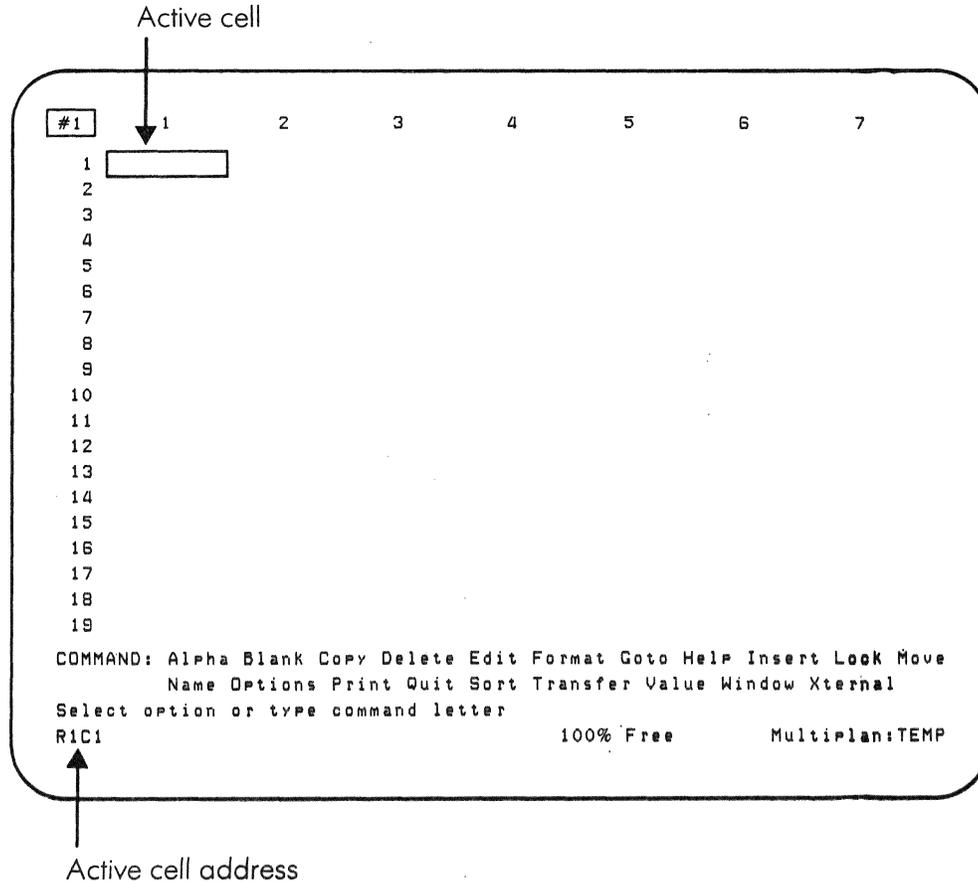
Every row is one character high, like the lines on a typed page. When you first view the Multiplan screen, each column is 10 characters wide. Later you will learn how to make any column vary from 3 to 32 characters wide.

CELL COORDINATES

The cells of the worksheet can be accessed by means of Multiplan's cell coordinate system of rows and columns. Each cell in your worksheet is identified by a row number and a column number. Rows are called R1, R2, R3, meaning rows 1, 2, and 3. Columns are called C1, C2, C3, referring to columns 1, 2, and 3.

For example, R1C1 is the cell coordinate for the cell located at the intersection of row 1 and column 1. This is the very upper left cell in the worksheet known as the HOME cell. Cell R255C63 is the very lower-right cell in the worksheet. You can refer to any cell in the worksheet by its coordinates. Cell coordinates are sometimes called cell references or cell addresses.

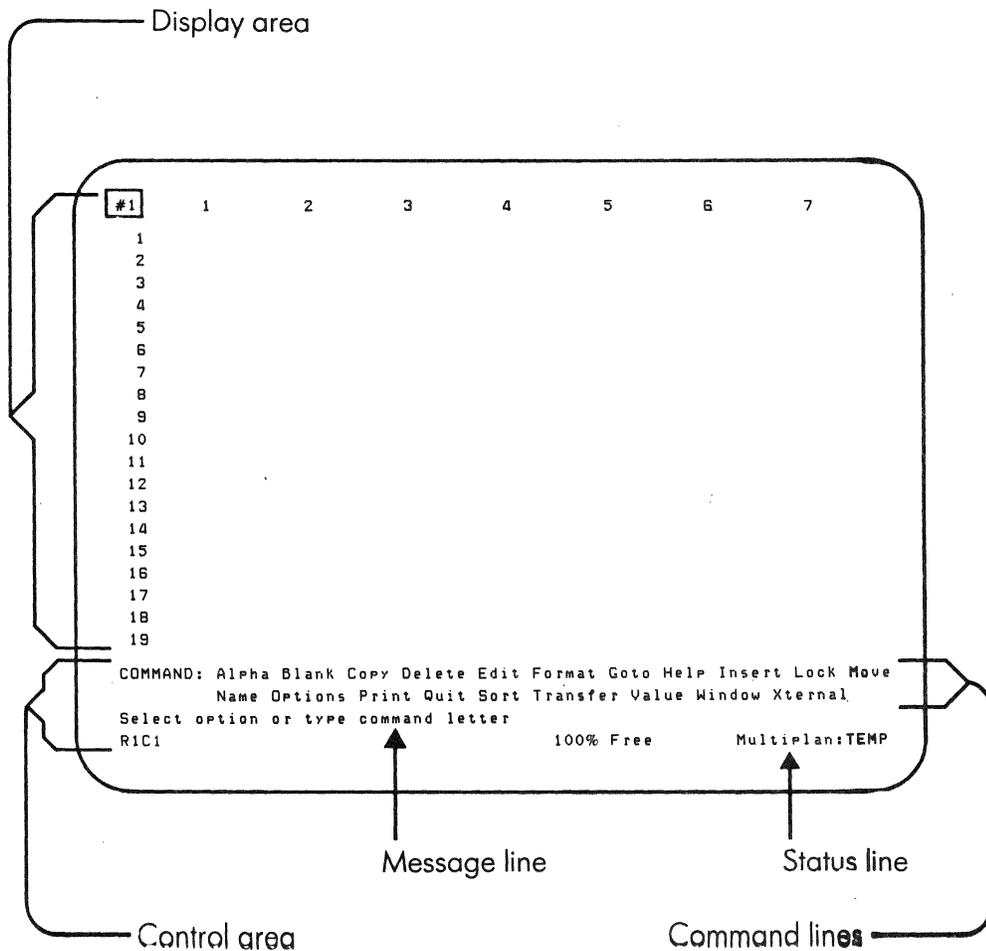
R1C1, the cell highlighted on the screen, is the active cell. You will always find the coordinates of the active cell displayed in the lower left corner of the screen. The active cell is the cell marked by the cell pointer.



The active cell is highlighted by the cell pointer. You can see the address of the cell at the bottom of the screen.

THE CONTROL LINES

Look at the control area. It has three parts that help you communicate with Multiplan. The bottom line of the screen is the status line. On the left it shows the location of the cell pointer, in the center is the percentage of space available, and on the right you see the name of the worksheet. Above the status line is the message line, where Multiplan communicates with you. It prompts you for information, and tells you what to do next. Above the message line are the two command lines, where you will select commands and enter command information.



The screen is divided into two areas. You do your work in the control area and see the results in the display area.

The Command Structure

To construct your worksheet, you will use various commands. Commands order and modify information, store and print results, or control the cell pointer. As you probably have noted, there are many commands available in Multiplan. Some will branch into subcommands, or options as shown in the illustration.

SELECTING A COMMAND

You can select a command in either of two ways. You can type the first letter of the command name, or you can use (RETURN), (TAB), (BACKSPACE), or (SPACE BAR) to move to a command's location on the command line and then press (EXECUTE). The brightly lit rectangle that highlights the commands is called the edit cursor or cursor. Whichever command is highlighted by the cursor is the one the computer currently recognizes.

Remember, to find out more information about a command, press (HELP).

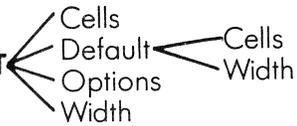
ALPHA

BLANK

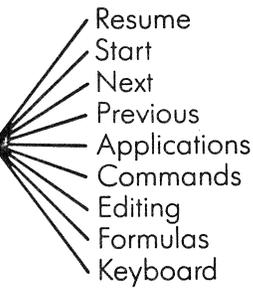
COPY  Right
Down
From

DELETE  Row
Column

EDIT

FORMAT  Cells
Default  Cells
Width
Options
Width

GOTO  Name
Row-col
Window

HELP  Resume
Start
Next
Previous
Applications
Commands
Editing
Formulas
Keyboard

INSERT  Row
Column

LOCK  Cells
Formulas

MOVE  Row
Column

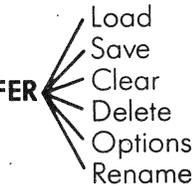
NAME

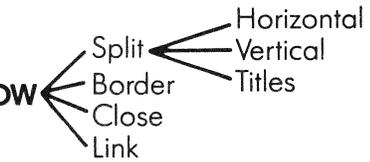
OPTIONS  Recalc
Mute
Iteration

PRINT  Printer
File
Margins
Options

QUIT

SORT

TRANSFER  Load
Save
Clear
Delete
Options
Rename

WINDOW  Split  Horizontal
Vertical
Titles
Border
Close
Link

XTERNAL  Copy
List
Use

These are the commands and their options.

Loading a Worksheet

With Multiplan, you can create, change, store, recall and delete worksheets. Soon you'll be developing your own models and worksheets. For the present, several worksheets have been saved on your Multiplan training disk to help you become familiar with the application. You will be working with these worksheets in many of the following procedures.

Loading a worksheet does not mean that it is no longer on the disk. The worksheet is being copied from the disk. Think of LOAD as filling the cells of the screen with information. Even if you make a mistake or turn the power off, the worksheet will still be on the disk.

The letter t, for TRANSFER, tells Multiplan to prepare the screen for a change. L, for LOAD, means place another worksheet into memory. To save a worksheet permanently, you must place a copy on disk with the TRANSFER SAVE command. If you don't plan to save the worksheet currently on the screen, loading another worksheet will clear the screen and delete anything that has not been previously saved.

In the next procedure, you will clear the screen and put a new worksheet on the screen using the TRANSFER command.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! tc	! Selects the TRANS-	!
! :	! :	! :	! FER CLEAR command.	!
! :	! :	! :	! :	!
! 2 !	! TRANSFER CLEAR:	! y	! Yes clears the	!
! :	! Enter Y to confirm	! :	! screen.	!
! :	! :	! :	! :	!
! 3 !	! COMMAND: ...Transfer	! tl	! Begins the TRANS-	!
! :	! :	! :	! FER LOAD command.	!
! :	! :	! :	! :	!
! 4 !	! TRANSFER LOAD file-	! invoice	! Enters the work-	!
! :	! name. Enter a	! (EXECUTE)	! sheet named	!
! :	! filename, or use	! :	! invoice.	!
! :	! direction keys to	! :	! :	!
! :	! view directory.	! :	! :	!
! :	! :	! :	! :	!

#1	1	2	3	4	5
1		Sam's Sweet Shoppe			
2	Item #	Description	Qty	Price/ea	TOT Price
3	1	Candy Bars	50	0.25	\$12.50
4	2	Chewing Gum	40	0.30	12.00
5	3	Nuts	60	0.21	12.60
6					0.00
7					0.00
8		Total	150		\$37.10
9					
10		Tax	6.50%		2.41
11		Total Due			\$39.51
12					
13					
14					
15					
16					
17					
18					
19					

You use the TRANSFER LOAD command to bring this worksheet onto the screen.

6 Moving Around the Worksheet

As you begin to enter information into the worksheet, you'll need to move the cell pointer to various locations. Multiplan provides certain keys and commands for that purpose.

In this section, you'll learn about the cells that make up the worksheet, the cell pointer that addresses those cells, and how to move around the screen. You'll learn about horizontal and vertical movement, how to automatically continue the cell pointer's motion, to scroll the worksheet, and to use the GOTO command.

Moving the Cell Pointer

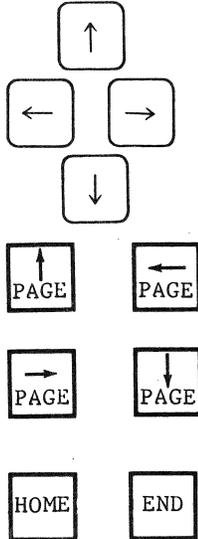
Information is entered into a worksheet one cell at a time. The cell pointer shows you the location of the active cell. The address of the active cell is always shown on the bottom left corner of the screen.

The cell pointer is controlled by the arrow keys, located at the lower right of your keyboard, and by six function keys. You can move the cell pointer up, down, left or right within the boundaries of the worksheet using the arrow keys.

Certain function keys move the cell pointer to specific locations. The Home key moves the cell pointer back to R1C1 from any location. The End key moves the cell pointer to the last cell on the sheet with information in it. Some others scroll the cell pointer over the worksheet. The page keys are used to move over a worksheet, giving you a view on the screen of any portion of the worksheet.

The GOTO command moves the cell pointer quickly over the worksheet. You can use GOTO to send the pointer to any cell you specify.

Key



Use

Moves the pointer vertically or horizontally in the direction of the arrow.

Moves the pointer, a section at a time, across the worksheet in the direction of the arrow.

The Home key moves the pointer to the upper left corner of the worksheet. The End key moves the pointer to the last active cell on the worksheet, nearest the lower right corner.

GOTO

This command moves the pointer to the cell you specify.

This procedure shows the various ways you can move the cell pointer using the arrow keys, (HOME) and (END).

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: Alpha...	! t1	! Selects the TRANS-
! !	! !	! !	! FER command and
! !	! !	! !	! the LOAD option.
! 2 !	! TRANSFER LOAD file-	! pointer (EXECUTE)	! Enters in the name!
! !	! !	! !	! of the pointer
! !	! !	! !	! sheet. Use (BACK
! !	! !	! !	! SPACE) to correct
! !	! !	! !	! any errors.
! 3 !	! COMMAND: Alpha...	! 	! Moves the pointer
! !	! !	! !	! to #1, cell R2C1.
! !	! !	! !	! !
! !	! !	! (3) 	! (3) means to press!
! !	! !	! 	!  three times!
! 4 !	! !	! !	! Moves the pointer
! !	! !	! !	! to #2, cell R3C4.
! !	! !	! !	! !
! 5 !	! !	! (4) 	! Moves the pointer
! !	! !	! (2) 	! to #3, cell R7C2.
! !	! !	! !	! !
! 6 !	! !	! (3) 	! Moves the pointer
! !	! !	! (3) 	! to #4, cell R10C5.
! !	! !	! !	! !
! 7 !	! !	! (4) 	! Moves the pointer
! !	! !	! (2) 	! to #5, cell R14C3.
! !	! !	! !	! !
! 8 !	! !	! (HOME)	! The pointer moves
! !	! !	! !	! to the home cell,
! !	! !	! !	! R1C1.
! !	! !	! !	! !
! 9 !	! !	! (END)	! The pointer moves
! !	! !	! !	! to cell R14C5.
! !	! !	! !	! !
! 10 !	! !	! tcy	! Clears the screen!

Scrolling the Worksheet

Movement over the worksheet using the arrow and page keys is called scrolling. Scrolling is like scanning the horizon with binoculars. Landmarks move into your area of vision and out again. Rows and columns do the same as you scroll through the worksheet. They move on or off the screen in the direction you're scrolling.

THE ARROW KEYS

You can scroll the worksheet up, down, right, or left by moving the cell pointer to the edge of the display with the appropriate arrow key. Pressing the arrow key again causes the cell pointer to move out of view for a moment and the screen to be redrawn, showing a new view of the worksheet. Pressing the arrow key continuously causes the screen to rapidly display new rows or columns.

THE AUTOMATIC REPEAT FEATURE

The keyboard has an automatic repeat feature. When a key is pressed and held down, the keystroke is repeated 15 times for each second the key is held. When the pointer reaches the edge of the sheet, a beep warns you that the pointer can't be moved any farther.

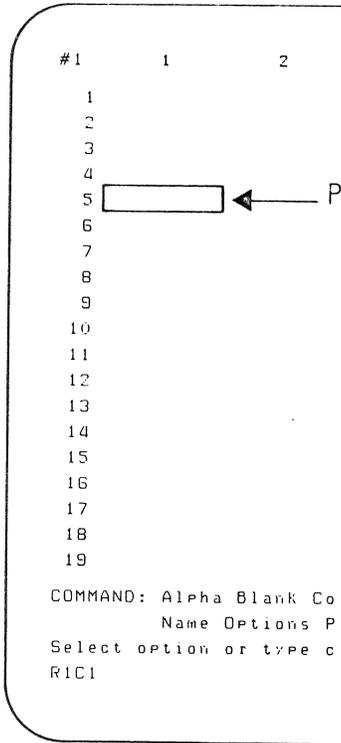
THE PAGE KEYS

Four function keys -- (PAGE →), (PAGE ↑), (PAGE ↓), and (PAGE ←) -- move the pointer automatically in the direction of the arrow to the next full screen of the worksheet in a single keystroke. You don't have to move the pointer all the way to the boundaries of the screen for scrolling to take place.

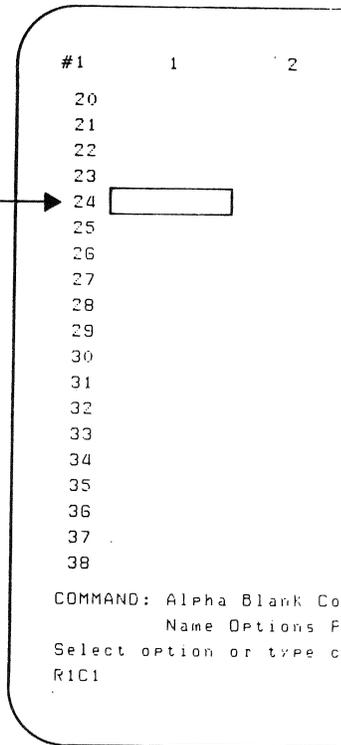
In the procedure, you will scroll the worksheet vertically and horizontally, using the arrow and page keys.

!Step!	Screen Says	You Type	Comments
1	COMMAND: ...TRANSFER	t1	Selects TRANSFER LOAD.
2	TRANSFER LOAD file-name: Enter a filename, or use direction keys to view directory.	scroll	Enters the name of the scroll worksheet. Correct errors with (BACK SPACE).
3		EXECUTE	Completes the command. The scroll sheet is displayed.
4	COMMAND: Alpha...	(6) 	Moves the pointer to the right edge of the display.
5		 Page	The worksheet scrolls horizontally.
6		(6) 	Moves the pointer to the left edge of the display.
7		(18) 	Moves the pointer to the bottom of the display.
8		 Page	Watch the worksheet scroll up.
9			The pointer is now in row 38. Press  , hold it down while you count to 3 and release the key. The pointer moves up. When it gets to row 1, there's a long beep.

This

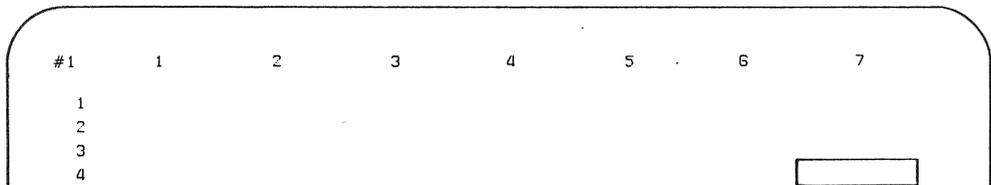


Becomes this



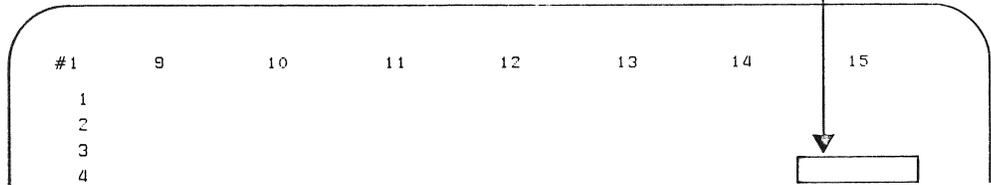
Rows scroll up from the bottom of the screen.

This



Pointer stays on screen.

Becomes this



Columns scroll to the left.

The GOTO Command

There are other ways to move to a particular cell in the worksheet than by scrolling with the arrow and page keys. Using the GOTO command, you can jump quickly to any cell in the worksheet. There are three ways to use GOTO. Using the options you can move to

- A row-column
- A name
- A window

The GOTO ROW-COLUMN command moves the cell pointer to whatever cell you specify. If you are close to the cell you need, use the arrow keys to move the pointer. But when you need to move the pointer to an undisplayed part of the worksheet, it's faster to use GOTO.

When you select GOTO ROW-COLUMN, Multiplan asks for the following information:

GOTO ROW: ? COLUMN: ?

The row and column numbers of the active cell are automatically displayed. This makes it easier if you wish to keep the pointer in the same row or column. However, if you need to change the displayed row or column numbers, type over these with the row or column number you want.

Try the following procedure to learn more about GOTO ROW-COLUMN. You will learn about the other two options of GOTO later. Remember to press (RETURN) to move from category to category. Press (EXECUTE) to complete the command.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...TRANSFER	!	! t1	!	! Selects TRANSFER	!
!	!	!	!	!	! LOAD.	!
!	!	!	!	!	!	!
!	2 ! TRANSFER LOAD file-	!	! goto	!	! <u>(EXECUTE)</u> Loads the goto	!
!	! name: Enter a	!	!	!	! worksheet.	!
!	! filename:	!	!	!	!	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Goto	!	! g	!	! Selects the GOTO	!
!	!	!	!	!	! command.	!

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 4 !	! GOTO: Name Row-Col	! r	! Selects the row-
!	! Window	!	! column option.
!	!	!	!
!	! Select option or type!	!	!
!	! command letter.	!	!
!	!	!	!
! 5 !	! GOTO row: 1 column: 1!	! 20	! (EXECUTE) ! The pointer jumps
!	! Enter a number.	!	! to R20C1.
!	!	!	!
! 6 !	! COMMAND: ...Goto	! gr	! Selects GOTO ROW-
!	!	!	! COLUMN again.
!	!	!	!
! 7 !	! GOTO row: 20 column: 1!	! 5	! (RETURN) ! The cursor jumps
!	! Enter a number.	!	! to the column
!	!	!	! category.
!	!	!	!
! 8 !	! GOTO row: 5 column: 1!	! 5	! Enters the new
!	!	!	! value.
!	!	!	!
! 9 !	! GOTO ROW: 5 column: 5!	! (2)	! (RETURN) ! Moves the cursor
!	!	!	! back and forth
!	!	!	! between the row
!	!	!	! and column
!	!	!	! categories.
!	!	!	!
! 10 !	!	!	! (EXECUTE) ! Completes the
!	!	!	! command. The
!	!	!	! pointer jumps to
!	!	!	! R5C5.
!	!	!	!
! 11 !	! COMMAND: ...Goto	! gr 255	! (RETURN) ! Selects GOTO and
!	!	! 63	! (EXECUTE) ! moves the pointer
!	!	!	! to the far corner
!	!	!	! of the sheet.
!	!	!	!

```

#1      1      2      3      4      5      6      7
 1  [ ]
 2
 3
 4
 5
 6
 7
 8
 9
10
11
12
13
14
15
16
17
18
19
20
GOTO row 1      column 1
Enter a number
RIC1                                100% Free      Multiplan:TEMP

```

Edit cursor

GOTO moves the cell pointer exactly where you want it.

```

#1      1      2      3      4      5      6      7
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11  [ ]
12
13
14
15
16
17
18
19
20
GOTO row 10     column 4
Enter a number
RIC1                                100% Free      Multiplan:TEMP

```

7 Using Commands

A command consists of a single word or acronym that describes the command's action. TRANSFER, LOAD and SAVE are commands you've already used. All the Multiplan commands are displayed on the command lines. Once you select a command, whatever additional information needed by that command is also displayed on the command line. You will find a list of commands and their options in the section titled The Command Structure.

Now briefly examine all the commands.

ALPHA	Enters any text -- letters or numbers -- into the active cell.
BLANK	Erases the contents of cells.
COPY	Copies information from some cells to other cells.
DELETE	Deletes rows or columns.
EDIT	Edits or replaces the contents of the active cell.
FORMAT	Formats the appearance of cells for width, text alignment, numbers, and graphs.
GOTO	Goes to the specified cell.
HELP	Gives explanations of commands, editing, formulas, and applications. You can also use the Help key.
INSERT	Inserts rows or columns at a specified location.
LOCK	Locks contents to prevent accidental changes to important data or formulas.
MOVE	Moves rows or columns from one part of the worksheet to another.
NAME	Names cells for future reference by formulas.
OPTIONS	Gives an optional choice of automatic or manual recalculation, and turns the circular references options on or off. Controls whether the beeper is off or on. OPTIONS is itself a command not to be confused with command choices, also called options.

PRINT	Prints the worksheet on the printer using specific options.
QUIT	Exits Multiplan, returning you to the global menu.
SORT	Sorts any part of the worksheet a column at a time.
TRANSFER	Loads or saves worksheets, renames and deletes files, and clears memory and the screen to start a new worksheet.
VALUE	Builds formulas or enters numbers into the active cell.
WINDOW	Creates separate areas on the screen to allow several parts of the worksheet to be displayed at one time.
XTERNAL	Allows the active worksheet to communicate with other sheets on the disk.

The computer automatically does everything you tell it to do. But it can't work until you first give it precise commands. You use commands for every change you make on a worksheet, in the following four steps:

- 1 Select the command.
- 2 Select from the choices or options the command offers, if any.
- 3 Enter the information needed by the command.
- 4 Activate the command.

This process will become natural as you practice in procedures in this guide. However, to use your application fully, you must be familiar with all the command steps. Your goal should be to think about what information you're entering into the computer rather than what keys to press to enter it.

When you begin Multiplan, the word **COMMAND** appears at the beginning of the list of possible commands. This means Multiplan is ready for action.

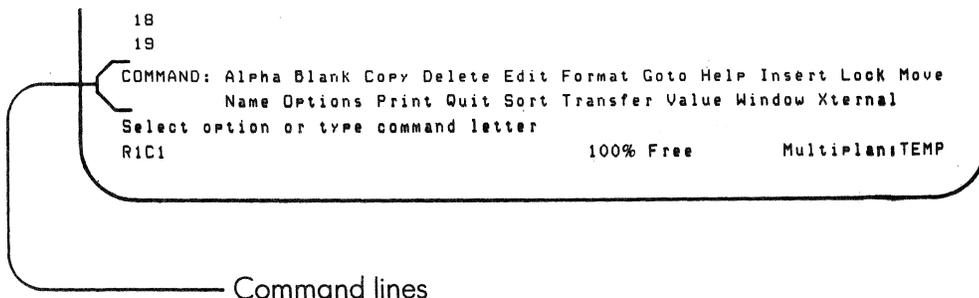
Remember, to choose a command you must either type the first letter of the command's name or, using **(SPACE BAR)** or **(BACK SPACE)**, **(RETURN)**, or **(TAB)**, move the cursor to the command and press **(EXECUTE)**.

Starting or Cancelling a Command

Before you perform a command, the command line must be in the command ready position as you see it on the illustration below. Pressing the Cancel key returns the screen to command ready position no matter where you are. In addition to using the Cancel key to ready the screen, you can use it to cancel a command you've already selected. The command lines look different when the command is in progress.

For example, suppose you entered a sentence into a cell, pressed (a) for the ALPHA command, and started to type a sentence. However, you forgot to move the cell pointer to the correct cell. Now you are changing the wrong cell. Will the original contents of the cell be lost? No. Press (CANCEL), and the screen returns to its original state before the command began. You may now enter the sentence in the correct cell.

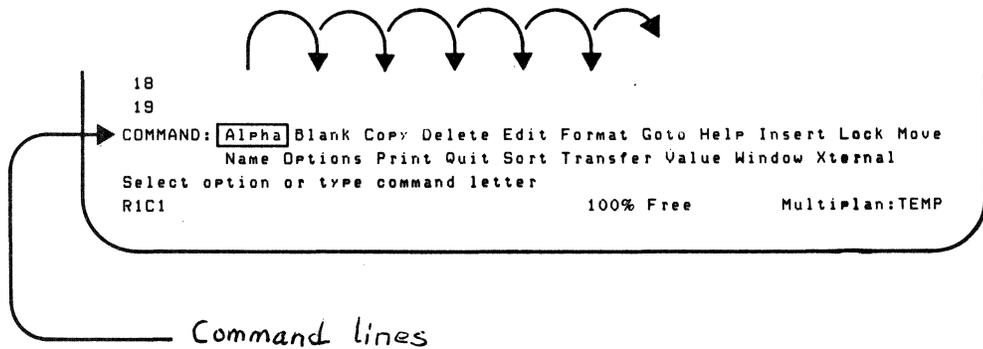
In the next procedure, you will move the cursor by pressing (SPACE BAR) until you reach the WINDOW command. If you want to move backward within the command lines, press (BACK SPACE). Using these keys, you'll move among the commands. Then you'll select the WINDOW command. The WINDOW command has options to choose from and you will practice indicating your choices. Later you will learn how to use the WINDOW feature to organize your worksheet.



All your work is done on the command lines.

Step	Screen Says	You Type	Comments
1	COMMAND: ...Transfer	tcy	Clears the screen.
2	COMMAND: Alpha...	(SPACE BAR)	Moves the edit cursor to the right.
3	COMMAND: ...Blank	(3) (SPACE BAR)	
4	COMMAND: ...Edit	(BACK SPACE)	Moves the edit cursor to the left.
5	COMMAND: ...Delete	(BACK SPACE)	
6	COMMAND: ...Copy	(2) (BACK SPACE)	Jumps the edit cursor to the ALPHA command.
7	COMMAND: Alpha...	(2) (BACK SPACE)	Moves the edit cursor to WINDOW.
8	COMMAND: ...Window	(EXECUTE)	The WINDOW command displays. The command line shows the WINDOW options.
9	WINDOW: Split... Select option or type command letter.	(EXECUTE)	The SPLIT option. The command line shows the WINDOW SPLIT options command.
10	WINDOW SPLIT: ...Titles	(2) (SPACE BAR)	Moves the edit cursor to Titles.
11	WINDOW SPLIT: ...Titles	(EXECUTE)	TITLES option. The command line shows the WINDOW SPLIT TITLES command categories.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	!	!	! The 0 in each	!
!	!	!	! field is known as	!
!	!	!	! a prepared re-	!
!	!	!	! sponse. You'll	!
!	!	!	! learn more later	!
!	!	!	! about prepared	!
!	!	!	! responses.	!
!	!	!	!	!
! 12	! WINDOW SPLIT TITLES:	! (CANCEL)	! Cancels out of	!
!	! # of rows:	!	! WINDOW SPLIT	!
!	! # of columns:	!	! TITLES AND returns!	!
!	! Enter a number.	!	! to command ready	!
!	!	!	! position.	!



You can move the edit cursor from command to command, using either the space bar key or the back space key.

Selecting Commands

Some commands offer several options, or categories from which you can choose. These are displayed on the command lines. When you chose WINDOW in the previous procedure, you also selected two of WINDOW's options, SPLIT and TITLES.

Some commands, such as, ALPHA and VALUE, have no options. Others, like TRANSFER, have a single level of options. Finally, the WINDOW and FORMAT commands have two levels of options.

This guide refers to commands as the entire command with its option. Each of the following is a command:

- ALPHA
- TRANSFER CLEAR (CLEAR is the option)
- FORMAT DEFAULT CELLS (DEFAULT CELLS is the option)

Selecting a command now becomes easy. You either type in the first letter of each word of the command and options in either upper or lowercase, or use (SPACE BAR) or (BACK SPACE) and (EXECUTE) to make your choice. To choose TRANSFER CLEAR, for example, type tc or 4 (BACK SPACE), (EXECUTE), 2 (SPACE BAR), and (EXECUTE).

FIELDS

The display areas where you sometimes see various options after you select a particular command are called fields. Fields contain information that helps the computer perform the command you've selected. As you learned earlier, the word field is also used to refer to sets of characters.

Remember how you selected GOTO and got the response Name Row-Col Window on the command lines? Those are the three fields associated with GOTO. The information you type into the fields will vary for whatever worksheet and command you use and will determine the kind of action the computer will take. Use (RETURN) or (TAB) to move between fields.

PREPARED RESPONSES

When you select a command other than ALPHA or VALUE, you'll notice that the computer has already entered certain values into the fields for you. Multiplan anticipates what you want and displays the most common response for the particular field. For example, when you chose the WINDOW SPLIT TITLES command, Multiplan proposed 0 in each field because the active cell was in the upper left corner, leaving no rows or columns to split off.

The values entered into the fields by the computer depend on the location of the cell pointer. If you want to use the computer's response in a field, do not type over it. If you want something different, just enter whatever information is needed for the field. As soon as you begin to type into the field, the prepared response disappears. The prepared response is often correct, though, saving you the trouble of typing it in.

Command Line Displays

All the information you type into the worksheet is first entered on the command lines. Whether you are typing the numbers of columns to delete, or entering a sentence, number, or formula into a cell, everything is shown on the command lines.

When you're satisfied with an entry in a command field, press (RETURN). The edit cursor then jumps to the next field. Each time you press (RETURN) the cursor moves to the next field. When you're satisfied that all the data fields are correct, press (EXECUTE). The command is then activated.

In the next procedure, you will select a number of commands and their options. Notice how the command lines change. Also note the fields and the prepared responses Multiplan places in them.

:Step:	Screen Says	You Type	Comments
1	COMMAND: Alpha...	a	ALPHA command. The command lines are used to type in characters when you use ALPHA.
2	ALPHA: Enter text (no double quotes)	<u>(CANCEL)</u>	Cancel the com- mand.
3	COMMAND: ...Delete	d	DELETE command. The command line shows the options.
4	DELETE: Row Column Select option or type command letter.	r	ROW option.
5	DELETE ROW # of rows: 1 starting at: 1 between col's: 1 and: 63	<u>(CANCEL)</u>	Cancel the com- mand.

#1	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

DELETE ROW # of rows: 1 starting at: 1
between columns: 1 and: 63
Select option or type command letter

R1C1

100% Free

Multiplan:TEMP

Press **RETURN** or **TAB** to move to the next field.

The Message Line

The computer uses the message line to request more information, or to caution you that the action you just performed is unacceptable. Here are some of the messages that might appear, instructing you to take action.

- Select command option
- Enter a number
- Enter text (no double quotes)

Eventually you'll do something Multiplan does not allow. Remember when you tried to move the pointer off the worksheet and the computer beeped? When it beeped, the computer cautioned you with a message. You might enter a formula the computer doesn't understand, mistype a command, or make a selection that isn't available. The caution on the message line might be:

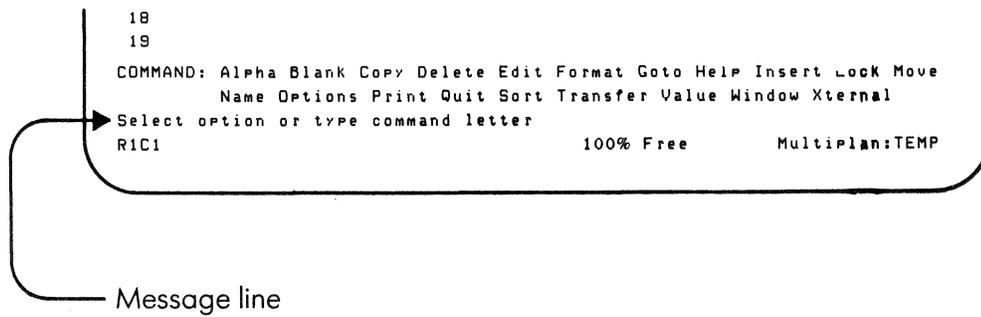
- Error in formula
- Illegal option

A list of error messages and other screen messages and their explanations is located in the Multiplan Reference Guide. When your Fortune system beeps, look for a message on the message line. The message directory will help you understand and correct the problem.

Try this next exercise. You can make intentional errors, so it should be fun. Watch the message line.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!		!		!
!	1 ! COMMAND: Alpha...	!	v	!	! VALUE command.	!
!	! Select option or type!	!		!		!
!	! command letter.	!		!		!
!	!	!		!		!
!	2 ! Enter a formula.	!	2+(3/2 <u>EXECUTE</u>)	!	! An improper	!
!	!	!		!	! formula.	!
!	!	!		!		!
!	3 ! VALUE: 2+(3/2	!)	!	! Puts in the miss-	!
!	! Error in formula.	!		!	! ing parenthesis.	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	4 ! VALUE: 2+(3/2)	!	(EXECUTE)	!	Enters the for-	!
!	! Enter a formula.	!		!	mula. The com-	!
!	!	!		!	puted value is	!
!	!	!		!	displayed in the	!
!	!	!		!	cell.	!



The computer tells you what to do on the message line.

The Status Line

The status line shows information about the active cell and the worksheet. Examine the status line, and you will see four kinds of information:

- The location of the active cell
- Its contents
- Percent of space free
- The name of the worksheet

LOCATION OF ACTIVE CELL

The location of the active cell is shown on the left end of the status line. For example, if you see R7C9, you know the active cell is in row 7, column 9.

CONTENTS OF ACTIVE CELL

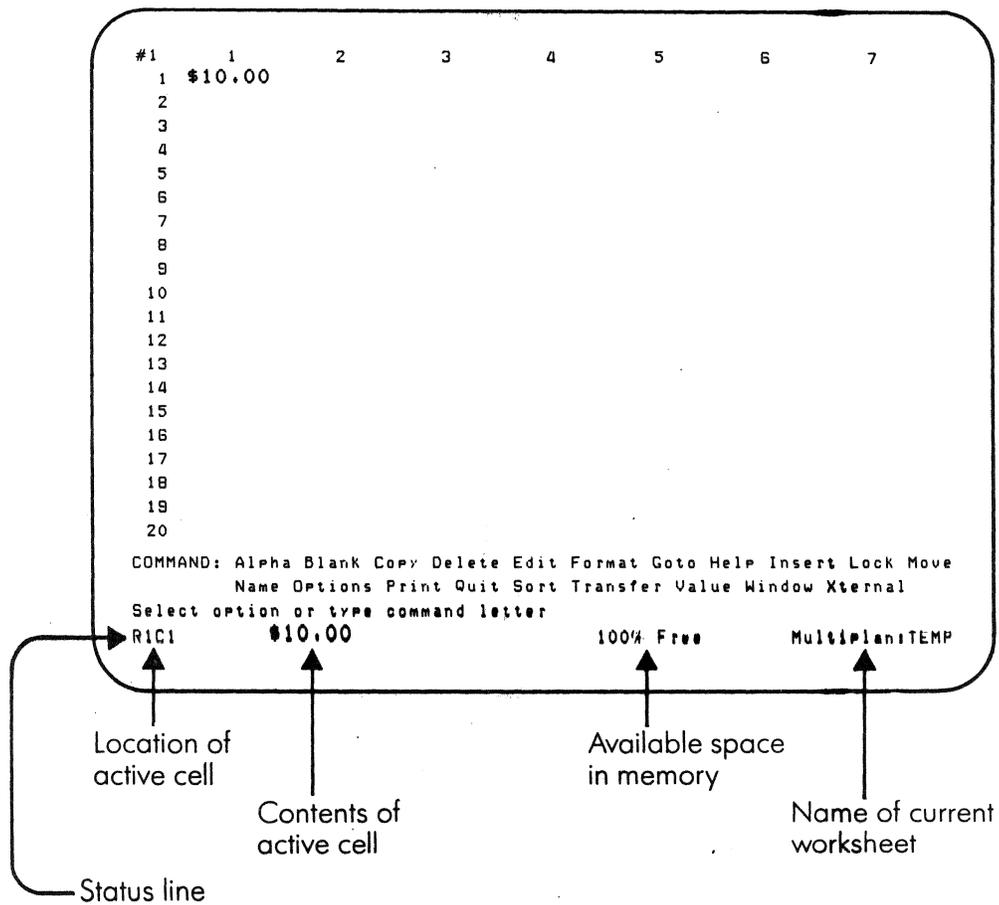
The second area of the status line shows the actual contents of the active cell; a formula, for instance. The display in the cell itself, however, shows the result of computing that formula. You can always see what a cell really contains by moving the pointer to the cell and looking at this part of the status line. If the cell is blank, so is this portion of the status line.

REMAINING SPACE IN MEMORY

Your computer has a finite space for memory where your worksheets are stored. To let you know how much space is left in memory for the worksheet, the status line displays the remaining space available as a percentage. Empty cells don't take up space in memory. When this number drops below 10 percent, you're in danger of running out of space. When it reaches 0, you can no longer enter information onto the sheet. Before that point save the worksheet and transfer it to your disk to ensure against loss. Then reorganize your worksheet into several smaller sheets. You will learn more about this in the section about the XTERNAL command.

NAME OF THE WORKSHEET

In the bottom right corner of the screen the current worksheet name is displayed. A new or unnamed sheet is called "TEMP." As soon as you name the sheet with TRANSFER SAVE the new name is displayed. Multiplan refers to worksheet names as filenames.



The status line provides current information about your worksheet.

Saving a Worksheet

The time you spend entering information will be lost if you don't save your worksheet. The computer does not keep the information once it is cleared from the screen. Once saved, though, it can be retrieved for review, changed, and saved again. It's like storing your document in a filing cabinet.

THE SAVE OPTION

To save a worksheet, use the SAVE option of TRANSFER. When you save a worksheet with a previously unused name, an exact copy of that worksheet is placed on your disk. Multiplan automatically attaches a .MP to the worksheet's name if it is a normal file, or a .SL to the worksheet's name if it is a symbolic file. You will learn more later about normal and symbolic files. When you view your directory, the Multiplan suffixes do not show up.

Multiplan keeps close track of filenames and when you save a file with a name already in use, the computer prompts:

Overwrite existing file?

If you type for yes, the worksheet on the disk is written over with the new worksheet and you lose the original worksheet. You will want to respond yes if you have made a change or update to a worksheet that you want saved.

Be alert when using the SAVE option. Use SAVE to keep a new worksheet or to keep an existing worksheet after updating it. Press any key but to cancel TRANSFER SAVE.

You give each worksheet a name so that both you and the computer can keep track of it. The name is usually given as you save the worksheet. You may use any combination of up to 11 characters, except quotes (" "), an exclamation mark (!), or a period (.). Every time you load that worksheet, you must type the worksheet name exactly the same.

WORKSHEET DIRECTORY

As you develop and save worksheets, the computer groups them together in a directory, also called a library. To see the directory of all the worksheets you have saved, issue the TRANSFER LOAD command and press one of the arrow keys. The screen goes blank, and then the list is displayed. To select the worksheet you want to work with, move the pointer to the appropriate worksheet and press (EXECUTE). Then that worksheet will appear on the screen.

To view only a specified portion of your directory you can use the asterisk (*) in your command. For example, if you have numerous files with a common suffix like .plan, you enter

TRANSFER LOAD filename: *.plan (press the arrow key)

and only files that include .plan at the end of their name will be listed. This command also works with prefixes, such as DIV *.

In all of the procedures in this guide, you are given the name of the worksheet you will use. Simply issue the TRANSFER LOAD command, type in the name of the worksheet, and press (EXECUTE). Or you can use the TRANSFER LOAD command with the arrow keys.

Your Multiplan directory can list up to 76 names on the screen. There may be more names stored in your directory, even though they don't appear. You may wish to create an additional directory. Use the Supervisory Function on the Fortune Systems Multiplan menu. This is discussed in the section on libraries. You will learn later to change directories within Multiplan using TRANSFER OPTIONS.

In the procedure you will use TRANSFER SAVE to name and save a worksheet.

!Step!	Screen Says	You Type	Comments
1	COMMAND: ...Transfer	t	Selects the TRANSFER command.
2	TRANSFER: Load... Select option or type command letter.	l	Selects the LOAD option.
3	TRANSFER LOAD file- name: Enter a file- name, or use direction keys to view directory.	cashflow	Type the name of the worksheet. Use (BACK SPACE) to correct any errors.
4		(EXECUTE)	Complete the command. The cashflow sheet is then displayed.
5	COMMAND: ...Transfer	t	Select the TRANSFER command.
6	TRANSFER: ...SAVE TRANSFER SAVE file- name: cashflow	s	Select the SAVE option. The computer shows the name cashflow, the last worksheet on the screen.
7		sample	Name of a worksheet. As soon as you touch a key, the name cashflow disappears.
8	TRANSFER SAVE file- name: sample	(EXECUTE)	If someone has already created a worksheet called sample, you'll receive the following prompt.

!Step!	Screen Says	! You Type	! Comments	!
! 9 !	! Overwrite existing	! y	! You want to copy	!
! :	! file?	! :	! over another sheet!	!
! :	! :	! :	! and save it under !	!
! :	! :	! :	! the same name as !	!
! :	! :	! :	! the last sheet. !	!
! 10 !	! COMMAND: ...Transfer	! tc	! TRANSFER command !	!
! :	! :	! :	! and CLEAR option. !	!
! 11 !	! TRANSFER CLEAR:	! y	! You've already !	!
! :	! Enter Y to confirm	! :	! saved the sheet, !	!
! :	! :	! :	! so it's okay to !	!
! :	! :	! :	! clear it. !	!
! 12 !	! COMMAND: Alpha...	! t1	! TRANSFER command !	!
! :	! :	! :	! and LOAD option. !	!
! 13 !	! TRANSFER LOAD file-	! sample	! (EXECUTE) !	!
! :	! name: Enter a	! :	! sheet is still !	!
! :	! filename:	! :	! there. !	!

1	2	3	4	5	6	7	8	9	10	11	12	13	
1													
2													
3													
4													
5													
6													
7	1978	-155	-140	-133	-435	-56	-55	-12	-25	0	12	22	21
8	1979	22	33	23	34	56	87	89	88	81	92	99	104
9	1980	107	106	111	94	99	125	122	134	142	144	123	151
10	1981	99	92	79	81	83	82	88	121	122	111	145	152
11	1982	104	133	135	166	178	189	159	122	177	132	198	201
12													
13	8500	Initial Investment											
14													
15	20	annual % rate											
16													
17	-524	= NPV											
18													
19													
	TRANSFER SAVE file name: cash flow												

Give this worksheet a name and save it on a flexible disk.

Managing Worksheets

The TRANSFER command is your means of communication with the disk. TRANSFER's various options help you manage how your worksheets are stored and accessed.

The RENAME option lets you give the worksheet another name. All references to the sheet are also renamed.

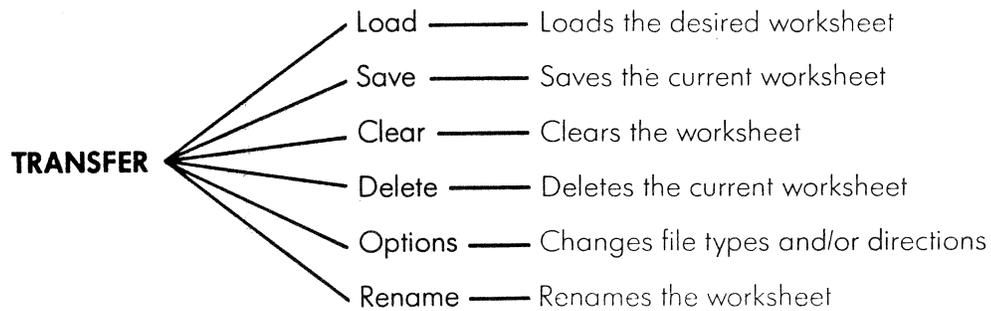
To permanently remove a worksheet from the disk, use TRANSFER DELETE. But be careful! Once you have removed the worksheet, you can never get it back.

TRANSFER OPTIONS is used to change directories and file formats. You will learn more about this later in the advanced features section.

Now, try the procedure. You'll use every aspect of TRANSFER except OPTIONS.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer	!	! tcy	!	! Clears the screen.	!
!	!	!	!	!	!	!
!	2 ! COMMAND: Alpha...	!	! lll	!	! Enters a value	!
!	!	!	!	!	! into R1C1.	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Transfer	!	! ts	!	! TRANSFER SAVE.	!
!	!	!	!	!	!	!
!	4 ! TRANSFER SAVE file-	!	! test	!	! Saves the work-	!
!	! name: TEMP	!	!	!	! sheet under the	!
!	! Enter a filename.	!	!	!	! name test.	!
!	!	!	!	!	!	!
!	5 ! COMMAND: ...Transfer	!	! tr	!	! TRANSFER RENAME	!
!	!	!	!	!	! option.	!
!	!	!	!	!	!	!
!	6 ! TRANSFER RENAME	!	! newname	!	! Renames the active!	!
!	! filename: test	!	!	!	! sheet to newname.	!
!	!	!	!	!	!	!
!	7 ! COMMAND: ...Transfer	!	! tcy	!	!	!
!	!	!	!	!	!	!
!	8 !	!	! t1	!	! TRANSFER LOAD.	!
!	!	!	!	!	!	!
!	9 ! TRANSFER LOAD file-	!	! test	!	! Try to load test.	!
!	! name:	!	!	!	! The worksheet is	!
!	!	!	!	!	! not there.	!

!Step!	Screen Says	You Type	Comments
! 10 !	! Enter Y to retry ! access.	! (CANCEL)	! Leave TRANSFER ! LOAD.
! 11 !	! COMMAND: ...Transfer	! tl newname ! (EXECUTE)	! Loads the newname ! worksheet.
! 12 !	! COMMAND: ...Transfer	! td	! TRANSFER DELETE.
! 13 !	! TRANSFER DELETE ! filename: newname	! newname (EXECUTE)	! Deletes newname.
! 14 !	! Enter Y to confirm	! y	! The sheet is re- ! moved from the ! disk.
! 15 !	! COMMAND: ...Transfer	! tcy	! Clears the screen.

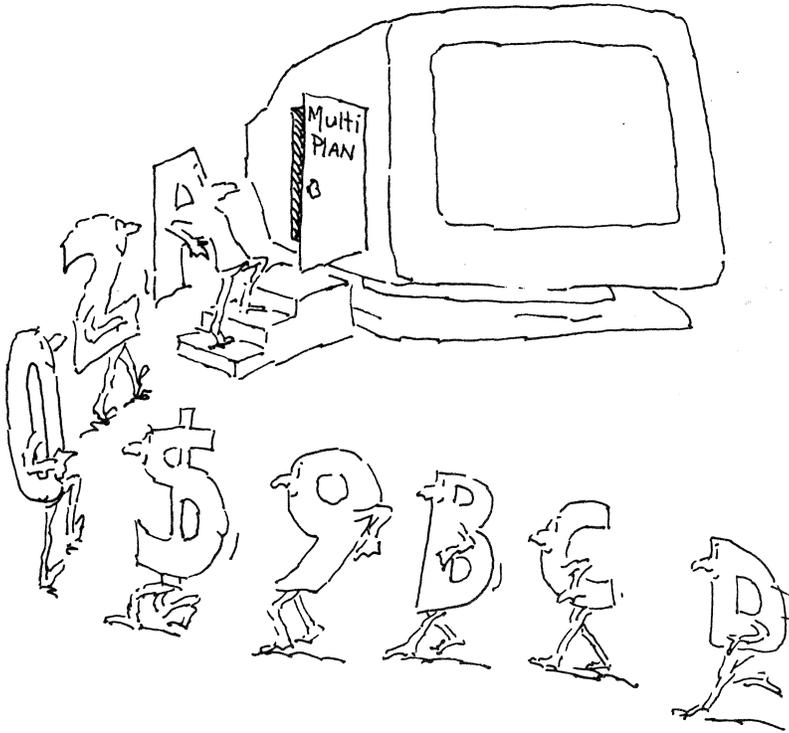


These are the options of the TRANSFER command.

8 Entering Information

Now you are ready to build your first Multiplan worksheet. This worksheet is a simple list of sources of revenue, developed gradually throughout the chapter. You will learn more about entering information into the cells of the worksheet. There are three types of information you can put into a cell: text, numbers, and formulas.

- Text entries, alphabetic information, allow you to build worksheets with titles that clearly define areas.
- Numeric entries are accepted into Multiplan without a preceding command, making series of numbers quick to enter.
- Formulas build relationships between cells. You can develop powerful worksheets using the functions built into Multiplan combined in formulas you write.



Entering Text

One type of information you can enter into a worksheet is text, including letters, numbers, punctuation marks, and special symbols. This capability allows you to put almost any information on the screen in order to label different parts of your worksheet, such as row and column headings.

To start entering text, select ALPHA on the command lines by pressing the letter a. Then type the text onto the command line. Numbers and formulas to be used in calculations should be entered with VALUE which you will read about in "Entering Numbers." When you complete your entry, press **(EXECUTE)** to enter it into the cell where the pointer is located.

In the following procedure, you will enter the labels for three sources of revenue: sales, royalties, and rent. Don't clear the screen when you finish. You'll use the screen in the next 5 procedures.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: Alpha...	! (2) 	! Goes to cell R3C1..	!
!	!	! a	! ALPHA Command.	!
!	!	!	!	!
! 2 !	! ALPHA:	! Sales	! (EXECUTE)	!
!	! Enter text (no double!	!	!	!
!	! quotes)	!	!	!
!	!	!	!	!
! 3 !	! COMMAND: ...Goto	! gr 4	! (EXECUTE)	!
!	!	!	! GOTO moves the	!
!	!	!	! pointer down to	!
!	!	!	! cell R4C1.	!
!	!	!	!	!
! 4 !	! COMMAND: Alpha...	! a	! ALPHA command.	!
!	!	!	!	!
! 5 !	! ALPHA:	! Royalties	!	!
!	!	!	!	!
! 6 !	! ALPHA: Royalties	!	! (EXECUTE)	!
!	!	! gr 5	! (EXECUTE)	!
!	!	!	! Accepts text and	!
!	!	!	! moves the pointer	!
!	!	!	! down to cell R5C1..	!

Editing a Tentative Entry

When you enter information into a cell, the computer places it in a temporary storage area called a buffer. In this tentative stage, you have time to change your mind and make revisions. You can edit information at any time while you are building a cell, using the back space key, the field edit keys, and the character edit keys.

The edit function keys provide a quick and easy means to modify text or numbers in your worksheets. These keys move the edit cursor on the command line by character or by field, so that you can modify or delete a single character or an entire field in one step. In this example each boxed segment is one field.

" | TOTALS | FOR | 1981 | / | 1982 | "

The edit function keys are located on the left of the top row of the keyboard.



Moves cursor to the left an entire field at a time.
Numbers next to text are considered separate fields.



Moves cursor to the right an entire field at a time.



Moves the cursor to the left one character at a time.



Moves the cursor to the right one character at a time .



Deletes whatever is highlighted by the cursor, either a single character or a field.

In the procedure, you'll enter a column heading, and practice correcting spelling mistakes, using the back space key, and the edit function keys. Again, don't clear the screen when you finish.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Goto	! gr 2 (RETURN)	! Uses GOTO to move !
! !	! !	! 2 (EXECUTE)	! to cell R2C2. !
! 2 !	! COMMAND: Alpha...	! a	! ALPHA command. !
! 3 !	! ALPHA:	! Sorces 09	! Enters this text. !
! 4 !	! ALPHA: Sorces 09	! (BACK SPACE)	! Moves back one !
! !	! !	! !	! space. !
! 5 !	! ALPHA: Sorces 0	! f	! Enters text. !
! 6 !	! ALPHA: Sorces Of	! (4) (← FIELD EDIT)	! !
! !	! !	! (← CHAR EDIT)	! Highlights S in !
! !	! !	! !	! Sorces. !
! !	! !	! (2) (→ CHAR EDIT)	! Highlights r in !
! !	! !	! !	! Sorces. !
! 7 !	! ALPHA: Sorces Of	! u	! Enters u before r. !
! 8 !	! ALPHA: Sources Of	! (2) (→ FIELD EDIT)	! Highlights 0. !
! 9 !	! ALPHA: Sources Of	! (DELETE)	! Erases 0. !
! 10 !	! ALPHA: Sources f	! (BACK SPACE)	! Deletes one space. !
! !	! !	! o (EXECUTE)	! Enters text on !
! !	! !	! !	! command lines. !
! 11 !	! COMMAND: Alpha...	! <input type="text" value="→"/>	! !
! 12 !	! !	! a	! ALPHA command. !
! 13 !	! ALPHA:	! Revenue (EXECUTE)	! Enters text. !

Extensive Entries

Multiplan has two special features which speed up text or number entries. By using the arrow keys, you can accept information and move in the direction you want to go all at one time. A special command prompt, ALPHA/VALUE accepts either text or numeric entries.

The arrow key, in this case, does two jobs. First, it accepts the information the way you have entered it. Second, if the information is accepted as correct, the cell pointer jumps one cell in the direction of the arrow key pressed.

This feature is particularly helpful when you have a long list of numbers to enter, because you can use Multiplan like a printing calculator. Enter the numbers, and accept each one by pressing the down arrow key. You can use either the numbers along the top of your keyboard, just below the function keys, or the keypad on the right.

Another useful feature is the screen prompt you'll see as you use the arrow keys for entry. Multiplan automatically displays

ALPHA/VALUE:

immediately after it accepts your last entry. A letter automatically moves to the ALPHA command and a number implements the VALUE command thereby selecting the correct command for you.

In the procedure, you enter a new list of numbers, using the down arrow key. Notice how natural it feels, like using a ten-key calculator. Don't clear the screen when you finish.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! COMMAND: ...Goto	! gr 3	! GOTO row 3.
!	!	!	!
! 2 !	! COMMAND: Alpha...	! (EXECUTE)	! Moves the pointer.!
!	!	!	!
! 3 !	! COMMAND: Alpha...	! 1111	! Enters this
!	!	!	! number.
!	!	!	!
! 4 !	! VALUE: 1111	!	! Accepts the number!
!	!	!	! and moves to R4C3.!

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 5 !	ALPHA/VALUE:	! 2222	! Enters the new
!	!	!	! number.
!	!	!	!
! 6 !	VALUE: 2222	!	!  Accepts the value
!	!	!	! and moves the
!	!	!	! pointer down.
!	!	!	!
! 7 !	COMMAND: Alpha...	! 3333	!
!	!	!	!
! 8 !	VALUE: 3333	!	! <u>EXECUTE</u> Accepts the value.!

Entering Numbers

You don't have to select a command to enter numeric information. Just type in the numbers, and then press **(EXECUTE)**. Multiplan automatically uses the VALUE command. Numbers can be displayed in a cell in any of several different formats, including whole number format, a format with a specified number of places to the right of the decimal point, or a dollars and cents format. You will learn more about this later.

It is possible to type a figure with more places than the width of the cell. (Legal cell width is 3 to 32 characters.) If you do this, the cell is filled with pound signs. The actual value in the cell is displayed on the status line. For example, if a cell is formatted for dollars and is 10 characters wide, \$45461729.44 will not fit, and is displayed as ##### in the cell.

For this procedure, you will enter three numbers for the sources of revenue. Don't clear the screen when you finish.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Goto	! gr 3	! (EXECUTE)	! Moves to cell
!	!	!	!	! R3C3.
!	!	!	!	!
! 2 !	! COMMAND: Alpha...	! 12563	!	! First number
!	!	!	!	! entered.
!	!	!	!	!
! 3 !	! VALUE: 12563	!	! (EXECUTE)	!
!	! Enters a formula.	!	!	!
!	!	!	!	!
! 4 !	! COMMAND: Alpha...	! 	!	! Moves to cell
!	!	!	!	! R4C3.
!	!	!	!	!
! 5 !	!	! 3287	!	! Second number
!	!	!	!	! entered.
!	!	!	!	!
! 6 !	! VALUE: 3287	!	! (EXECUTE)	!
!	!	!	!	!
! 7 !	! COMMAND: Alpha...	! 	!	! Moves to cell
!	!	!	!	! R5C3.
!	!	!	!	!
! 8 !	!	! 6745	!	! Third number
!	!	!	!	! entered.
!	!	!	!	!

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 9 !	VALUE: 6745	! (EXECUTE) !		!
!	!	!	!	!
! 10 !		!	! Moves to cell	!
!	!	!	! R6C3.	!

#1	1	2	3
1			
2		Sources of Revenue	
3	Sales		12563
4	Royalties		3287
5	Rent		6745

Once you enter the numbers, the worksheet looks like this.

Entering Formulas

Formulas in Multiplan help you to combine calculator functions with technical typing capabilities. If Multiplan only let you enter text and numbers it would certainly be useful, though not much more so than a typewriter. With formulas, however, an important dimension is added to your ability to work efficiently.

You can add up any row or column of numbers, simply by moving the pointer to the cell where you want the sum to appear. Then press the equal sign (=), and type sum. This cues Multiplan to use the SUM function, a function built into Multiplan. You'll need to tell Multiplan what to add by specifying the range of cells to be added.

In the procedure, you will enter the range R3C3:R5C3 to be summed. The colon indicates a range, here indicating cell R3C3 through cell R5C3. After you enter the formula, Multiplan quickly adds the values in the range of cells and puts the result where you want the sum to go.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: Alpha...	! =	! Tells Multiplan	!
!	!	!	! you are going to	!
!	!	!	! type in a formula.	!
!	!	!	!	!
! 2 !	! VALUE:	! sum(r3c3:r5c3)	! Enters the SUM	!
!	! Enter a formula	!	! function at cell	!
!	!	!	! R7C3.	!
!	!	!	!	!
! 3 !	! VALUE: sum(R3C3:R5C3)!	! <u>EXECUTE</u> !	! Adds the figures	!
!	!	!	! on the three cells!	!
!	!	!	! and prints the to-	!
!	!	!	! tal 22595 in R7C3.!	!

#1	1	2	3
1			
2		Sources of	Revenue
3	Sales		12563
4	Royalties		3287
5	Rent		6745
6			22595

The SUM function adds the values in the cells in the formula, and shows the response on the screen.

9 Recalculation

Recalculation is an important benefit of Multiplan because it automatically recomputes all formulas if any cell is changed. You've seen Multiplan compute a sum for a single column of numbers. To see Multiplan's real power, visualize a case where several sum cells are recalculated.

In this chapter you will load a worksheet example and use Multiplan's recalculation feature to change numbers and see the results. You will also add a new row and change the range of cells being added. Sometimes, when you are making many numeric entries, for example, it is useful to make such recalculation manual instead of automatic. This chapter will show you how to do that.



Changing Numbers

Automatic recalculation means that as you change numbers, all of the cells containing formulas will be automatically recalculated. This means that your arithmetic always stays accurate.

BENEFITS OF AUTOMATIC RECALCULATION

Recalculation helps you in two ways. First, it lets the computer do what it is best at doing -- rapid calculation of numbers. Second, you can do what you are best at doing -- using human judgment to estimate, recognize, and select which numbers need to be changed and by how much.

The crossfoot worksheet shows three columns of sources of revenue, labeled for the years 1981, 1982, and 1983. Notice that sums are computed across rows as well as down columns. There is also a cell that sums the column subtotals, and another cell that sums the row subtotals. These two cells agree, or crossfoot with each other, serving as a check on one another.

Try the following procedure, in which you'll enter new figures on the crossfoot worksheet. Watch how recalculation occurs automatically.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! t1	! TRANSFER LOAD.	!
!	!	!	!	!
! 2 !	! Filename:	! crossfoot	!	!
!	!	!	!	!
! 3 !	! Filename: crossfoot	!	! <u>EXECUTE</u> Displays cross-	!
!	!	!	! foot	!
!	!	!	!	!
! 4 !	! COMMAND: ...Goto	! gr 5	! <u>RETURN</u> Moves the pointer	!
!	!	! 3	! <u>EXECUTE</u> to cell R5C3.	!
!	!	!	! Value in this cell!	!
!	!	!	! is 4000.	!
!	!	!	!	!
! 5 !	!	! 2000	! Changes the value	!
!	!	!	! of R5C3 to 2000.	!

!Step!	Screen Says	You Type	Comments
6	VALUE: 2000	(EXECUTE)	Starts recalculation.
7	COMMAND: Alpha...	↓ →	Moves the pointer to cell R6C4. Its current value is 2000.
8		5000	
9	VALUE: 5000	(EXECUTE)	Starts recalculation.

Adding a Row

When you add new numbers in rows or columns outside the range of formulas, your worksheet will not recalculate properly. You need to change your formula to include them. For example, SUM(r2c4:6) adds the values in row 2 columns 4, 5, and 6. If you want a value in column 7 included in the sum, you need to change the formula to SUM(r2c4:7). Now you'll learn how to change several sums with a single command.

Suppose a new source of revenue needs to be added to your crossfoot worksheet. It pays 1500 in 1981 and 2300 in 1982 and 2800 in 1983. Adding these values in the proper columns of row 8 has no effect. The SUM formula totals rows 5 through 7 only.

Previously, you learned how to define a range for a sum by using cell coordinates. In the next procedure the worksheet includes sum cells based on a particular range of rows. When you add figures in a new row you must also change the SUM formula ranges.

In this procedure you will use the COPY DOWN and the COPY RIGHT commands. These will be fully explained later.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Goto	! gr 8	! (RETURN)	! Moves the pointer
!	!	! 2	! (EXECUTE)	! to cell R8C2.
!	!	!	!	!
! 2 !	! COMMAND: Alpha	! 1500	! 	! Enters the number
!	!	!	!	! 1500 and moves
!	!	!	!	! the pointer to
!	!	!	!	! cell R8C3.
!	!	!	!	!
! 3 !	! ALPHA/VALUE	! 2300	! 	! Enters the number
!	!	!	!	! 2300 with no
!	!	!	!	! recalculation.
!	!	!	!	!
! 4 !	!	! 2800	! 	! Enters the number
!	!	! 	! (CANCEL)	! 2800 and moves to
!	!	!	!	! R7C5.
!	!	!	!	!
! 5 !	! COMMAND: ...Copy	! cd 1	! (EXECUTE)	! Copies the formula
!	! Select option or type!	!	!	! for totals to
!	! command letter.	!	!	! R8C5.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 6 !	! COMMAND: ...Goto	! gr 9	! (RETURN)	! Moves the pointer
! :	! :	! 2	! (EXECUTE)	! to cell R9C2.
! :	! :	! :	! :	! :
! 7 !	! COMMAND: Alpha...	! =	!	! Changes the for-
! :	! :	! SUM(r5:8 c)	!	! mula to include
! :	! :	!	! (EXECUTE)	! row eight.
! :	! :	! :	! :	! :
! 8 !	! COMMAND: ...Copy	! cr 3	! (EXECUTE)	! Copies the for-
! :	! :	! :	!	! mula for totals
! :	! :	! :	!	! to R8C3:5.

New formula: SUM(R[-4]C:R[-1]C)

#1	1	2	3	4	5
1		Sources of Revenue: Crossfoot Example			
2					
3		1981	1982	1983	Total
4					
5	Sales	1000	4000	3000	8000
6	Royalties	2000	5000	2000	9000
7	Rent	3000	6000	3500	12500
8	Additional	1500	2300	2800	
9	Total	6000	15000	8500	29500
10					
11	Cumulative	6000	21000	29500	

Adding a row and changing sum cells requires a change in formula ranges.

Manual Recalculation

If you have to make many changes to a worksheet with a lot of numbers, you may find the automatic recalculation feature distracting. Furthermore, the computer may not be able to keep up with your typing speed, especially if the worksheet is large.

What you'll frequently want is the ability to enter a long column of numbers, totaling only after you have finished entering all of the numbers. To do this, use the `OPTIONS` command and the Recalculate key.

The `OPTIONS` command gives you three choices.

- Turn recalculation on or off
- Turn the beeper on or off
- Turn circular references (iteration) on or off

Pressing `(RETURN)` or `(TAB)` moves the cursor between fields, each of which contains Yes and No. A response of "No" in the recalculation field turns off automatic recalculation. If you select No for the beeper field, you won't hear the beeper when the pointer reaches the boundaries of the worksheet. You will learn more about circular references in the section about advanced features. Your choice is maintained with the sheet and can be changed at any time.

Use the Recalc key, a function key, to manually recalculate all formulas on a worksheet whenever you want. First, select the `OPTIONS` command, and turn off automatic recalculation. Then, change figures and add new information. When you need to recalculate, just press `(RECALC)`. All formulas are recalculated using the new figures.

Remember, when you press `(RECALC)`, you recalculate one time only. To turn automatic recalculation back on, you must use the `OPTIONS` command.

In the following procedure, you'll turn off automatic recalculation.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: Alpha...	!	tcy	!	! Clears the screen.	!
!	!	!	!	!	!	!
!	2 ! COMMAND: ...Options	!	o	!	! OPTIONS command.	!
!	!	!	!	!	!	!
!	3 ! OPTIONS: recal:(Yes)	!	n	!	! Turns off	!
!	! No	!	!	!	! automatic	!
!	! Select option.	!	!	!	! recalculation.	!

!Step!	Screen Says	You Type	Comments
4	OPTIONS: recalc: Yes (No)	(EXECUTE)	Accepts the change of manual recalculation.
5	COMMAND: ...Goto	gr 10 1 (RETURN) (EXECUTE)	
6	COMMAND: Alpha...	= SUM (r1:9c1) (EXECUTE)	Enters formula.
7	COMMAND: ...Goto	gr 1 1 (RETURN) (EXECUTE)	Goes to cell R1C1.
8	COMMAND: Alpha...	29 ↓	
9	ALPHA/VALUE:	423 ↓	Every time you use the arrow key, the ALPHA/VALUE prompt displays.
10		2 ↓	
11		94 ↓	
12		53 ↓	
13		67 ↓	
14		502 ↓	
15		177 ↓	
16		84 ↓	Enters column of numbers and moves down 1 cell each time.
17	COMMAND: Alpha...	(RECALC)	Recalculates and adds column 1.
18		tcy	

10 Printing the Worksheet

When you have finished a worksheet, you'll want to print it to see the results. Printing the worksheet is quite easy. But, before you use the PRINT command, be sure your printer is prepared. It should be connected to your Fortune system and an electrical outlet and then turned on. The paper, ribbon, and print element should be loaded. Specific directions for readying your printer can be found in the user guide that came with the printer or Meet Your Fortune Printer.

You have choices about how your worksheet is displayed. You can set up the margins, print only a certain portion of the worksheet, or tell the printer to print the formulas used in the worksheet rather than the results. You can also create a special print file.

The PRINT Command

Whenever you need a printed copy of the current worksheet, use the PRINT command. PRINT lets you define margins on the printed copy, decide whether formulas and row and column numbers are to be printed, and perform other printer-related actions. The PRINT command has four options.

PRINTER

PRINTER is the option you select when the worksheet is ready for printing. If you want to send the current worksheet to the printer without changing the print margins, etcetera, press PP. The worksheet is then printed using Multiplan's prepared print format.

FILE

Use the FILE option when you want to use the worksheet with another application. When you select FILE, the computer makes a copy of your worksheet and asks you to name this file. The file is then saved on your disk, under the name you gave it, for later use with other Fortune applications.

MARGINS

MARGINS controls how the worksheet is displayed on the paper. You can print any width from a letter-size sheet to a very wide financial sheet.

OPTIONS

With the OPTIONS selection you can specify the area of the worksheet you'll print. You may add a title to the sheet, choose to print out formulas instead of results, or include row and column numbers on the printed sheet.

Prepare your printer, and print out a worksheet using the following procedure.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! t1 print <u>EXECUTE</u>	! Loads print work-	!
!	!	!	! sheet.	!
!	!	!	!	!
! 2 !	! COMMAND: ...Print	! pp	! Chooses Printer	!
!	!	!	! option of PRINT	!
!	!	!	! command and prints!	!
!	!	!	! worksheet.	!

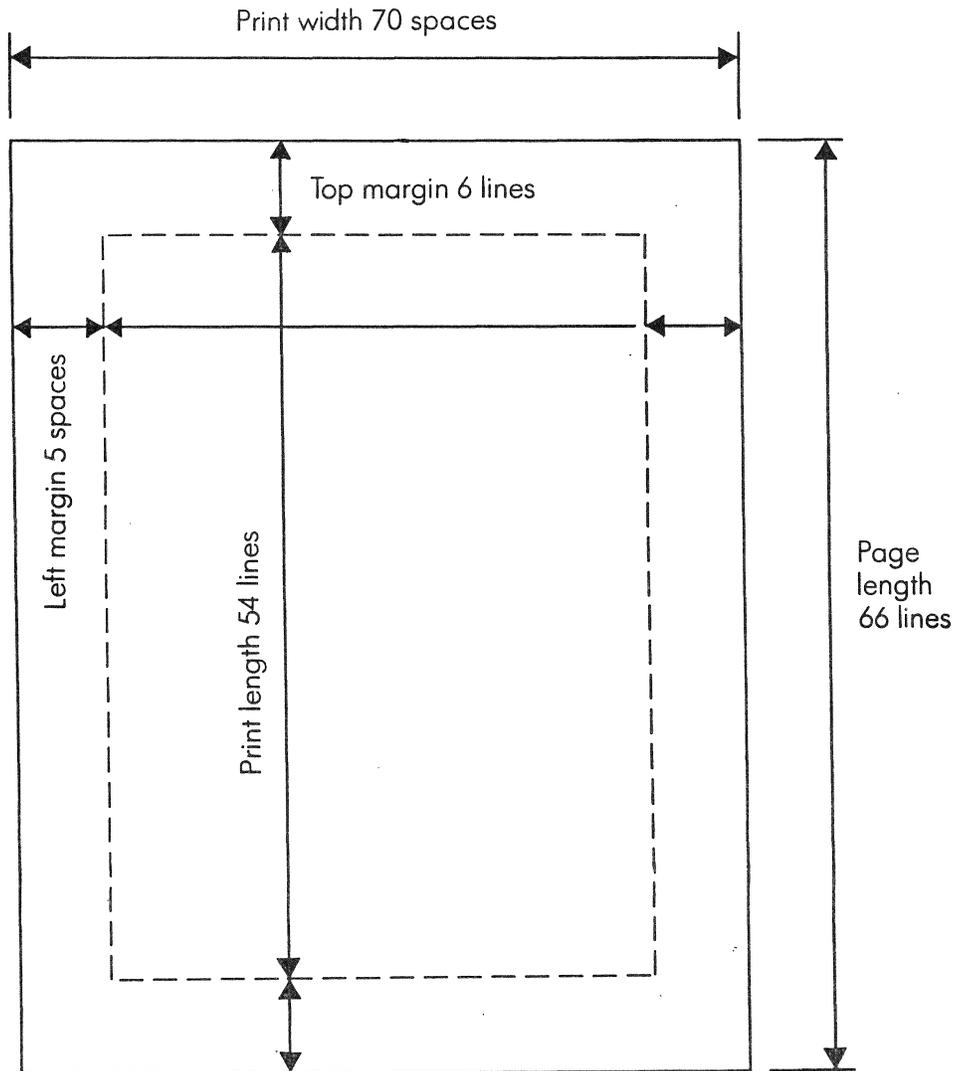
Setting the Print Margins

To print a worksheet larger than 8 1/2 x 11 inches, the printer divides the sheet into sections and prints each on a separate piece of paper. You can control how the sections are divided and centered by using the MARGINS option before you print the worksheet.

When you select MARGINS, the following fields appear on the command lines, along with Multiplan's prepared responses.

```
PRINT MARGINS: left: 5 top: 6 print width: 70  
                print length: 54 page length: 66
```

If you don't select MARGINS before printing a worksheet, the worksheet prints according to the responses shown above.



The following is a description of the MARGINS fields.

Left Indicates how many spaces are in the left margin.

Top Indicates how many unprinted lines are at the top of the paper.

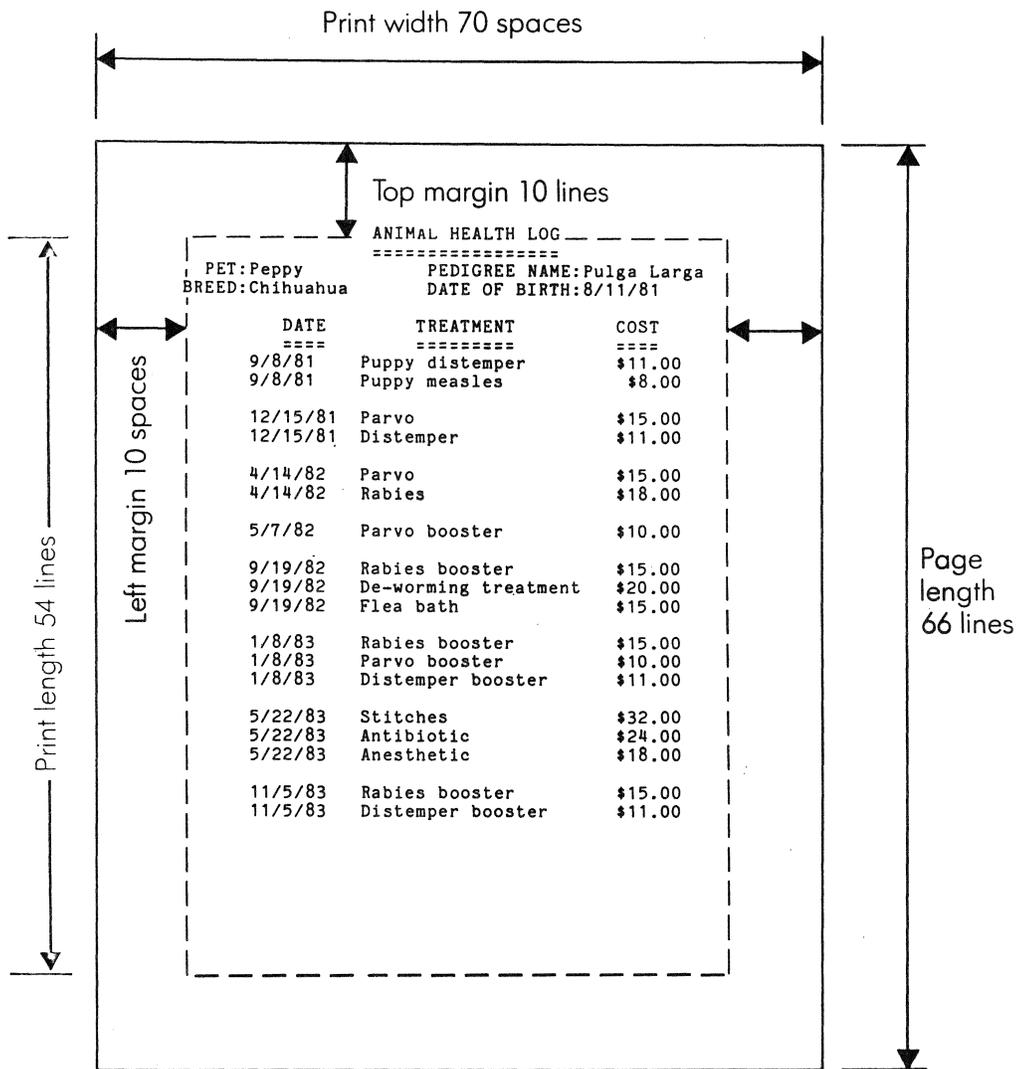
Print Width Specifies how many characters you want to print on a single line. If it is too narrow to complete a column on the right edge, that column will be moved to the next page.

Print Length Specifies how many rows of data you want to print on a page.

Page Length Specifies the total number of lines on the page from top to bottom. For example, if you use paper that is 11 inches long, the paper could contain 66 lines, printing at six lines per inch (11 x 6). If you printed on 11-inch paper at eight lines per inch, you would set the page length at 88 (11 x 8).

In the procedure, you'll set up the print margins for a worksheet.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! t1 print (EXECUTE)	! Loads print	!
!	!	!	! worksheet.	!
!	!	!	!	!
! 2 !	! COMMAND: ...Print	! pm 10 (RETURN)	! Chooses PRINT	!
!	! PRINT MARGINS:	! 10 (EXECUTE)	! MARGINS option.	!
!	! Left: 5 Top: 6	!	! Enters changes	!
!	! Print Width: 70	!	! in prepared res-	!
!	! Page Length: 66	!	! ponses for left	!
!	!	!	! and top margins.	!
!	!	!	!	!
! 3 !	! COMMAND: Print	! pp	! Prints worksheet.	!



A printed worksheet has these margins.

Selecting PRINT OPTIONS

The OPTIONS selection of the PRINT command sets special print specifications for your worksheet. When you select PRINT OPTIONS, the command lines display the following:

```
PRINT OPTIONS:  area:  R1:255      setup:
                Formulas: (No) Yes   Row-col numbers: (No) Yes
```

Here is what the OPTIONS fields mean.

Area In the area field, Multiplan's response is all rows from 1:255; the area to be printed includes the entire worksheet. However, you can choose to print only a certain part of the worksheet by specifying its row and column range in the area field. For example, r1:l0c2:3.

Setup In the setup field you can specify a title for the current worksheet.

Formulas Rather than displaying the results of the formulas, the format is expanded to allow enough space and the formulas themselves are printed.

Row-Col Numbers You have the option of printing the row and column numbers on the worksheet.

The procedure shows how to set up the PRINT OPTIONS.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tl print (EXECUTE)	! Loads print	!
! !	! !	! !	! worksheet.	!
! 2 !	! COMMAND: ...Print	! po (3) (RETURN)	! Chooses PRINT	!
! !	! !	! y (EXECUTE)	! OPTIONS.	!
! 3 !	! COMMAND: ...Print	! pp	! Prints worksheet.	!

Row numbers

Column numbers

1	2	3	4	5
1		ANIMAL HEALTH LOG		
2		=====		
3	PET:Peppy	PEDIGREE NAME:Pulga Larga		
4	BREED:Chihuahua	DATE OF BIRTH:8/11/81		
5				
6		DATE	TREATMENT	COST
7		=====	=====	=====
8	9/8/81	Puppy distemper		\$11.00
9	9/8/81	Puppy measles		\$8.00
10				
11	12/15/81	Parvo		\$15.00
12	12/15/81	Distemper		\$11.00
13				
14	4/14/82	Parvo		\$15.00
15	4/14/82	Rabies		\$18.00
16				
17	5/7/82	Parvo booster		\$10.00
18				
19	9/19/82	Rabies booster		\$15.00
20	9/19/82	De-worming treatment		\$20.00
21	9/19/82	Flea bath		\$15.00
22				
23	1/8/83	Rabies booster		\$15.00
24	1/8/83	Parvo booster		\$10.00
25	1/8/83	Distemper booster		\$11.00
26				
27	5/22/83	Stitches		\$32.00
28	5/22/83	Antibiotic		\$24.00
29	5/22/83	Anesthetic		\$18.00
30				
31	11/5/83	Rabies booster		\$15.00
32	11/5/83	Distemper booster		\$11.00

The PRINT OPTIONS is used to print this version of the worksheet, which includes row and column numbers.



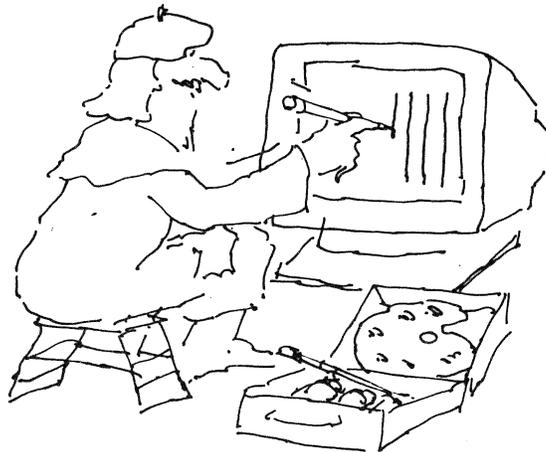
Developing the Worksheet

The format of a worksheet refers to the way data is displayed on the screen or printed out. The advanced formatting and editing features of Multiplan provide a flexible reporting capability to meet your varying business needs.

Information can be formatted in different ways for screen display. You can control the screen display by varying the width of the cells, or by changing the alignment of a cell's contents or the way a number is displayed in a cell. All of these functions are performed by the FORMAT command. With more edit commands you can modify or refine existing worksheets.

In this part you'll:

- Format a worksheet determining both cell width and alignments
- Vary numeric formats
- Modify text
- Use the BLANK, COPY, MOVE, INSERT, DELETE, and SORT commands



11 Formatting the Worksheet

Multiplan is designed for business, scientific, academic, and other applications, the variety of uses requires a wide range of options for representing numbers. Business applications usually express values as percentages or as dollar values. Scientists like to work with numbers with several decimal places; often these numbers are larger than a trillion or smaller than a billionth. In addition, some applications benefit by expressing their information in pictures called bar graphs. Any of these possibilities can be selected with the FORMAT command.

When you create a worksheet, the first thing to do is plan it. The better you plan, the less you need to fine tune the sheet when entering information. As you define the appearance of the worksheet ask yourself a few questions. What width will the majority of columns have? What is the most common alignment of cell contents? What cell format should most of the cells have? When you have decided the answers, use the FORMAT command to set the conditions of your worksheet.

The FORMAT command provides several selections to modify column widths, change alignments, and format cell displays. Formats do not change the numbers themselves; they only change the form that the number is displayed in. The number itself remains in memory exactly as entered. This form is shown in the status line as the cell contents when the pointer is moved to the cell.

CELLS The FORMAT CELLS selection specifies the alignment of information in a cell and the form (called format code) that information takes for a single cell or area of cells.

DEFAULT The FORMAT DEFAULT selection has two further options. Use the FORMAT DEFAULT CELLS command to specify the standard alignment and cell format for the entire worksheet. Use the FORMAT DEFAULT WIDTH command to set up the column width for the entire worksheet.

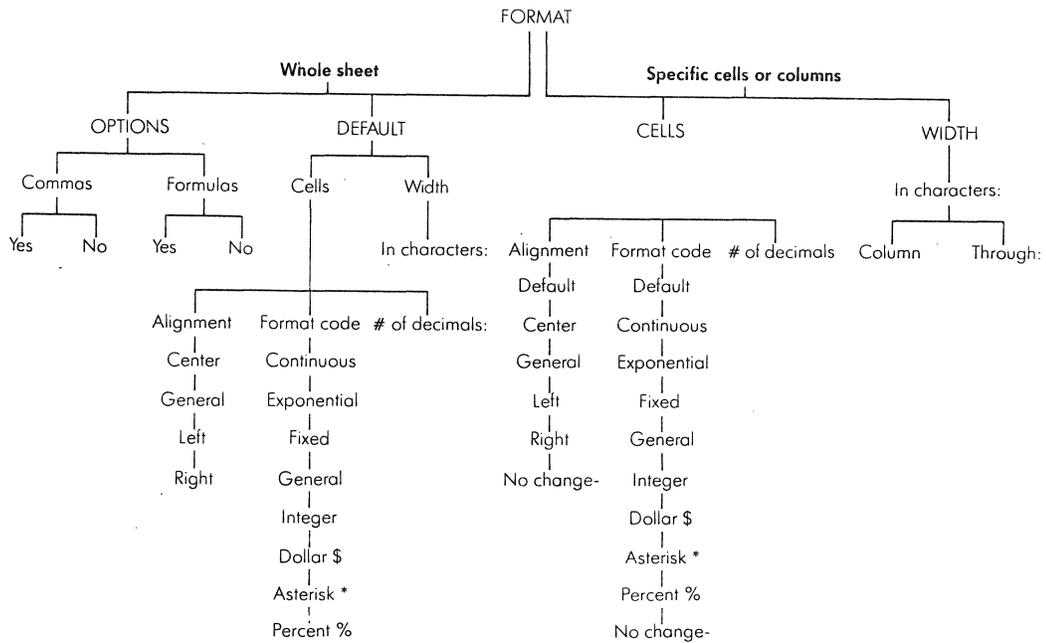
OPTIONS With the FORMAT OPTIONS selection you can place commas in all large numbers on the worksheet and display the formulas used rather than their results on the worksheet.

WIDTH The FORMAT WIDTH command adjusts the width of individual columns.

In this section you will learn about setting column widths, cell alignment, format codes and other formatting techniques.

PREPARED FORMAT

Multiplan provides a default format, or prepared format. All the cells of the worksheet are 10 characters wide, alphanumeric data are left-aligned in the cells, numeric data are right-aligned, and each cell has the general cell format (the computer represents a number in exponential form when required). You'll see examples of the default format in the section about cell alignment.



The options of the FORMAT command give you a wide range of ways to display data.

Formatting Column Widths

Generally the first thing to do when formatting is set the column widths. Estimate the number of characters required in each column. A column can be formatted to any width from 3 to 32 characters. Remember, there are no spaces between columns, so provide for spacing in each column size. Once the size of each column is determined, format the column widths using the `FORMAT DEFAULT WIDTH` and `FORMAT WIDTH` commands.

Pick the most common column width you have chosen and set the entire sheet to that width using `FORMAT DEFAULT WIDTH`. The computer's default width response is 10 characters. In each column that does not have the default width, you set the width using `FORMAT WIDTH`. You can do this without affecting the information you've already entered. For example, if the column is not wide enough to display a certain number you can adjust the column width until the entire number appears. The information in the columns to the right is not affected; these columns are simply shifted over.

Now try the following procedure. It will show you the effect of using the `FORMAT DEFAULT WIDTH` command.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! t1 def.wid	! Loads the def.wid	!
!	!	!	! (EXECUTE) worksheet.	!
!	!	!	!	!
! 2 !	! COMMAND: Format	! f	! FORMAT command.	!
!	!	!	!	!
! 3 !	! FORMAT: Cells Default	! d	! DEFAULT option.	!
!	! Option Width	!	!	!
!	! Select option or type	!	!	!
!	! command letter	!	!	!
!	!	!	!	!
! 4 !	! FORMAT DEFAULT:	! w	! WIDTH option.	!
!	! Cells Width	!	!	!
!	! Select option or type	!	!	!
!	! command letter.	!	!	!
!	!	!	!	!
! 5 !	! FORMAT DEFAULT width	!	! (EXECUTE)	!
!	! in chars: 10	!	!	!

!Step!	Screen Says	! You Type	! Comments
6	COMMAND: Format	fdw 32	FORMAT DEFAULT WIDTH. The maximum width is set at 32 characters.
7	FORMAT DEFAULT column width in chars: 32	(EXECUTE)	
8	COMMAND: Format	fdw 3	(EXECUTE) The minimum column width, 3 characters is set.
9		fw (2) (RETURN)	FORMAT WIDTH.
10	FORMAT WIDTH in chars: or d(efault): d column: 1 through: 63 Enter a number	(EXECUTE)	Sets every column (1-63) to the default width of 3 characters.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1														
2														
3	123	123	123	123	123	123	123	123	123	123	123	123	123	123
4														
5														
6	D	****	D	*****										
7	E	****	E	*****										
8	F	****	F	*****										
9	A	****	A	*****										
10	U	****	U	*****										
11	L	****	L	*****										
12	T	****	T	*****										
13		****		*****		*****		*****		*****		*****		*****
14	W	****	W	*****										
15	I	****	I	*****										
16	D	****	D	*****										
17	T	****	T	*****										
18	H	****	H	*****										

You'll change the column widths of this sheet.

Determining Cell Alignments

The cell alignment and the cell format control the way a cell displays its contents on the screen. Each cell has its alignment and format stored in memory, along with its contents.

Cell alignment refers to the way the cell display appears in the column. There are three possibilities: text or a value can be left-aligned, right-aligned, or centered in the cell. Cell format code refers to how the contents of a cell are displayed. Numeric values may be displayed as integers, dollar amounts, percentages, or fixed point values. Format code is covered in the next section.

Cell alignment is set up in one step using the FORMAT DEFAULT CELLS command or the FORMAT CELLS command for the entire sheet or the FORMAT CELLS command for a part of the sheet.

SIX ALIGNMENT OPTIONS

Def	Default alignment	Returns cells to the alignment specified by the default alignment.
Gen	General alignment	Strings (text) left, values right.
Left	Left alignment	Everything aligned left.
Right	Right alignment	Everything aligned right.
Ctr	Center alignment	Centers the display in the cell.
-	Don't change	Changes the format code of some cells without affecting cell alignment.

When a display is aligned left or right, the characters appear at the edge of the cell. There is one exception. When a value is aligned right, there is a single space between the number and the edge of the cell, separating columns of numbers.

Left or right alignments make everything in a cell appear to the left or right.

fox	100
-----	-----

The center alignment displays strings and values centered in the cell.

fox	100
-----	-----

Center Alignment

The general alignment displays strings with a left alignment and values with a right alignment.

fox	100
-----	-----

General Alignment

In the first field for the FORMAT CELLS command, you specify what cells you want to format. This can be a reference to a single cell or to a group of cells. The second and the third fields for both commands are the same. You select the options for cell alignment and cell format respectively. The last field is used to specify the number of decimals associated with some of the format types.

Now try the procedure in which you'll change the alignments for the entire worksheet.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer	!	tcy	!		!
!	!	!	!	!	!	!
!	2 !	!	t1 alignment	!	FORMAT DEFAULT	!
!	!	!	(EXECUTE)	!	CELL sheet.	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Format	!	fdc	!	FORMAT DEFAULT	!
!	!	!	!	!	CELLS.	!
!	!	!	!	!	!	!
!	4 ! FORMAT DEFAULT CELLS	!	c	!	(EXECUTE) Center alignment.	!
!	! alignment: Ctr Gen	!	!	!	!	!
!	! Left Right	!	!	!	!	!
!	! Select Option	!	!	!	!	!
!	!	!	!	!	!	!

Cell Format Codes

FORMAT DEFAULT CELLS sets the format code for the whole sheet. Individual areas or cells are set to a different code with FORMAT CELLS command.

The format code is selected in the third field of each command. The last field, # of decimals, is only needed when Fix, Exp, or % is selected. It specifies how many decimal places are displayed when one of these three options is selected. All of these codes except Gen and Cont refer to a way of representing numbers. Here are the options and what they do.

Def	Default	Removes any specific format and displays this cell according to the default format.
Gen	General	Strings are displayed only for the width of the cell. Numbers are displayed as precisely as possible in the width of the cell, with scientific notation used automatically as needed.
\$	Money Amounts	Numbers are displayed with a leading dollar sign and two decimal places. Negative numbers are enclosed in parentheses.
Int	Integer	Numbers with a decimal fraction are rounded to whole numbers.
Fix	Fixed Point	Numbers are displayed with a fixed number of digits of decimal fraction. The number of digits is set by the last field of command, "# of decimals."
Exp	Scientific Notation	Numbers are displayed as a decimal times a power of ten, for instance, 2.001E03 for 2001. The number of decimal places used is set by the last field of the command, "#of decimals."
Cont	Continuous	Strings longer than the column width are displayed at their full width, crossing into the column on the right if necessary (the cell to the right must be blank and have the Cont format also).

- * Bar Graph When the cell contains a number, it is rounded to a whole number and as many asterisks are displayed.
- No Change Leave format code as it is. Used if the alignment needs to be changed in a collection of cells.
- % Percent Displays the number times 100 followed by a percent sign. (.05 = 5%)

In the procedure, you'll see how numbers look in different formats.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! t1	! !
! !	! !	! alignment	! Loads alignment !
! !	! !	! !	! worksheet. !
! 2 !	! COMMAND: Alpha...	! fdc	! Chooses FORMAT !
! !	! !	! e	! (EXECUTE) DEFAULT CELLS, !
! !	! !	! !	! exponential selec- !
! !	! !	! !	! tion. !
! !	! FORMAT DEFAULT	! !	! The values are !
! !	! CELLS: ...	! !	! displayed in expo- !
! !	! format code:...(Exp)	! !	! nential form. !
! !	! !	! !	! !
! 3 !	! COMMAND: Alpha...	! fc	! Chooses FORMAT !
! !	! !	! c4	! CELL. Column 4 is !
! !	! !	! f	! (RETURN) formatted fixed !
! !	! !	! 2	! (RETURN) with 2 decimal !
! !	! !	! !	! (RETURN) places. R14C4 !
! !	! !	! !	! displays # in the !
! !	! !	! !	! cell because the !
! !	! !	! !	! number is too !
! !	! !	! !	! large to fit. !

1	2	3	4
1			
2			
3	ACCOUNT #	BALANCE	
4	=====	=====	
5			
6	4079-11327-9SA	\$26873.93	} Formatted without commas
7			
8	4079-17892-4TX	\$3339929.05	
9			
10	4079-12525-0FD	\$8447444.87	
11			
12	4079-23334-100	\$129789.44	
13			
14	4079-21197-7JH	\$19873.79	
15			
16	4079-09833-3TU	\$1028733.93	
17			
18	4079-33867-11P	\$27198356.88	

1	2	3	4
1			
2			
3	ACCOUNT #	BALANCE	
4	=====	=====	
5			
6	4079-11327-9SA	\$26,873.93	} Formatted with commas
7			
8	4079 17892 4TX	\$3,339,929.05	
9			
10	4079-12525-0FD	\$8,447,444.87	
11			
12	4079-23334-100	\$129,789.44	
13			
14	4079-21197-7JH	\$19,873.79	
15			
16	4079-09833-3TU	\$1,028,733.93	
17			
18	4079-33867-11P	\$27,198,356.88	

The numbers in this worksheet are displayed with and without commas using the FORMAT OPTIONS command.

Creating a Bar Graph

An interesting feature of Multiplan is to display information as a bar graph. For example, you can create a visual image of stock price fluctuations with the bar graph cell format.

In the section on format codes, you learned that the code for the bar graph format is an asterisk (*). When a cell is set to this format, numbers are displayed as horizontal bars of asterisks. The number of asterisks used is the same as the number the cell contains. So, 4 looks like this, ****. Decimals are rounded to the nearest whole number and negative numbers are enclosed in parentheses. For example, -3.4 is displayed as (***) , a representation of the next smallest number. These bars can be aligned left, right or centered by changing the cell alignment.

To ensure that all the numbers fit within the column width, each should be divided by a single number, called a factor. Generally this is done by changing the formula contained in each cell.

- 1 The column is set to 30 characters wide.
- 2 To find what factor to use, look at the largest number. (See \$142,122 in the illustration.) What number do you divide into this number to make the result just smaller than the width of the column? A guess at a factor of 5,000 gives a result of 28.4244. That's close enough to 30 to fit the column. 5,000 becomes the factor.
- 3 Each number in column 2 is divided by the factor. The result is used in the formula in column 3.

In the procedure, you'll change column 3 in the illustration from a general format to the bar graph format.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	1 ! COMMAND: ...Transfer	! tcy	!	!
!	!	!	!	!
!	2 !	! t1 bar.graph	! Loads the	!
!	!	! (EXECUTE)	! bar.graph work-	!
!	!	!	! sheet.	!
!	!	!	!	!
!	3 ! COMMAND: ...Format	! fc	! FORMAT CELLS.	!
!	!	!	!	!

Displaying Text Across Columns

Those cell formats discussed so far apply to numbers. No matter what format a cell may have, text strings always appear as they are entered. The continuous format, Cont, is the single exception and applies only to text strings.

When a string is displayed, it is aligned left, right, or centered according to the cell alignment. When the string is longer than the width of the cell, it is cut off at the cell's width no matter what alignment the cell may have. The characters that don't fit are not shown. For instance, if the cell width is six characters and the cell contains The quick brown which is 15 characters, the display shows The qu. Remember that a space is always considered a character.

There are two ways to display an entire string. First, you can change the width of the column so the entire string is visible. However, if the string exceeds the maximum column size, or if you have a table or chart above or below the text, you may not want to change the width of columns. The alternative is to use the continuous format, which is the second way to display a string across column boundaries.

When a cell has the continuous format, any string that is longer than the cell's width crosses over into the cells to the right. There are two requirements for the cells that are crossed into. They must also have the continuous format, and must be blank. Numbers are not affected by the continuous format.

In the procedure, you'll start with a worksheet displayed in the general format. Watch the effect of using the continuous format.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer	!	! tcy	!	!	!
!	!	!	!	!	!	!
!	2 !	!	! t1 continuous	!	! Loads the conti-	!
!	!	!	!	!	! nuous worksheet.	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Format	!	! fc	!	! FORMAT CELLS.	!

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 4 !	! FORMAT CELLS: <u>R1C1</u>	! R5:11	! Rows 5 through 11.!	!
!	! alignment: (Def)...	!	!	!
!	! format code: (Def)...	! (2) <u>RETURN</u> !	!	!
!	! Enter reference.	!	!	!
!	!	!	!	!
! 5 !	! FORMAT CELLS: R5:11	! c'	! Moves the format	!
!	! alignment: (Def)...	!	! code selector to	!
!	! format code: (Def)...	!	! Cont.	!
!	!	!	!	!
! 6 !	! FORMAT CELLS: R5:11	!	!	!
!	! alignment: (Def)...	!	!	!
!	! format code:...(Cont)!	!	!	!

After your worksheet is formatted, new factors could affect the results, so that existing information needs to be modified or changed. The edit commands discussed in the following procedures simplify this editing process.

THE EDIT COMMANDS

A variety of commands are used to develop and modify worksheets.

EDIT	Modifies single characters without changing the rest of the contents of the cell.
BLANK	Erases the contents of a cell. The space remains on the screen where the cell was.
COPY	Duplicates cells to other locations on the worksheet. You can copy cells down or to the right, or copy a group of cells from one location to another.
MOVE	Transfers either rows or columns to another location on the worksheet.
INSERT	Adds empty cells to a selected location on the worksheet. Rows or columns are adjusted automatically on the screen around the new cells.
DELETE	Erases rows and columns on a worksheet. Space previously occupied by the rows and columns disappears on the screen.
SORT	Rearranges rows and columns by specifying a particular cell.

!Step!	Screen Says	You Type	Comments
6	EDIT: "The quick blue foxx jumps"	(4) (DELETE)	(DELETE) erases characters high- lighted by the cursor.
7	EDIT: "The quick foxx jumps"	brown	The letters you type are inserted behind the edit cursor.
8	EDIT: "The quick brown foxx jumps"	(4) (→ CHAR EDIT) (DELETE)	Deletes <u>x</u> in foxx. Deletes <u>x</u> in foxx.
9	EDIT: "The quick brown fox jumps:"	(EXECUTE)	The phrase is cor- rect so enter it into the cell.
10	COMMAND: ...Edit	(2) ↓ e	
11	EDIT: "ower the crazy chicken"	(8) (BACK SPACE)	Erases the word chicken.
12	EDIT: "ower the crazy dog		
13	EDIT: "ower the crazy dog	(7) (← CHAR EDIT)	Positions the edit cursor on the <u>a</u> in crazy.
14	EDIT: "ower the crazy dog	(2) (BACK SPACE)	Erases the <u>cr</u> in crazy.
15	EDIT: "ower the lazy dog	(8) 1 (← CHAR EDIT)	Type in 1 (1 as in lazy, not one.) Moves the cursor to the word ower.
16	EDIT: "over the lazy dog	v (DELETE)	Corrects the word over.

The BLANK Command

The BLANK command is your electronic eraser. It deletes the contents of a cell, leaving the cell space and name in the worksheet. The cell is then ready for you to enter new information.

A blank cell contains nothing and therefore takes up less space in memory. So if you are running out of space on a worksheet, try erasing some of the unnecessary cells. You can use (END) to check the size of your worksheet; (END) will move the pointer to the cell nearest the right bottom of the sheet that contains data. For example, if you lock an entire row (using LOCK which you'll learn more about later) and fill only six columns with information, (END) shows the whole row in use. You can then unlock unused cells and free up memory space.

BLANK is a simple command with no options. After selecting the command, you are asked the locations of the cells you wish to erase. Refer to a single cell by its address, such as R3C6. To make more than one cell blank, list each cell separated by commas. You can even refer to entire rows, such as R5, or entire columns, such as C9, or areas such as R5:7C1:3.

To blank a single cell, move the pointer to that cell. By typing b (EXECUTE), the cell is erased. The computer's prepared response for the BLANK command is to erase the active cell.

In the procedure you'll see how the BLANK command works.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
!	!	!	!	!
! 2 !	!	! t1 blank	! (EXECUTE) ! Loads the blank	!
!	!	!	! worksheet.	!
!	!	!	!	!
! 3 !	! COMMAND: ...Blank	! b	!	! BLANK command.
!	!	!	!	!
! 4 !	! BLANK cells: R1C1	! r5c2	! (EXECUTE) ! The computer's	!
!	! Enter reference to	!	! prepared response	!
!	! cell or group of	!	! is the active	!
!	! cells	!	! cell.	!
!	!	!	!	!
! 5 !	! COMMAND: ...Blank	! b	!	! BLANK command.
!	!	!	!	!
! 6 !	! BLANK cells: R5C2	! r9	! (EXECUTE) ! Blanks row 9.	!

!Step!	Screen Says	! You Type	! Comments
! 7 !	! COMMAND: ...Goto	! gr 5	! (RETURN) Moves pointer to
! !	! !	! 8	! (EXECUTE) R5C8. Blanks
! !	! !	! b	! (EXECUTE) R5C8.
! !	! !	! (8)	! !
! 8 !	! COMMAND: ...Blank	! b	! (EXECUTE) Moves pointer to
! !	! !	! !	! R13C8. Blanks
! !	! !	! !	! R13C8.

With BLANK R21:27C9:11,
This

Becomes this

#1	8	9	10	11	12
20	x	x	x	x	x
21	x	x	x	x	x
22	x	x	x	x	x
23	x	x	x	x	x
24	x	x	x	x	x
25	x	x	x	x	x
26	x	x	x	x	x
27	x	x	x	x	x
28	x	x	x	x	x

#1	8	9	10	11	12
20	x	x	x	x	x
21	x				x
22	x				x
23	x				x
24	x				x
25	x				x
26	x				x
27	x				x
28	x	x	x	x	x



The COPY Command

Save yourself time in duplicating a cell's contents and format by using the COPY command. It automatically repeats the contents and format of a cell downward in a column, across in a row, or from one location on the worksheet to another.

THE OPTIONS OF THE COPY COMMAND

The COPY RIGHT, COPY DOWN, and COPY FROM options of the COPY command make a frequently required function easier to perform. If you have turned off automatic recalculation, the destination cells will display exactly the same values as the source cells.

COPY RIGHT

You can repeat a cell's contents in a row of cells to the right of it by using COPY RIGHT. The number of cells that receive copies is given in the first field. The prepared response for the second field is the cell that is active when you give the command. Generally, you first move the pointer to the cell being copied. Therefore the second field is rarely altered.

COPY RIGHT number of cells: 5 starting at: R1C1

Original cell contents

#1	1	2	3	4	5	6
1	x					
2						
3						

5 cells copied

#1	1	2	3	4	5	6
1	x	x	x	x	x	x
2						
3						

COPY DOWN

You can repeat a cell's contents in the column beneath it. The fields for COPY DOWN work the same as COPY RIGHT. Once you change the first field using either command, it becomes the computer's prepared response.

COPY DOWN number of cells: 5 Starting at: R1C1

Original cell contents

1	100
2	
3	
4	
5	
6	

5 cells copied

1	100
2	100
3	100
4	100
5	100
6	100

COPY FROM

You can copy a cell's contents to a single cell or to a group of cells. When you copy a group of cells to another area indicate the upper left cell of the destination area in the second field of the command.

COPY FROM cells: R1C1 to cells: R5C3

Now try using the COPY FROM command to copy area cells to another.

COPY FROM cell R1C1

	1	2	3	4	5
1	Hi!				
2					
3					
4					
5					

To cell R5C3

	1	2	3	4	5
1	Hi!				
2					
3					
4					
5			Hi!		

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
! 2 !	!	! tl copy.from	! Loads the copy	!
!	!	! (EXECUTE)!	! from sheet.	!
! 3 !	! COMMAND: ...Copy	!	! COPY FROM command.!	!
!	!	! (6)	!	!
!	!	! cf	!	!
! 4 !	! COPY FROM cells:	! :	! R7C4 is the de-	!
!	! R7C2:R +6 C2 to	! (6)	! fault choice.	!
!	! cells: R7C4	!	! Type : then 6	!
!	!	!	! to indictate the	!
!	!	!	! range of the area	!
!	!	!	! you want to copy	!
!	!	!	! from. After you	!
!	!	! (RETURN)!	! press (RETURN)	!
!	!	!	! enter R7C4, the	!
!	!	! r7c4	! area you are	!
!	!	!	! copying to.	!
!	!	!	!	!
! 5 !	! COMMAND: Alpha...	! (EXECUTE)!	! The area on the	!
!	!	!	! left is duplicated!	!
!	!	!	! on the right.	!

Copy this					Over here				
#1	1	2	3	4	#1	1	2	3	4
1					1				
2					2				
3					3				
4					4				
5					5				
6					6				
7		1001			7		1001		
8		lazy dos			8		lazy dos		
9		Fred Jones			9		Fred Jones		
10		3.1415			10		3.1415		
11		Jumps			11		Jumps		
12		229_1771			12		229_1771		
13		1E+12			13		1E+12		
14					14				

The cells on the left were copied to the column on the right using the COPY FROM command.

The MOVE Command

When you are working with a chart or table and need to rearrange the rows or columns, transfer rows and columns to other parts of the worksheet with the MOVE command. The rows or columns are deleted from their original locations. The MOVE command has two options, Row and Column.

ROW OPTION

The ROW option changes the order of rows on the sheet by shifting one or more rows up or down. Suppose you want to move rows 9-13 to precede row 4.

Move these rows

#1	1	2	3	4	5	6	7	8	9
1	xxxxxxx								
2	xxxxxxx								
3	xxxxxxx								
4	xxxxxxx								
5	xxxxxxx								
6									
7									
8									
9									

Over here

#1	1	2	3	4	5	6	7	8	9	10	11
1				xxxxxxx							
2				xxxxxxx							
3				xxxxxxx							
4				xxxxxxx							
5				xxxxxxx							
6											
7											
8											
9											

In this case, you enter the fields of the MOVE ROW command as follows:

MOVE ROW from row: 9 to before row: 4
of rows: 5

The rows that are displaced are shifted downward to make room for the new rows. The rows are automatically renumbered when moved. Formulas in the moved rows are also recalculated to be correct.

COLUMN OPTION

The COLUMN option works in a similar way. It changes the order of columns on the sheet by shifting one or more columns left or right.

Suppose you want to move columns 8 through 11 to precede column 16.

Move these columns

#1	8	9	10	11	12	13	14	15	16	17	18
1	x	x	x	x							
2	x	x	x	x							
3	x	x	x	x							
4	x	x	x	x							
5											

Over here

#2	8	9	10	11	12	13	14	15	16	17	18
1								x	x	x	x
2								x	x	x	x
3								x	x	x	x
4								x	x	x	x
5											

Columns 12-15 move left to fill the space created by moving columns (8-11) and are renumbered 8-11.

Just as with MOVE ROW, the computer automatically adjusts column names and column formulas, as well as renumbering the columns.

When using the MOVE COLUMN command, take advantage of the computer's prepared responses by moving the cell pointer to the "to the left of column" (position). Unlike the COPY command, moving the pointer after starting the command does not affect the fields. Once the pointer is in the correct position, type mc. The second and third fields are already correct. Now you only need to type the number of the "# of columns" and press EXECUTE. This also works for MOVE ROW.

In the procedure, you'll arrange some rows alphabetically with the ROW option of the MOVE command.

:Step:	Screen Says	: You Type	: Comments	:
: 1 :	COMMAND: ...Transfer	: tcy	:	:
: 2 :	:	: t1 move <u>EXECUTE</u>	: Loads the move	:
:	:	:	: worksheet.	:

!Step!	Screen Says	! You Type	! Comments
! 3 !	! COMMAND: ...Goto	! gr 14	! (EXECUTE)
! !	! COMMAND: ...Move	! m	! MOVE command.
! 4 !	! MOVE: Row Column	! r	! ROW option.
! !	! Select option or	!	!
! !	! type command letter.	!	!
! 5 !	! MOVE ROW from row:	! 10	! (EXECUTE)
! !	! 14 to before row: 14	!	! Moves the row of
! !	! Enter a number	!	! a's.
! 6 !	! COMMAND: ...Move	! mr 7	! (EXECUTE)
! !	!	!	! Moves row of b's.
! 7 !	!	! mr 8	! (EXECUTE)
! !	!	!	! Moves row of c's.
! 8 !	!	! mr 6	! (EXECUTE)
! !	!	!	! Moves row of d's.
! 9 !	!	! mr 6	! (EXECUTE)
! !	!	!	! Moves row of e's.

The INSERT Command

The INSERT command adds blank cells to already existing information. When space is inserted between rows or columns, all cell references affected by the insertion are updated such as names, formulas or other cells. For example, if a formula that refers to rc -1 is moved one column to the right after a column insert, Multiplan automatically changes the formula to rc -2 .

Existing columns are moved sideways while existing rows are moved downward by the INSERT command. The far right columns and the bottom rows of the sheet are always dropped. Multiplan maintains 255 rows and 63 columns. The INSERT command has two options, COLUMN and ROW.

INSERT COLUMN

You are asked the number of columns to add, before which column, and between which rows. Look at the following example:

#1	1	2	3	4	5	6	7	8	9
1	x	x	x	x	x	x	x		
2	1	2	3	4	5	6	7		
3	1	2	3	4	5	6	7		
4	x	x	x	x	x	x	x		
5	x	x	x	x	x	x	x		

To shift part of this area to the right, use the INSERT COLUMNS command with the following entries in the fields.

INSERT COLUMN # of columns: 2 before column: 4
between rows: 2 and: 3

The result looks like this:

#1	1	2	3	4	5	6	7	8	9
1	x	x	x	x	x	x	x		
2	1	2	3			4	5	6	7
3	1	2	3			4	5	6	7
4	x	x	x	x	x	x	x		
5	x	x	x	x	x	x	x		

INSERT ROW

Similarly, to shift the area down, use the INSERT ROW command with the following entries.

INSERT ROW # of rows: 2 before row: 4
between columns: 1 and: 63

The result looks like this:

Rows 4 and 5 move down.

#1	1	2	3	4	5	6	7
1	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x
3	x	x	x	x	x	x	x
4							
5							
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

The most common use of INSERT is to add groups of rows and columns. The computer's prepared response is to assume that this is the case. Therefore the between rows:field always shows from 1 to 255 rows and the between columns:field always shows from 1 to 63 columns on an INSERT.

You'll see how easy it is to use the computer's prepared responses for INSERT in this next procedure, by inserting rows and columns right at the active cell.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	!	! tl insert	! Loads the insert
!	!	! (EXECUTE)	! sheet.
! 3 !	! COMMAND: ...Goto.	! gr 8	! (EXECUTE)
! 4 !	! COMMAND: ...Insert	! i	! INSERT command.
! 5 !	! INSERT: Row Column	! r	! ROW option.
!	! Select option or type!	!	!
!	! command letter.	!	!
! 6 !	! INSERT ROW # of	! 8	! Insert 8 rows.
!	! rows: <u>1</u>	!	!
!	! before row: 8	!	!
!	! between col's: 1 and	!	!
!	! : 63. Enter a number.	!	!
! 7 !	! INSERT ROW # of	!	! (EXECUTE)
!	! rows: 8	!	!
! 8 !	! COMMAND: ...Insert	! ic 3	! (RETURN)
!	!	! 5	! INSERT COLUMN.
!	!	!	! Inserts 3 columns.
!	! INSERT COLUMN # of	!	! (EXECUTE)
!	! columns: 3	!	! The screen is re-
!	! before cols: 5	!	! drawn with the 3
!	! Enter a number.	!	! extra columns.

The DELETE Command

The DELETE command removes rows or columns from your worksheet. The cells above and below the deleted cells shift to the left or right to take the place of the deleted cells. New blank cells are added to the right edge or bottom of the sheet, depending on whether you have deleted columns or rows. All cell references, names, and formulas affected by the deletion are automatically adjusted. DELETE has two options, ROW and COLUMN.

DELETE ROW

Suppose you want to remove the cells in rows 1 to 6 and columns 4 through 5. Below is an example of how the DELETE ROW command works.

This

#1	1	2	3	4	5	6	7
1	x	x	x	x	x		
2	x	x	x	x	x		
3	x	x	x	x	x		
4	x	x	x	x	x		
5	x	x	x	x	x		
6	x	x	x	x	x		
7							

Becomes this

#1	1	2	3	4	5	6	7
1	x	x	x				
2	x	x	x				
3	x	x	x				
4	x	x	x				
5	x	x	x				
6	x	x	x				
7							

DELETE COLUMN

DELETE COLUMN asks you the number of columns to delete, before which column and between which rows.

For example, with these instructions DELETE COLUMN
of columns: 2 before column:3 between rows: 3 and: 4.

This

#1	1	2	3	4	5	6
1	x	x	x	x	x	x
2	x	x	x	x	x	x
3	x	x	x	x	y	y
4	x	x	x	x	y	y
5	x	x	x	x	x	x
6	x	x	x	x	x	x

Becomes this

#1	1	2	3	4	5	6
1	x	x	x	x	x	x
2	x	x	x	x	x	x
3	x	x	y	y		
4	x	x	y	y		
5	x	x	x	x	x	x
6	x	x	x	x	x	x

As with INSERT, the most common use of the DELETE command is deleting entire rows and columns. Here, however, to familiarize yourself with the flexibility of the command, you'll begin by deleting just segments of rows. To do this, you'll be overriding the computer's prepared responses.

In the procedure, you'll begin by loading a worksheet like the one shown in the illustration. Then, you'll use the DELETE command to remove only those cells containing dots.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	!	! tcy	!	!	!
!	!	!	!	!	!	!
! 2 !	!	!	! t1 delete	!	! Loads the delete	!
!	!	!	!	!	! (EXECUTE) worksheet.	!
!	!	!	!	!	!	!
! 3 !	! COMMAND: ...Delete	!	! d	!	! DELETE command.	!
!	!	!	!	!	!	!
! 4 !	! DELETE: Row Column.	!	! r	!	! ROW option.	!
!	! Select option or type!	!	!	!	!	!
!	! command letter.	!	!	!	!	!
!	!	!	!	!	!	!
! 5 !	! DELETE ROW # of	!	! 10	!	! (RETURN) Enters the infor-	!
!	! rows: 1	!	!	!	! mation into the	!
!	! starting at: 7	!	! 5	!	! (RETURN) field	!
!	! between columns: 1	!	!	!	!	!
!	! and: 63	!	! 3	!	! (RETURN)	!
!	! Enter a number	!	! 4	!	!	!
!	!	!	!	!	!	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!		!		!
! 6	! DELETE ROWS # of	!	(EXECUTE)	!	Deletes the square!	!
!	! rows: 10	!		!	! of dots.	!
!	! starting at: 5	!		!		!
!	! between col's: 3	!		!		!
!	! and: 4	!		!		!
!	!	!		!		!
! 7	! COMMAND: ...Delete	!	dr 10 (RETURN)	!		!
!	!	!		!		!
! 8	! DELETE ROWS # of	!	11 (EXECUTE)	!	All dots are	!
!	! rows: 10	!		!	! deleted.	!
!	! starting at: 11	!		!		!
!	! between col's: 1	!		!		!
!	! and: 63	!		!		!
!	!	!		!		!

```

#1      1      2      3      4      5      6
1
2
3          DELETE THE DOTS
4          =====
5 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
6 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
7 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
8 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
9 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
10 aaaaaaaaaaaaaaaaaaaaaaaaa.....aaaaaaaaaaaaaaaaaaaaaaaa
11 .....
12 .....
13 .....
14 .....
15 .....aaaaaaaaaaaaaaaaaaaaaaaa.....
16 .....aaaaaaaaaaaaaaaaaaaaaaaa.....
17 .....

```

Use the DELETE command to remove the dots.

The SORT Command

You've seen ways to relocate cells by moving or copying cells. Now you'll learn how to rearrange rows by sorting them according to a specified column.

Sorting greatly expands the range of problems you can handle with Multiplan. For example, consider a checkbook register, where besides keeping track of the current balance, you want to sort the rows by category, payee, check number, or total deposits to date. Using the SORT command, you can perform all of these processes in a few steps.

The SORT command has four fields. It asks which column you want to sort, between which rows, and in what order. Multiplan offers prepared responses on each field.

- column -- current column
- row -- rows 1 through 255
- order -- > (increasing)

Sorts may be done on text, values, or a combination of the two, which will place values first, upper case text next, and lower case text last. Sorting rows in one column affects those rows in all other columns. For example, doing a sort on the list in column 2, rows 1:5, affects column 1, rows 1:5 in the example below.

This

	1	2
1	1	Nancy
2	2	John
3	3	Sam
4	4	Nigel
5	5	Paul

Becomes this

	1	2
1	2	John
2	1	Nancy
3	4	Nigel
4	5	Paul
5	3	Sam

As you see, a sort on column 2 also affects the order of column 1. In this next procedure, you'll use the SORT command on a check register.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
! 2 !	!	! t1	!	!
! 3 !	! TRANSFER LOAD	! checkbook	! Loads checkbook	!
!	! filename:	!	! sheet.	!
!	!	!	!	!
! 4 !	! COMMAND: ...Sort	! s	! SORT command.	!
!	!	!	!	!
! 5 !	! SORT by column: <u>1</u>	! 4	! (RETURN) ! Sort by code	!
!	! Enter a number.	!	! (Column 4)	!
!	!	!	!	!
! 6 !	! Between rows: <u>1</u>	! 3	! (RETURN) ! Between rows 3	!
!	! and: 255	!	! and 255.	!
!	!	!	!	!
! 7 !	!	!	! (EXECUTE) ! Starts the sort.	!
!	!	!	!	!
! 8 !	! COMMAND: ...Sort	! s	! SORT command.	!
!	!	!	!	!
! 9 !	! SORT by column: 1	! 3	! (RETURN) ! Sorts by payee	!
!	!	!	! (column 3),	!
!	!	! 8	! (RETURN) ! between rows 8	!
!	!	! 19	! (RETURN) ! and 19.	!
!	!	! <	!	!
! 10 !	! COMMAND: ...Sort	! s	! SORT command.	!
!	!	!	!	!
! 11 !	! Sort by column: 1	! 5	! (RETURN) ! Sorts by check	!
!	!	! 8	! (RETURN) ! amount, between	!
!	!	! 19	! (RETURN) ! rows 8 and 19.	!
!	!	!	!	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 12 !	! Order: > (<)	!	! (EXECUTE)	!	! Sorts decending	!
!	!	!	!	!	! order.	!
!	!	!	!	!	!	!
! 13 !	! COMMAND: ...Sort	!	! s	!	! Selects SORT.	!
!	!	!	!	!	!	!
! 14 !	! Sort by column: <u>1</u>	!	! 2	!	! (RETURN) ! Sorts by date	!
!	!	!	! 3	!	! (RETURN) ! from row 3 to row	!
!	!	!	! 19	!	! (EXECUTE) ! 19.	!
!	!	!	!	!	!	!
!	!	!	!	!	!	!

Using Formulas

Formulas are created using references to cells: the four arithmetic operators (addition, subtraction, multiplication, and division); and Multiplan's built-in functions. With the use of formulas, you have all the power of an advanced calculator to figure simple to complex calculations automatically.

A check register balances itself. A balance sheet updates the totals whenever changes are made to any of the entries. Cash flow is instantly analyzed to determine the return on an investment. Amortization charts, automated ledgers, tax tables, and budget analysis can all take place in a matter of seconds. Using formulas gives you this power.

In this section you'll:

- Use formulas
- Develop cell references
- Develop cell names
- Use the functions of Multiplan

13 Simple Formulas

A cell can hold text, a number, or a formula. You have worked with text and numbers; now you'll work with formulas. A formula is not a value itself, as numbers or strings are. A formula is like a recipe or a procedure that tells Multiplan how to produce a value and where to place it, if other than in the formula's own cell. Multiplan follows the formula to arrive at a value to display in the proper cell on the worksheet. The result can be either a number or text. You enter the formula in the cell; the result is displayed in the cell; and the formula itself is shown on the status line.

Formulas consist of references to other cells, text or numbers, and functions. The simplest formula is a reference to another cell, such as R[-1]C. This formula copies the value above the active cell into the active cell so that both cells now show the same value. The present cell changes as the cell above it changes.

Place R[+ 1]C in R2C4.

		1	2	3	4	5	6	7
1					70			
2					70			
3								

The next type of formula makes an arithmetic calculation based on another cell's value, such as R[+1]C[+1]. This formula takes the value in the cell above the active cell and adds one to it. Then the value is displayed in the active cell.

Place R[+1]C[+1] in R2C4.

	1	2	3	4	5	6	7
1				70			
2				71			
3							

As you can see, you can build more and more complicated formulas as you increase the number of cell references involved and use the functions available to you from Multiplan. Cell references and functions are explained in detail in later chapters. Formulas are entered by typing an equal sign and then the formula. The formula can contain several cell references and mathematical operators entered on a single line. The formula is complete when the Execute key is pressed.

In the following section, you'll see how to construct simple formulas using cell references and arithmetic operators.

Formula Warning Displays

Syntax, or arrangement of characters, is important in Multiplan. A formula requires both correct syntax and that all operations be legal. If you make an error in a formula, it is detected by Multiplan when you press (EXECUTE). A message will appear in the cell indicating the type of problem you need to correct.

THE SYNTAX OF FORMULAS

Two things can go wrong when you are using a formula. First, you might enter a formula that doesn't make sense to the computer. For example:

3 + 4 +

The computer can solve 3 + 4, but what does it do with the extra +? Errors of this sort are detected as soon as you press (EXECUTE). The computer beeps and you receive the message:

Error in formula

To help you find the problem, the edit cursor highlights the incorrect part of the formula. When entering the above formula into a cell, the edit cursor appears on the last +, showing you where the error has been detected.

THE LOGIC OF FORMULAS

The second kind of mistake occurs when you enter a formula with the correct syntax but there is a logic error. What you think the formula means and what the computer does to compute the formula may be two different things. When a logic error happens the screen displays one of the following warning messages in the cell containing the formula.

#NAME Formula contains an undefined name.
 #NUM Numeric overflow; a number outside the range of the computer must be computed.
 #DIV/0 When the formula is evaluated, it must divide a number by zero.
 #REF Improper relative reference, the cell no longer exists.
 #NULL Empty intersection.
 #VALUE A cell containing text is used as a number or vice versa.

When a cell contains a formula, the formula is calculated using whatever cell references appear in the formula. Therefore, when a formula cannot be calculated, the appropriate warning message is displayed not only in the cell containing the formula, but also simultaneously in all the cells that depend on that original formula cell.

In this procedure, you'll cause four warnings to appear on purpose.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	!	! t1 warnings	! This sheet shows
!	!	! (EXECUTE)	! all the warning
!	!	!	! displays
! 3 !	!	! tcy	! Clears the sheet
!	!	!	! and moves the
!	!	! (4) ↓	! cursor to R5C3.
!	!	! (2) →	!
! 4 !	! COMMAND: ...Value	! = r5c2 & r5c2 &	! Enters the formula!
!	!	! r5c2	! into cell R5C3.
! 5 !	! VALUE: r5c2 & r5c2 &	! (EXECUTE)	! The formula
!	! r5c2	!	! appears on the
!	!	!	! status line. Watch!
!	!	!	! this part of the
!	!	!	! screen in the next!
!	!	!	! few steps.
!	!	!	!

!Step!	Screen Says	You Type	Comments
! 10 !		<input type="text" value="="/>	! Enters the formula!
! :		! r5c1 ^ 10 (EXECUTE)	! R5C1 ^ 10 in R5C2.!
! :		! :	! The #DIV/0! warn-!
! :		! :	! ing is also!
! :		! :	! displayed in this!
! :		! :	! cell.!
! 11 !		! :	! R5C2 now shows!
! :		! 10 (EXECUTE)	! 1E + 10.!
! 12 !		! 1e3 (EXECUTE)	! R5C2 now shows!
! :		! :	! 1E + 30.!
! 13 !		! 1e 7 (EXECUTE)	! Enters 1E7 in!
! :		! :	! R5C1. R5C2 now!
! :		! :	! shows the #NUM!!
! :		! :	! warning. The!
! :		! :	! value is 1E70,!
! :		! :	! which is above the!
! :		! :	! range of the!
! :		! :	! application. This!
! :		! :	! is a numeric!
! :		! :	! overflow.!
! :		! :	! :

Using Operators

Addition, subtraction, multiplication, division, and exponentiation are used in Multiplan formulas. These operators perform in formulas just as they do in algebra. Each operation is represented by a symbol. You will learn more operators later.

<u>Symbol</u>	<u>Operator</u>		<u>Example</u>
+	Addition	Returns, or results in the sum of two numbers.	$3 + 6 = 9$
-	Subtraction	Returns the difference between two numbers.	$8 - 5 = 3$
*	Multiplication	Returns the product of two numbers.	$7 * 11 = 77$
/	Division	Returns the result of dividing the first number by the second.	$9/4 = 2.25$
^	Exponentiation	Returns the first number raised to the power expressed by the second number.	$3 \wedge 2 = 9$ (i.e. 3^2)
()		Group operations together. Operations inside the parentheses are calculated first.	$3 + (4-5)*2 = 1$ $(3 + 4)-5*2 = -3$

Multiplan processes these operators in the order below, from first to last. To achieve accurate results, write your formulas keeping the order of the categories in mind.

- 1 () Parentheses
- 2 ^ Exponentiation
- 3 * , / Multiplication and Division
- 4 + , - Addition and Subtraction

Within each category, the processing order is from left to right. Look at some examples that show left to right processing. You can see that the answer is affected by the processing order.

<u>Expression</u>	<u>Is processed like this</u>	<u>Not this</u>
3 - 7 + 4 = =	-4 + 4 0	3 - 11 -8
8/2 * 2 = =	4 * 2 8	8/4 2
2 ^ 3 ^ 2 = =	8 ^ 2 64	2 ^ 9 512

When you have a formula with operators from different categories, the order of operations provides the following results:

<u>Expression</u>	<u>Is processed like this</u>	<u>Not this</u>
(Multiplication occurs before addition and subtraction)		
32 - 7 * 4 = =	32 - 28 4	25 * 4 100
(Division occurs before addition and subtraction)		
16/4 - 2 = =	4 - 2 2	16/2 8
(Powers are performed before multiplication and division)		
3 * 2 ^ 3 = =	3 * 8 24	6 ^ 3 216

When you position the cell pointer on a cell with a formula, the formula shows on the status line even though the cells themselves display the result of computing the formula's value.

In the procedure you'll enter the above formulas into some cells. In Step 6, use the ^ character for exponentiation. ^ is the shift 6 key.

<u>!Step!</u>	<u>Screen Says</u>	<u>! You Type</u>	<u>! Comments</u>	<u>!</u>
!	!	!	!	!
! 1	! COMMAND: ...Transfer	! tcy	!	!
!	!	!	!	!
! 2	! COMMAND: ...Value	! =	! Note the = key	!
!	!	! 3 - 7 + 4	! for <u>VALUE</u> .	!
!	!	!	!	!

!Step!	Screen Says	! You Type	! Comments
! 3 !	! VALUE: 3 - 7 + 4	!	! The answer is 0. ! ! The arrow key ! ! presents a choice ! ! of ALPHA or VALUE.! ! A number automati-! ! cally chooses ! ! VALUE. !
! 4 !	! ALPHA/VALUE	! 8/2 * 2	! Be sure to use / ! ! and not \ . It's! ! easy to mix them ! ! up. !
! 5 !	! VALUE: 8/2 * 2	!	! The answer is 8. !
! 6 !	! ALPHA/VALUE	! 2 ^ 3 ^ 2	!
! 7 !	! VALUE: 2 ^ 3 ^ 2	! 	! The answer is 64. ! ! Remember the pro- ! ! cessing order is ! ! left to right for ! ! like signs. !
! 8 !	! ALPHA/VALUE	! 32 - 7 * 4 ! 	! The answer is 4. !
! 9 !	!	! 16/4 - 2 ! 	! The answer is 2. !
! 10 !	!	! 3 * 2 3 ! 	! The answer is 24. !
! 11 !	!	! (32 - 7) * 4 ! 	!
! 12 !	! VALUE: (32 - 7) * 4	!	! The answer is 100.!
! 13 !	! ALPHA/VALUE	! 16/(4 - 2) ! 	! The answer is 8. !
! 14 !	!	! (3 * 2) ^ 3 ! (EXECUTE)!	! The answer is 216.!

Joining Text

It is sometimes useful to concatenate, or link together, text from two or more cells. The concatenate operator, used only with text strings, is used in formulas to do just that. For example, concatenating two cells containing com and puter would result in the value computer being placed in a cell. The ampersand (&) is the symbol of the concatenate operation. The formula would look like this

r2c2 & r3c5

where r2c2 contains com and r3c5 contains puter.

Later you will learn functions that convert numeric entries into text, for example, the FIXED and DOLLAR functions. You can combine values and text in this way. In this example R11C4 represents a number that is changed to a string with the FIXED function; rounded to two places, and displayed in dollar format (with the DOLLAR function).

Formula: R2C3 & R9C2 & (DOLLAR(FIXED(R11C4,2))
 Cell Contents: J. Warner Owes 4269.456
 Results: J. Warner Owes \$4269.46

In the procedure, you'll use the concatenate operator to string together the words in column one rows 4-9.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer !	! tcy	!	!
! 2 !	!	! t1 concatenate	! Loads the concatenate!	!
!	!	!	! sheet.	!
!	!	! (3) 	!	!
!	!	! 	! R4C2	!
! 3 !	! COMMAND: ...Value	! = r4c1&r5c1&	! Enters the	!
!	!	! r6c1&r7c1&	! formula.	!
!	!	! r8c1&r9c1	!	!
! 4 !	! VALUE: r4c1 & r5c1 &	!	! String is:	!
!	! ... & r9c1	!	! Thequickbrownfox	!
!	!	!	! jumpsover. Now	!
!	!	!	! put in the spaces..!	!

Step	Screen Says	You Type	Comments
5	COMMAND: Alpha...	a  	Puts the pointer on quick, R5cl. Selects ALPHA.
6	ALPHA: quick	 CHAR EDIT (SPACE BAR)	
7	ALPHA: quick	(EXECUTE)	A space has been inserted before quick, so there is also a space between The and quick in the catenated string.
8	COMMAND: Alpha...	 a  CHAR EDIT (SPACE BAR) (EXECUTE)	Puts the space before brown.
9		 a  CHAR EDIT (SPACE BAR) (EXECUTE)	Puts a space before fox.
10		 a  CHAR EDIT (SPACE BAR) (EXECUTE)	Puts a space before jumps.
11		 a  CHAR EDIT (SPACE BAR) (EXECUTE)	Puts a space before over.

Formula:
R4C1+R5C1+R6C1+R7C1+R8C1+R9C1

#1	1	2	3	4	5	6	
1							
2							
3							
4	The	The	quick	brown	fox	Jumps	over
5	quick						
6	brown						
7	fox						
8	Jumps						
9	over						

The catenate operator joins strings together.

14 Cell References

Your ability to use Multiplan will increase as you learn more about writing cell references. The two types of cell references are absolute and relative. Commands and formulas cover a much broader range with cell references.

Cell references used in formulas relate one part of the worksheet to another, building a logical sequence of calculations. For example, if you are calculating a total based on changing costs, you can refer to the cells listing the costs, rather than the numbers contained in the cells in your formula. So the total cell can reflect the fluctuations in costs.

In this section, the rules governing writing cell references are covered. You will learn how to use cell references in formulas and with various commands (BLANK, COPY, FORMAT, LOCK, NAME, PRINT). Three rules that govern cell references deal with cell ranges, unions, and intersections.

CELL RANGE

A cell range refers to a group of cells that represents a rectangular area. A colon is used to separate the cell positions indicating the boundaries of the range. For instance, suppose you want to assign the dollar format to all the cells in column 5, rows 11 through 16. You could do one cell at a time, using the FORMAT CELLS command. However, that would take all day. To format this particular group of cells in a single step, indicate the range desired by typing R11:16C5. You can use the range operator (:) to denote a group of rows, a group of columns, or a combination of rows and columns.

Range, R11:16C5, refers to this rectangular area of cells.

Range: R11:16C5

#1	1	2	3	4	5	6	7	8	9	10
10										
11					x	x	x	x	x	
12					x	x	x	x	x	
13					x	x	x	x	x	
14					x	x	x	x	x	
15					x	x	x	x	x	
16										

CELL UNIONS

A union is the combination of all the cells in a cell reference list. The union of cell references is represented by a comma. An example is the union of R1C5, R2C5, which consists of two cells, while the range R1C1:R2C2 would consist of four cells.

Union R11,R15,C5,C9 refers to all cells in rows 11 and 15 and to all cells in columns 5 and 9.

Union: R11,R15,C5,C9

#1	1	2	3	4	5	6	7	8	9	10
10					x				x	
11	x	x	x	x	x	x	x	x	x	x
12					x				x	
13	x				x				x	
14	x				x				x	
15	x	x	x	x	x	x	x	x	x	x
16					x				x	

CELL INTERSECTIONS

The intersection of two cell references is the set of all cells common to both references. The most common use of an intersection is in referencing a single cell. For example, R1C1 is a reference to the cell located at the intersection of row one and column one. Intersection is represented by a space. When writing simple intersections, though, you can eliminate the space: R1C1, R2C3, etc.

Intersection R11:C1 refers to that one cell.

Intersection: R11C1

#1	1	2	3	4	5
10					
11	x				
12					
13					
14					
15					

Absolute References

Absolute references name a specific row and column location. Use absolute references in formulas when you know exactly which cells you are using in your operation. For example, to add the contents of the cell in row 7 column 6 to the contents of the cell in row 8 column 6, you type `r7c6 + r8c6`. No matter where you place the formula on the worksheet, the formula always adds the same two cells. The term absolute is used because this type of reference remains the same no matter what other conditions exist.

`R7C6+R8C6` always adds these two cells.

	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7						12	
8						10	
9						22	

Relative References

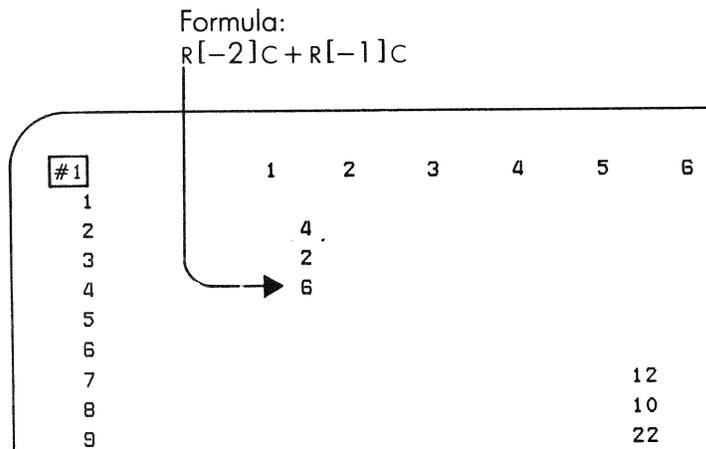
Relative references depend on a specific cell. When used in a command, a relative reference depends on the location of the active cell. When used in a formula, the reference depends on the location of the cell containing the formula. For example, adding a cell two columns to the left to a cell one column to the left, returns an answer that depends on where the formula is written. Using relative references makes formulas easier to create and enter into the worksheet. The notation used for relative references is:

$R[+n]C[+m]$

The values n and m represent the distance from the active cell. The sign $+$ or $-$ represents the direction of that distance. The plus sign means to increase the row or column number. The minus sign means to decrease the row or column numbers. For example, $R[+3]C[-2]$ represents the cell located three rows down and two columns left of the currently active cell. Relative references are written with brackets $[]$. If you wish to express $R7C6$ and $R8C6$ with relative references, you could place your pointer in $R9C6$ and type

$R[-2]C + R[-1]C$

If you choose to place your pointer in another cell to enter the formula, the relative reference in the formula would change accordingly. The results of the formula depend on the location of the cell containing it.



Relative References in Formulas

Use relative references in formulas to simplify the process of entering a series of formulas. Remember that the reference is dependent upon the location of the cell containing the formula.

You can save yourself time by interrelating your worksheet with relative references. In the following procedure, for example, 27 formulas are used. With relative references, though, you create only three distinct formulas. These formulas are then copied to the corresponding cells that require the same calculations.

To create the formulas, you'll use the two methods of entering relative references -- typing the actual values and pressing the arrow keys to enter them.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Transfer	! tcy	! :
! 2 !	! :	! t1 arrow (EXECUTE)	! :
! :	! :	! (6) (4)	! R7C5
! 3 !	! COMMAND: ...Value	! =	! Enters a formula.
! 4 !	! VALUE:	! rc[-1] -rc[-2]	! The profit formula
! :	! :	! (EXECUTE)	! is in cell R7C5.
! 5 !	! COMMAND: ...Value	! →	! Moves pointer
! :	! :	! =	! to R7C6.
! 6 !	! VALUE: RC[-1] /RC[-2]	! ←	! :
! :	! :	! / (2)	! Enters formula for
! :	! :	! ← (EXECUTE)	! margin in R7C6.
! 7 !	! COMMAND: ...Value	! →	! Moves pointer to
! :	! :	! = (2) ←	! R7C6.
! :	! :	! / (4) ←	! :
! 8 !	! VALUE: RC -2 /RC -4	! (EXECUTE)	! Enters formula
! :	! :	! :	! for markup in
! :	! :	! :	! R7C7.
! :	! :	! :	! :

!Step!	Screen Says	! You Type	! Comments
! 9 !	! COMMAND: ...Copy	! cd 8 (RETURN)	!
! !	! !	! r5c5:7	!
! 10 !	! COPY DOWN number of	! (EXECUTE)	! Copies formula to
! !	! cells: 8	! !	! other cells
! !	! Starting at r7c5:7	! !	! requiring that
! !	! !	! !	! formula.

#1	1	2	3	4	5	6	7
1			PRICING	ANALYSIS			
2			*****	*****			
3							
4		ITEM NUMBER	COST	PRICE	PROFIT	MARGIN	MARKUP
5		**** *	*****	*****	*****	*****	*****
6							
7		11221-33	\$33.67	\$45.95			
8		11223-41	\$38.92	\$52.50			
9		11227-45	\$63.93	\$87.75			
10		11229-71	\$27.85	\$40.00			
11		11235-22	\$87.66	\$122.50			
12		11238-51	\$232.91	\$325.00			
13		11245-11	\$33.92	\$45.50			
14		11249-54	\$63.26	\$88.50			
15		11252-77	\$126.92	\$185.00			
16							
17							
18							
19							
COMMAND: Alpha Blank Copy Delete Edit Format Goto Help Insert Lock Move							
Name Options Print Quit Sort Transfer Value Window Xternal							
Select option or type command letter							
R1C1 100% Free Multiplan:TEMP							

$\text{Profit} = \text{RC}[-2] - \text{RC}[-1]$
 cost-price

$\text{Margin} = \text{RC}[-1] / \text{RC}[-2]$
 profit/price

$\text{Markup} = \text{RC}[-2] / \text{RC}[-4]$
 profit/cost

This worksheet uses relative references to figure profit, margin, and markup.

Commands That Use Cell References

Commands use absolute cell references as well as combinations of ranges, intersections and unions. Relative references are not generally used in commands, although they will work. The commands that use cell references are: BLANK, COPY, FORMAT, PRINT, LOCK, and NAME. You'll learn more about the last two commands later.

BLANK

The BLANK command blanks all the cells named in the reference. The most common use is to blank out a rectangular range, such as R5:15C9:11. Here, the area in rows 5 through 15 between columns 9 and 11 would be emptied of contents.

At other times a single portion of a column or row is blanked. For example, those cells between rows 7 and 19 in column 4 can be blanked by specifying R7:19C4.

COPY

The COPY command has added capability when you use ranges. Consider these entries for the COPY FROM command.

COPY FROM cells: R3:9C5:12 to cells: R13C5

Here, the rectangle formed by R3:9C5:12 may represent a certain table or chart. The effect of this command is to copy the entire rectangle to another part of the sheet. The top left cell of the rectangle will be located at the target cell, R13C5.

When these references are reversed, a single cell is copied into a group of cells.

COPY FROM cells: R13C5 to cells: R3:9C5:12

This copies the contents of cell R13C5 into each cell in the rectangle R3:9C5:12.

In the procedure, you'll use the BLANK and COPY FROM commands to create a graphic display. Watch how the cell ranges are used by these commands.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	! COMMAND: ...Formt	! fdw	! Formats the
		! 5	! default column
		(EXECUTE)	! width to 5
			! characters.
! 3 !	! COMMAND: ...Alpha	! a	! Enters the string
		! *****	! ***** into R1C1.
		(EXECUTE)	!
! 4 !	! COMMAND: ...Copy	! cf	! Copies the cell
		! r1:19c1:15	! R1C1 into all of
			! the cells of the
			! range R1:19C1:15.
! 5 !	! COPY FROM cells: R1C1!	(EXECUTE)	! Every cell on the
	! to cells: R1:19C1:15!		! screen now dis-
			! plays *****.
! 6 !	! COMMAND: ...Blank	! b	! Blanks the range
		! r3:17c2:14	! R3:17C2:14.
! 7 !	! BLANK cells:	(EXECUTE)	! Blanks the given
	! r3:17c2:14		! range.
! 8 !	! COMMAND: ...Copy	! cf	! Copies cell R1C1
		! r5:15c3:13	! into all the cells!
			! of the range
			! R5:15C3:13.
! 9 !	! COPY FROM cells: R1C1!	(EXECUTE)	! The given range
	! to cells: r5:15c3:13 !		! now displays
			! *****.
! 10 !	! COMMAND: ...Blank	! b	! Blanks the range
		! r7:13c4:12	! R7:13C4:12.
		(EXECUTE)	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 11 !	COMMAND: ...Copy	!	cf (RETURN)	!	Copies ***** into	!
!	!	!	r9:11c5:11	!	each cell of the	!
!	!	!	(EXECUTE)	!	range R9:11C5:11.	!
!	!	!	!	!	!	!
! 12 !	COMMAND: ...Goto	!	gr	!	Moves pointer to	!
!	!	!	10 (RETURN)	!	R10C8.	!
!	!	!	8 (EXECUTE)	!	!	!
!	!	!	!	!	!	!
! 13 !	COMMAND: ...Blank	!	b (EXECUTE)	!	Blanks the active	!
!	!	!	!	!	cell.	!
!	!	!	!	!	!	!

```

      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
1 *****
2 *****
3 *****
4 *****
5 *****
6 *****
7 *****
8 *****
9 *****
10 *****
11 *****
12 *****
13 *****
14 *****
15 *****
16 *****
17 *****
18 *****
19 *****

```

With some commands combined with cell references you can create this on your screen.

Cell References and the FORMAT Command

It's easy to give your worksheet a highly professional appearance in Multiplan. Using the FORMAT command combined with cell references greatly simplifies setting up your worksheet.

With cell ranges you can format entire groups of cells in a single step. For example, a column of numbers can be centered and given a dollar format at one time. Or you can line up a row of headings over columns of figures.

In the procedure, you'll use cell ranges to format a worksheet.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	!	! t1 pricing	! Loads the pricing !
!	!	! (EXECUTE)	! sheet. !
! 3 !	! COMMAND: ...Format	! fc	!
!	!	! r1:2 (2) (RETURN)	!
! 4 !	! FORMAT cells: r1:2	! c (EXECUTE)	! Formats the range !
!	! format code: ...cont	!	! R1:2 with the !
!	! ...	!	! continuous format. !
! 5 !	! COMMAND: ...Format	! fc	! Formats rows 4 !
!	!	! r4:5c3:5 (RETURN)	! and 5 in columns !
!	!	! c	! 3-5 with the !
!	!	!	! center alignment. !
! 6 !	! FORMAT CELLS:	! (EXECUTE)	!
!	! r4:5c3:5	!	!
!	! alignment: ...Ctr...	!	!
! 7 !	! COMMAND: ...Format	! fc	! Formats columns 3 !
!	!	! r7:15c3:4	! and 4 between rows !
!	!	! (2) (RETURN)	! 7 and 15 in the !
!	!	! \$! dollar format. !

!Step!	Screen Says	! You Type	! Comments
! 8 !	! FORMAT cells:	! (EXECUTE)!	!
! :	! r7:15c3:4 format	! :	! :
! :	! code: ...\$...	! :	! :
! 9 !	! COMMAND: ...Format	! fc	! :
! :	! :	! r7:15c5	! :
! :	! :	! (2) (RETURN)!	! :
! 10 !	! FORMAT cells:	! % (RETURN)!	! Formats the
! :	! r7:15c5...	! 1 (EXECUTE)!	! entries in column
! :	! format code: ...%	! :	! 5 in the % format
! :	! # of decimals: 1	! :	! with 1 decimal
! :	! :	! :	! place.

This

	1	2	3	4	5	6
1			PRICING	ANALYSIS		
2			*****	*****		
3						
4		ITEM NUMBER	COST	PRICE	MARGIN	
5		**** *****	*****	*****	*****	
6						
7		11221-33	33.67	45.95	0.26725	
8		11223-41	38.92	52.5	0.25867	
9		11227-45	63.93	87.75	0.271	
10		11229-71	27.85			
11		11235-22	87.66			
12		11228-71				

Becomes this

	1	2	3	4	5	6
1			PRICING	ANALYSIS		
2			*****	*****		
3						
4		ITEM NUMBER	COST	PRICE	MARGIN	
5		**** *****	*****	*****	*****	
6						
7		11221-33	\$33.67	\$45.95	26.7%	
8		11223-41	\$38.92	\$52.50	25.9%	
9		11227-45	\$63.93	\$87.75	27.1%	
10		11229-71	\$27.85	\$40.00		
11		11235-22	\$87.66			
12		11228-71				

Writing formulas and issuing commands is easier and more efficient when you use names. You can assign a name to a single cell or to a group of cells using the NAME command. Whenever you want to refer to that cell or area you simply use its name.

Using names rather than absolute or relative references in formulas and commands provides several benefits.

- Formulas are easier to create. When making up a formula, it's easier to think of the processes involved than to think in terms of individual cells. You can name a column of numbers costs and use costs in a formula rather than a series of cell references.
- Formulas are less complicated. A formula containing names is shorter, and easier to understand than one using absolute and relative references. The formula costs + expenses is self-explanatory.
- Problems are easier to correct. If you've entered a formula and the answer seems to be wrong, you must correct the formula. Since formulas with names are shorter, the error is easier to find.

A name can contain any letter, either capital or small, any number, and the underscore character `_`. You can't use the single quote (`'`) or double quote (`"`) or the exclamation point (`!`) in names, though. Also don't use any name that can be confused with a cell reference, such as R, C, r, R3, etc.

The NAME command asks you for a name and a reference. Type the name in the first field. Press (TAB) or (RETURN) to move to the second field, and enter the reference. Using the name total, for example, to refer to the sum of many numbers is easier to remember than r10c9.

Names can be used with the BLANK, COPY, FORMAT, LOCK, and PRINT commands. So wherever cell references are used, cell names will also work. For example, to format all costs cells to \$ you refer to the name costs in the command.

Groups of cells can be given a single name. You might name an entire table or portion of a column or even disjointed cells. Then the names can be used in both formulas and commands. You will find this especially useful with Multiplan functions.

In the next few pages you'll learn about using names in both formulas and commands and how to list all the names for any particular worksheet. You will also learn how to lock particular cells to protect them from accidental change.

Using Names in Formulas

Once you have assigned a name it can be used any number of times in many ways. You can refer directly to the name in a formula and the computer will use the value contained in that name in the formula's operation. You can also be less direct in your reference.

For example, suppose you are developing a budget sheet. Two categories you include are Direct Labor Costs and Indirect Labor Costs, each of which contains a column of costs.

#1	1	2	3	4
1	Direct Labor Costs		Indirect Labor Costs	
2	486.00		14.00	
3	124.00		29.00	
4	926.00		120.00	
5	24.00		80.00	
6	144.00		340.00	
7	82.00		75.00	
8	290.00			

First, subtotal the costs by naming each column.

NAME: Dircost to refer to:r1:8c1

NAME: Indircost to refer to r1:8c2

You can then total the labor costs with the formula

dircost + indircost.

In the procedure, you'll create a system of formulas to compute prices and use cell names to make the job easier.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
!	!	!	!	!
! 2 !	!	! t1 prices	!	!
!	!	!	! (EXECUTE)	!
!	!	!	!	!
! 3 !	! COMMAND: ...Name	! n	! Gives the cell	!
!	!	! m1	! (RETURN)	! R17C3 the name
!	!	! r17c3	! m1.	!

!Step!	Screen Says	You Type	Comments
! 5 !	! COMMAND: ...Name	! n	! Gives the cell
! :	! :	! m2	! (RETURN) R18C3 the name
! :	! :	! r18c2	! m2.
! 6 !	! NAME: define name: m2!	! :	! (EXECUTE)!
! :	! to refer to: r18c3	! :	! :
! 7 !	! COMMAND: ...Name	! n	! Gives the cell
! :	! :	! m3	! (RETURN) R19C3 the name m3.!
! :	! :	! r19c3	! :
! 8 !	! NAME: define name: m3!	! :	! :
! :	! to refer to: r19c3.	! :	! :
! 9 !	! COMMAND: ...Name	! n	! Gives column 3
! :	! :	! cost	! (RETURN) the name cost.
! :	! :	! c3	! :
! 10 !	! NAME: define name:	! :	! (EXECUTE)!
! :	! cost to refer to: c3	! :	! :
! 11 !	! COMMAND: ...Goto	! gr 7	! (RETURN) Moves the pointer
! :	! :	! 4	! (EXECUTE) to R7C4.
! 12 !	! COMMAND: ...Value	! = cost/(1-m1)	! Enters the first
! :	! :	! :	! (EXECUTE) formula. The
! :	! :	! :	! computed price is
! :	! :	! :	! \$56.12.
! 13 !	! COMMAND: ...Copy	! cd 8	! (EXECUTE) Copies the formula!
! :	! :	! :	! down 8 cells. All
! :	! :	! :	! the prices are
! :	! :	! :	! calculated.
! 14 !	! COMMAND: ...Goto	! gr 7	! (RETURN) Moves the pointer
! :	! :	! 5	! (EXECUTE) to R7C5.
! 15 !	! COMMAND: ...Value	! = cost/ (1-m2)	! Enters the second
! :	! :	! :	! (EXECUTE) formula. The price!
! :	! :	! :	! is calculated as
! :	! :	! :	! \$48.10.

!Step!	Screen Says	! You Type	! Comments
! 16 !	! COMMAND: ...Copy	! cd 8 (EXECUTE)	! Copies the formula! ! down 8 cells.
! 17 !	! COMMAND: ...Goto	! gr (RETURN) ! 6 (EXECUTE)	! Moves pointer to ! ! R7C6.
! 18 !	! COMMAND: ...Value	! = cost/ (1-m3) (EXECUTE)	! Does the same in ! ! the third pricing ! ! level.
! 19 !	! COMMAND: ...Copy	! cd 8 (EXECUTE)	! Copies the ! ! formula down 8 ! ! cells.
! 20 !	! COMMAND: ...Goto	! gr 16 (RETURN) ! 1 (EXECUTE)	! Moves pointer to ! ! R16C1.
! 21 !	! COMMAND: ...Name	! n (RETURN) ! border (EXECUTE) ! r 16 (EXECUTE)	! Assigns name of ! ! border to row 16. !
! 22 !	! COMMAND: Alpha...	! a (EXECUTE) ! **** (EXECUTE)	! Enters 4 '*'s in ! ! R16C1.
! 23 !	! COMMAND: ...Copy	! cf (RETURN) ! border (EXECUTE)	! Copies contents ! ! of R16C1 to all of ! ! row 16. Row 16 ! ! is defined as ! ! border.

	1	2	3	4	5	6
1			PRICING ANALYSIS			
2			*****			
3			*****			
4		ITEM NUMBER	COST	(1-99)	(100-499)	(500+)
5		*****	*****	*****	*****	*****
6						
7		11221-33	\$33.67	\$56.12	\$48.10	\$42.09
8		11223-41	\$38.92	\$64.87	\$55.60	\$48.65
9		11227-45	\$63.93	\$106.55	\$91.33	\$79.91
10		11229-71	\$27.85	\$46.42	\$39.79	\$34.81
11		11235-22	\$87.66	\$146.10	\$125.23	\$109.57
12		11238-51	\$232.91	\$388.18	\$332.73	\$291.14
13		11245-11	\$33.92	\$56.53	\$48.46	\$42.40
14		11249-54	\$63.26	\$105.43	\$90.37	\$79.08
15		11252-77	\$126.92	\$211.53	\$181.31	\$158.65
16	****	****	****	****	****	****
17		MARGIN Range1 =	40.0%			
18		***** Range2 =	30.0%			
19		Range3 =	20.0%			

You'll use the NAME command to create this pricing schedule.

Listing Cell Names

As you increase the list of names on a worksheet, you will want to reference them. There are three ways to list the cell names assigned to a particular worksheet.

- The NAME command
- The GOTO NAME command
- The Refer key

Select one of the three and press the appropriate arrow key. The arrow keys operate in the following ways with the NAME command, the GOTO NAME command, and the Refer key.

-  Displays the first name entered
-  Displays the last name entered
-  Displays the previous name on the list
-  Displays the next name on the list

NAME COMMAND

Using the NAME command with the arrow keys, you can check names for spelling, review what names you have used, or check a name for its reference.

GOTO NAME COMMAND

When you use GOTO NAME and the arrow keys, you can move directly to the named cell you choose.

THE REFER KEY

The Refer key, a function key, and the arrow keys are used to choose names for formulas. Press (REFER) and the arrow keys while entering a formula at the point you wish to use a name.

In the following procedure, use the arrow keys and the Refer key to view cell names and add them to formulas.

Step	Screen Says	You Type	Comments
1	COMMAND: ...Transfer	tcy	
2		tl save (EXECUTE)	
3	COMMAND: ...Name	n <input type="text" value="↑"/>	NAME command. The <input type="text" value="↑"/> key displays the first name entered.
4	NAME: define name: y to refer to: R12C3	<input type="text" value="→"/> <input type="text" value="→"/> <input type="text" value="→"/> <input type="text" value="→"/> <input type="text" value="↓"/> <input type="text" value="←"/>	y is the entry for years. m is the entry for months. k is # compoundings/year. a is the APR. i is the rate per comp period. n is # compoundings. It is the last entry. f is the future-value.
		(CANCEL)	
5	COMMAND: ...Goto	gr 14 5	(RETURN) Moves the pointer to R14C5. Looks at the formula on the status line. Entry is equal to: APR _____ = a/ # compounding per year.
		(REFER) <input type="text" value="→"/> (3) <input type="text" value="→"/> (EXECUTE)	
6	COMMAND: ...Vaue	(2) <input type="text" value="↑"/> = (y+m/12)*k	(2) Moves the pointer up. The number of compoundings formula is (y + m/12) * k.
		(EXECUTE)	

!Step!	Screen Says	! You Type	! Comments
! 7 !		(2) <input type="button" value="↑"/>	! Interest formula !
! !		= (REFER)	! is f - p. !
! !		(3) <input type="button" value="←"/>	! !
! !		- (REFER)	! !
! !		(4) <input type="button" value="←"/>	! !
! !		(EXECUTE)	! !
! 8 !		(2) <input type="button" value="↑"/>	! Gives future !
! !		=	! value by the !
! !		(REFER) (4)	! formula $f = p(1 +$!
! !		$* (1 + i) ^ n$! $i) ^ n$!
! !		(EXECUTE)	! !

SAVINGS CALCULATOR	
\$	
Enter the Following	These are Calculated
\$	\$
Principal = \$1000.00	\$1405.41 = Future Value
A P R = 6.5%	\$405.41 = Interest
Years = 5	63 = # Compoundings
Months = 3	0.54167% = Rate per Compounding Period
#Compoundings/Year = 12	

You will use the Refer key and the NAME command with the arrow keys to view the list of names on this savings calculator.

Locking Cells

Often named cells will contain formulas or values that you may want to protect from being changed. This can be done with the LOCK command. On occasion, you can lock almost an entire model to make it easier to enter information to certain unlocked cells. When a cell is locked it takes up space in memory. If you lock an entire row, for example, you decrease the memory space. The LOCK command has two options: cells and formulas.

CELLS

The CELLS option both locks and unlocks cells. A locked cell must be unlocked before it can be changed. To use this option, enter a cell reference and select the Locked or Unlocked option. You may reference a single cell or a group of cells using ranges or cell names. The field automatically expands to give you enough room to enter all the cell references.

FORMULAS

The FORMULAS option locks every cell on the sheet that contains a formula or text. To use the FORMULAS option, enter a y to confirm that all formula cells are locked.

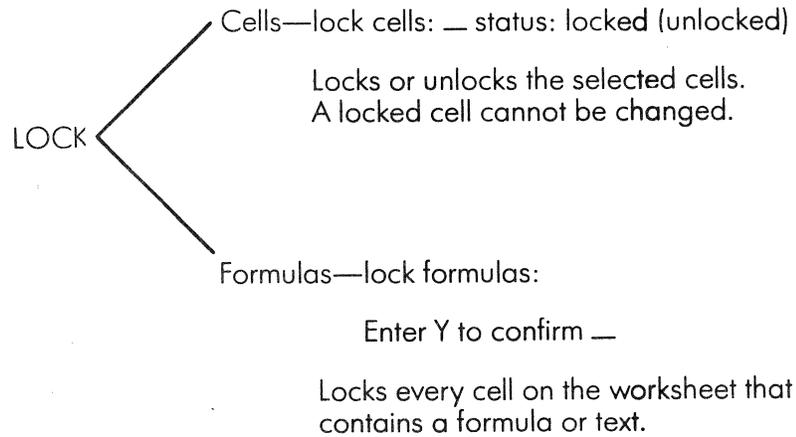
If you try to change a locked cell, you'll receive the following message:

Locked cell may not be changed.

In the following procedure, you'll lock all the cells on the worksheet except those used for entering new information for calculating interest on a savings account. Press (NEXT UNLKD), located along the top of your keyboard, to move the cell pointer between the unlocked fields. Use the same worksheet, save, that you loaded for the last exercise.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ALPHA...	! (HOME)	! Moves pointer to ! ! R1C1. !
! 2 !	! COMMAND: ...Lock ! Select option or ! type command letter	! l	! Chooses the LOCK ! ! commnd. (You're ! ! still using the ! ! save worksheet). !
! 3 !	! LCOK: Cells Formulas	! c	! CELLS option. !
! 4 !	! LOCK cells: R1C1	! [:]	! (END) ! ! (RETURN) !
! 5 !	! LOCK cells: ! R1C1:R16C7 status: ! Locked (Unlocked)	! l	! (EXECUTE) !
! 6 !	! COMMAND: ...Lock	! lc	! Executes the LOCK ! ! Cells option. !
! 7 !	! LOCK cells: R8C8 ! status: (Locked) ! Unlocked	! r8c3, r10c3, ! r12c3, r14c3, ! r16c3 ! u	! (RETURN) ! ! (EXECUTE) !
! 8 !	! COMMAND: ...Goto	! gn	! Chooses GOTO name ! ! command. Moves ! ! to cell named p ! ! for principal. !
! 9 !	! COMMAND: ...Value	! 10000 (NEXT UNLKD)	! Enters \$10,000.00 ! ! for the principal. ! ! The pointer jumps ! ! to the next free ! ! cell. !

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
! 10 !	! COMMAND: ALPHA/VALUE	!	! .075 (NEXT UNLKD)	!	! Enters the other	!
!	!	!	! 16 (NEXT UNLKD)	!	! value.	!
!	!	!	! 0 (NEXT UNLKD)	!	!	!
!	!	!	! 365 (EXECUTE)	!	!	!
!	!	!	!	!	!	!
! 11 !	! COMMAND: Alpha...	!	!	!	! The results are	!
!	!	!	!	!	! Future value:	!
!	!	!	!	!	! \$33,197.08	!
!	!	!	!	!	! Interest:	!
!	!	!	!	!	! \$23,197.08.	!
!	!	!	!	!	!	!



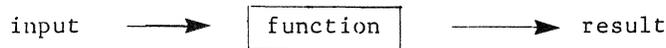
This is the format of the LOCK command.

16 Functions

Functions are formulas that are already built into Multiplan. You can use functions to save time and effort when you create your own formulas. The four kinds of Multiplan functions are: area, numeric, mathematical, and text.

HOW FUNCTIONS WORK

A function acts like a formula in a magic box. The input goes in, is acted on by the formula, and the result is returned.



You never need to see the formula contained in the function. The actual formulas are a part of Multiplan.

Take, for example, the INT function. INT is short for integer. This function takes the number in parentheses and drops the decimal portion of the number. INT (3.125) returns 3, or INT (-5.7) returns -5.

The value inside the parentheses is called the input or argument. The argument is the value given to the function, and can be anything that results in a number, such as a cell reference, a name, or even a formula.

Multiplan differentiates functions from names with parentheses, which must follow a function. For example, INT can be used to name a cell, whereas INT() represents the integer function. Functions are entered on the command line as formulas or as parts of formulas with the (=) key.

You can call a function into operation by using its name with an argument enclosed in parentheses. Each function has specific types of values that you can use as arguments. You must match the values with the kind of input allowed.

FUNCTION ARGUMENTS

The type of argument you use depends on the function you use. The types include: numbers, text, areas (groups of cells, such as R3:7C5:11), and formulas.

All of the types may be entered as either relative or absolute references. If you use a formula, it must result in the correct input type, or the #VALUE! warning will display.

Take for example, ROUND (R1C1, R1C2). The ROUND function takes the number in the first argument, cell R1C1, and rounds it to the number of decimal places specified by the second argument, cell R1C2. If either R1C1 or R1C2 contains text, the result is a #VALUE! warning.

Some functions, like INT, have a single input. Others may have several. ROUND, for example, uses two, and looks like this:

ROUND (x,n) where x is any number and n is a whole number (1, 2, 3, etc).

The ROUND function takes the value of x and rounds it to the number of decimal places specified by n. For instance,

ROUND (3.1415924,4) returns 3.1416.

It is very important that you enter the numbers in the right order, and that you use the correct type of argument. In the following procedures, you'll learn how to use functions in Multiplan models.

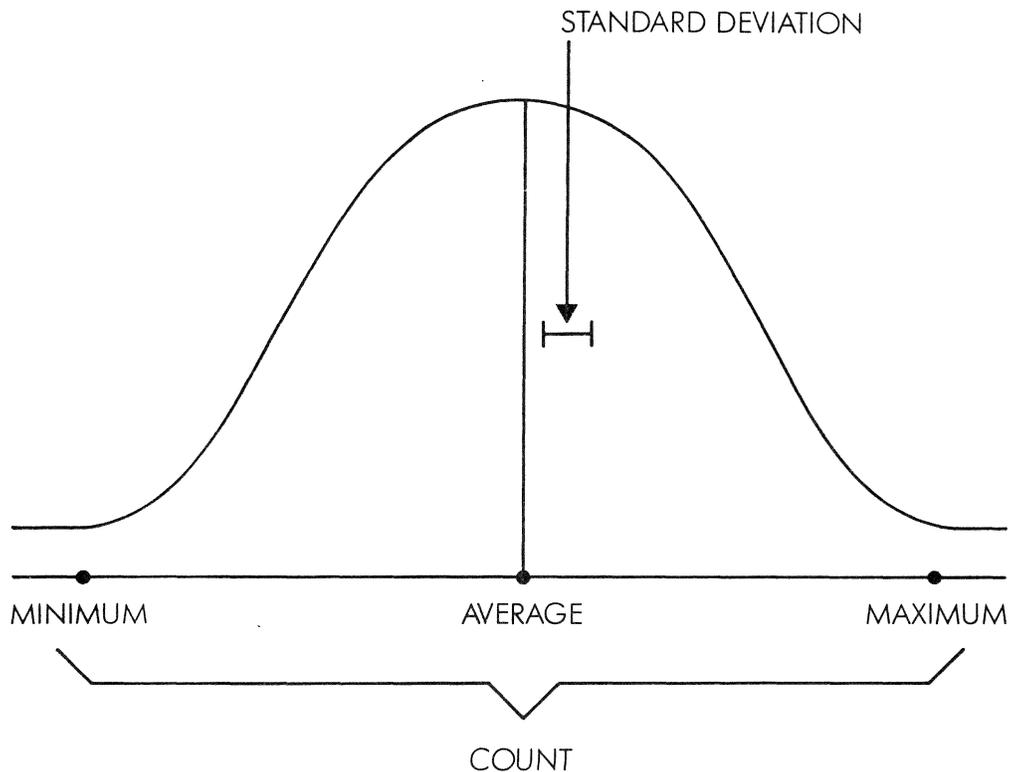


Area Functions

The area functions operate on groups of cells, and can greatly simplify your formulas by reducing the information and number of formulas you have to enter. For example, the SUM function totals its arguments and can be as simple as SUM (Table). The area functions are: ROW(), COLUMN(), SUM(), COUNT(), MAX(), MIN(), AVERAGE(), STDEV(), and MPV().

The inputs for the area functions take the form of a list of cell groups. Both absolute and relative cell references can be used. For example, the SUM function might be used in either of two ways:

SUM(R1:4C2:9, R1C4, R2C4:9) adds these absolute references
SUM(R [-4]C11:R [+5]C14) adds these relative references



To make your formulas easier to work with, use cell or area names. If you give the name table to a group of cells containing a particular chart, the total of all the values in that chart can be easily calculated by entering:

SUM(table)

ROW Row()

The ROW function allows you to use the current row number in your formula. A simple example, ROW()*3, results in the current row number multiplied by 3.

COLUMN COLUMN()

The COLUMN function operates as does the ROW function, taking instead the current column number. COLUMN()*ROW() yields the result of the current column number times the current row number.

SUM SUM (a,a,a,...,a)

The SUM function totals all the input from the cells named in the parentheses. If a cell contains text, the value is taken to be 0. When a cell is included in more than one cell group, the value of that cell is used more than once. For instance, in the formula SUM (R5,C7) all the cells in row 5 and column 7 are added together. The cell R5C7 is a part of both R5 and C7. When the function is performed, it adds in the value of R5C7 twice.

COUNT COUNT(a,a,a,...,a)

The COUNT function returns the total number of cells in the list in parentheses. Only cells that contain numbers are counted, not cells containing text. As with SUM, if a cell is mentioned twice in the reference, it is counted twice. COUNT can be used for averaging a group of cells where you do not know the size of the group, as in SUM(A)/COUNT(A). In this example, COUNT(A) counts the elements of A. The count is then divided into SUM(A), the total of A.

This diagram shows a visual representation of the area functions.

(a) may be one or more numeric values. It may refer to a cell or group of cells, or a series of numeric values separated by commas. The first value is taken as the required income this year, the second as the required income next year, etc. For example, you require \$1000 next year and \$1500 at the end of the year after that. You are offered an annual interest rate of 12%. How much must you invest? Enter:

NPV(0.12,0,1000,1500)

The INDEX and LOOKUP functions, also are area functions; they will be covered in later chapters.

In the following procedure you'll become familiar with the AREA functions.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	!	! t1 math (EXECUTE)	! Loads math work-sheet.
! 3 !	! COMMAND: ...Name	! n	! Gives R4:10 the
!	!	! x (RETURN)	! name x.
!	!	! r4:10	!
! 4 !	! NAME: define name: x	!	! (EXECUTE)
!	! to refer to: r5:l1	!	!
! 5 !	! COMMAND: ...Name	! n	! Gives C3:5 the
!	!	! y (RETURN)	! name y.
!	!	! c3:5 (EXECUTE)	!
! 6 !	! COMMAND: ...Goto	! gr 4	! Moves cell pointer
!	!	! (RETURN) 6!	! to r4c6.
!	!	! (EXECUTE)	!
! 7 !	! COMMAND: ...Value	! = sum(y r)	! Enters the formula
!	!	! (EXECUTE)	! for TOTAL. (y r) !
!	!	!	! represents the !
!	!	!	! intersection of y !
!	!	!	! and the current !
!	!	!	! row. !
!	!	!	!

Step	Screen Says	You Type	Comments
8	COMMAND: ...Copy	cd 6	
9	COPY DOWN number of cells: 6	(EXECUTE)	Copies the formula: 6 cells down.
10	COMMAND: ...Goto	gr 13 2	(RETURN) Jumps the pointer to R13C2. (EXECUTE)
11	COMMAND: ...Value	= average (x c)	Enters the formula: for average. (x c) represents the intersection of x and the current row.
12	COMMAND: ...Value	= max (x c) 	Enters the formula: for highest score.
13	ALPHA/VALUE	= min(x c) 	Enters the formula: for lowest score.
14		= stdev(x c) (EXECUTE)	Enters the formula: for standard deviation.
15	COMMAND: ...Copy	cr r13:l6c2	(RETURN)
16	COPY RIGHT number of cells: 4 starting at r13:l6c2	(EXECUTE)	Copies the formulas to the right.

MATH A

MATH RECORDS:

STUDENT	TEST 1	TEST 2	TEST 3	TEST 4	TOTAL
Doe, John	19	21	18	25	83
Jones, Freddy	21	21	22	20	84
Murphey, Paula	11	15	17	14	57
Piper, Peter	24	19	23	22	88
Smith, Ralph	15	17	18	12	62
Turner, Terri	19	19	22	20	80
Lisa Underwood	22	21	24	25	92
Average	19	19	21	20	78
Highest	24	21	24	25	94
Lowest	11	15	17	12	55
Standard Deviation	4	2	3	5	15

The formulas you enter on the area worksheet illustrate the use of some Multiplan area functions.

In the procedure, student scores are added and rounded to give a two-place total. You can change the scores on the worksheet to see the effect of the ROUND function.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
! 2 !	!	! t1	!	!
!	!	! round	! (EXECUTE)	!
! 3 !	! COMMAND: ...Goto	! gr 5	! (RETURN)	! Places the pointer!
!	!	! 6	! (EXECUTE)	! at R5C6.
! 4 !	! COMMAND: ...Value	! = round(sum	! Enters formula in	!
!	!	! (r c2:5),0)	! totals column.	!
!	!	!	! (EXECUTE)	! Rounds to whole
!	!	!	!	! number.
! 5 !	! COMMAND: ...Copy	! cd10	!	! Copies formula
0	!	!	!	! down 10 cells.
!	!	!	!	!

	1	2	3	4	5	6
1	Computer Science I -- Test Scores					
2	=====					
3	Names	Scores			Totals	
4	-----					
5	C. Adams	57.8	66.6	71.2	79.9	275
6	V. Astor	89.9	95.7	89.5	98.1	373
7	R. Baines	90.0	87.9	89.0	92.3	359
8	C. Cook	79.8	80.3	76.1	75.9	312
9	G. Franks	75.9	79.8	81.6	91.2	328
10	I. Godwin	91.6	79.5	74.8	93.6	339
11	L. Hopkins	85.4	85.1	74.9	86.9	332
12	K. Jenkins	77.9	88.3	79.5	93.5	339
13	L. King	78.8	84.4	87.7	91.7	343
14	P. Peters	72.4	85.8	89.9	77.9	326
15	M. Wilkins	78.6	88.6	91.3	67.8	326

When you have entered the formula using the ROUND function, the point totals in column 6 will be rounded off.

Mathematical Functions

The mathematical functions are accurate to 14 decimal places, and are mainly used in scientific calculations, though some financial formulas use the exponential functions. For example, the formula for continuous compounding contains the natural logarithm function LN().

TRIGONOMETRIC FUNCTIONS: PI() COS(x) SIN(x) TAN(x) ATAN(x)

The trigonometric functions have many technical uses. The PI function gives the value of pi to 8 decimal places.

PI() equals 3.1415927

As you can see, there is no input, or argument in the parentheses. The parentheses are needed, however, for the computer to differentiate between a function and a name.

The COS, SIN, and TAN functions correspond to the cosine, sine, and tangent functions. The arguments, though, must be in radians, a unit for measuring arcs. To convert from degrees to radians, multiply by 180/PI().

The ATAN function corresponds to the arctangent, or inverse tangent function. The argument can be any number, positive or negative. The result is given in radians. To convert from radians to degrees, multiply by PI()/180.

EXPONENTIAL FUNCTIONS: Sqrt(x) EXP(x) LN(x) LOG10(x)

The exponential functions are useful for modeling growth rates. In addition, many scientific and engineering applications use these functions.

The Sqrt function returns the positive square root of the input. The argument must not be negative or a numeric overflow warning (#NUM!) results. To avoid this, use the absolute value function in combination with Sqrt(x): Sqrt(ABS(x)).

The exponential and natural log functions are usually written in this way

$$\text{EXP}(x) = e^x \quad \text{LN}(x) = \ln(x)$$

The argument of EXP can be positive or negative. The argument of LN must be greater than zero.

The LOG10 function is the logarithm to the base 10. It is usually written in the following way.

$$\text{LOG10}(x) = \log_{10}(x)$$

Try this procedure. It shows a bar graph of the sine function. Load the worksheet, adjust the frequency, and watch the results.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! t1 sinewave	!
! :	! :	! (EXECUTE)	!
! 2 !	! COMMAND: ...Value	! 20	! Adjusts frequency
! :	! :	! :	! to 20.
! 3 !	! :	! 15	! Adjusts frequency
! :	! :	! :	! to 15.
! 4 !	! :	! 10	! (EXECUTE)
! :	! :	! :	!
! 5 !	! :	! 5	! (EXECUTE)
! :	! :	! :	!
! 6 !	! :	! 4	! (EXECUTE)
! :	! :	! :	!
! 7 !	! :	! 3	! (EXECUTE)
! :	! :	! :	!
! 8 !	! :	! 2	! (EXECUTE)
! :	! :	! :	!

```

2
1 *****
2 *****
3 #####
4 *****
5 *****
6 ****
7 (***** )
8 (***** )
9 #####
10 #####
11 (***** )
12 (***** )
13 *****
14 *****
15 *****
16 *****
17 *****
18 *****
19 (**)
20 (***** )
21 #####
22 #####
23 #####
24 (***** )
25 (**)
26 *****
27 *****
28 *****
29 *****
30 *****
31 *****
32 (***** )
33 (***** )
34 #####
35 #####
36 (***** )

```

With mathematical functions you can create useful graphs. Here the SIN function is used.

VALUE VALUE(s)

The VALUE function converts a string into a number. For example:

VALUE("789.33")	returns	789.33
VALUE("34E11")	returns	34E11
VALUE("\$235.20")	returns	235.2

One use of the VALUE function is to link together numbers.

VALUE("23" & "4.9") returns "234.9"

LEN LEN(s)

The LEN function finds the length, in number of characters, of a string. All characters are included, even the space character, " ".

LEN("Multiplan")	returns	9
LEN("Fred Jones")	returns	10

LEN is especially useful combined with the MID function.

MID MID(s,m,n)

The MID function pulls out a portion of a string. The part of s, the string that begins in position m and is n characters long, is returned by Multiplan. Suppose the cell R1C1 contains the string John Doe/SSN412-13-3387/Married. We can then have the following:

MID(R1C1,1,8)	returns	"John Doe"
MID(R1C1,10,14)	returns	"SSN412-13-3387"
MID(R1C1,25,7)	returns	"Married"

The MID function is often used with the LEN function to take a portion from the end of the string. Suppose the cell R1C1 contains the string John Doe, (473)354-7759.

MID(R1C1,LEN(R1C1)-8,8)	returns	"354-7759"
-------------------------	---------	------------

REPT

REPT(s,n)

The REPT function produces a string consisting of n repetitions of s. If n = 0 no characters are produced, the result is still a string, but it has zero length. Negative n values produce the #VALUE warning message.

s must be one string, not a series. It may be a reference to a cell or a formula with a string result, such as FIXED (250). (s) is usually a single character, but it may have any number of characters.

n must be only one value. It may be a reference to a single cell, a number, or a formula. If it has a fractional part, that part is cut off to form an integer before use.

This formula

REPT ("=", 10)

creates a double line 10 characters wide. REPT is useful in dividing worksheets at certain points such as above TOTAL rows. The above formula can be copied to the right to fill cells the length of a row.

In this procedure marital status and social security numbers are taken from a string and isolated in separate columns using the MID and LEN functions.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
! 2 !	!	! t1 text (EXECUTE)	!	!
! 3 !	! COMMAND: ...Goto	! gr 6 (RETURN)	! Takes you to cell	!
!	!	! 2 (EXECUTE)	! r6c2.	!
! 4 !	! COMMAND: ...Value	! = mid (r cl,len)	! Enters formula.	!
!	!	! (r cl),1)	!	!
!	!	! (EXECUTE)	!	!
! 5 !	! COMMAND: ...Copy	! cd10	! Copies formula	!
!	!	!	! down 10 cells.	!
! 6 !	! COPY DOWN number	! (EXECUTE)	!	!
!	! of cells: starting	!	!	!
!	! at: R6C2	!	!	!
!	!	!	!	!

Step	Screen Says	You Type	Comments
7	COMMAND: ...Goto	gr 6 3	(RETURN) Takes you to (EXECUTE) R6C3.
8	COMMAND: ...Value	= mid(r c1,len (r c1)-12,11)	Enters formula. (EXECUTE)
9	COMMAND: ...Copy	cd 10	(EXECUTE) Copies formula down 10 cells.

#1	1	2	3	4
1	Employee Information Sheet			
2	Date: 1/1/82			
3	=====			
4	Printout Information	Marital Status	SSN	
5	-----			
6	David Adams/SSN220-64-5432/M	M	220-64-5432	
7	Doris Binkley/SSN886-55-4679/M	M	886-55-4679	
8	Susan Castor/SSN776-72-8971/M	S	776-72-8971	
9	Hank Davidson/SSN459-61-7556/M	M	459-61-7556	
10	Neil Koss/SSN442-71-5631/S	S	442-71-5631	
11	Sam Norris/SSN798-51-4385/S	S	789-51-4385	
12	Anita Orins/SSN772-53-7258/M	M	772-53-7258	
13	Helen Peters/SSN555-81-7301/M	M	555-81-7301	
14	Susan Smith/SSN330-51-6278/S	S	330-51-6278	
15	Paul Trueman/SSN663-81-9245/M	M	663-81-9245	
16	Tim Yardley/SSN638-81-9357/S	S	638-81-9357	
17				
18				
19	COMMAND: Alpha Blank Copy Delete Edit Format Goto Help Insert Lock Move Name Options Print Quit Sort Transfer Value Window Xternal Select option or type command letter R1C1 100% Free Multiplan:TEMP			

Formula:
MID(RC1),LEN(RC1),1)

Formula:
MID(RC1,LEN(RC1)-12,11)

With the TEXT functions you can use text or strings as numbers, or numbers as strings. Enter the formula in R6C2 to retrieve a portion of the text in column 1.

(Part opener illustration)

Advanced Features

Now you can dig deeper into the power of Multiplan by learning about several advanced features.

Windows bring several parts of a worksheet onto the screen at the same time, so that you can see more of what's happening in a large worksheet.

With external references you can link up worksheets so that they automatically update each other. Powerful logic abilities handle applications with nonmathematical rules and conditions for calculation.

With the advanced techniques you can perform many of the tasks that normally require computer programming.

In this part you'll learn

- How to use the WINDOW command to organize your worksheet
- How to build a system of supporting worksheets with the XTERNAL command
- How to use the logical functions
- The TRANSFER OPTIONS, LOOKUP, and INDEX functions



17 Windows

The Multiplan WINDOW command helps you to manage sheets that become too large to fit on the screen at one time. You can divide the screen into as many as eight windows, or sections, each displayed and formatted like a separate screen, and view them at the same time.

In the following pages you'll learn how, using the WINDOW command, you can split windows horizontally and vertically. A function key, Change Window, moves you between windows and linking windows. One option, SPLITTING TITLES, divides the screen to keep your headings visible as you work. You'll learn to position windows to your best advantages.

Changes you make while working in one window may not appear in another window because of your view of the sheet. Though you may not see it on the screen, Multiplan keeps all windows current. Despite appearances, you are still working on a single worksheet.

#1	1	2	3	4	5	6
1				MATH A		
2						
3	MATH RECORDS:					
4						
5	STUDENT	TEST 1	TEST 2	TEST 3	TEST 4	TOTAL
6	-----					
#2	7					
8	Doe, John	19	21	18	25	83
9	Jones, Freddy	21	21	22	20	84
10	Murphey, Paula	11	15	17	14	57
11	Piper, Peter	24	19	23	22	88
12	Smith, Ralph	15	17	18	12	62
13	Turner, Terri	19	19	22	20	80
14	Lisa Underwood	22	21	24	25	92

This is an example of a screen split into two windows.

The WINDOW Command

The WINDOW command has four options and a special function key with which to manage the screen better: SPLIT, BORDER, CLOSE, AND LINK. The options work independently of each other, yet can be used together to enhance the appearance of your worksheet. The SPLIT option of the WINDOW command is used to open windows. You can split windows in either a vertical (along a column) or horizontal (along a row) direction. With the CHANGE WINDOW key, you can easily move the cursor between windows. To highlight one or more windows, use the BORDER option. Windows are closed with the CLOSE WINDOW option.

WINDOW SPLIT HORIZONTAL

The WINDOW SPLIT HORIZONTAL option splits the screen at the row you indicate. If you choose the linked option, both windows are linked. That means that any movement or scrolling done in one is copied by the other.

WINDOW SPLIT VERTICAL

With the VERTICAL option windows are created along a vertical line at the column specified. Again, you may choose to link the windows, and have them scroll together, or not.

THE (CHANGE WINDOW) KEY

When the screen is divided into windows, only one window is active at a time, the one containing the cell pointer. To make any other window active, use the Change Window key, located in the middle of the function keys. With this key, you make the cell pointer jump to the next window. From the last window, the pointer jumps to window one.

WINDOW

With the BORDER option, you can draw a line around any window. This helps organize your screen. Use borders only if you have extra space, as each one takes up a single character space on either side of the window. When your original window is bordered, any new windows you add will also be bordered. To remove the border, repeat the command a second time on the same window.

WINDOW CLOSE

Here you enter the number of the window you want to close, and that window is removed when you press (EXECUTE).

In the procedure, you will border window one and split the screen into two windows.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Transfer	! tl inc.rpt	!
! :	! :	! (EXECUTE)	!
! 2 !	! COMMAND: ...Window	! wbl	! WINDOW BORDER
! :	! :	! :	! command. Places
! :	! :	! :	! a border round
! :	! :	! :	! window #1.
! 3 !	! WINDOW change border	! (EXECUTE)	!
! :	! in window number: <u>1</u>	!	!
! :	! Enter a number	!	!
! 4 !	! COMMAND: ...Window	! ws	! WINDOW SPLIT
! :	! :	!	! command.
! 5 !	! WINDOW SPLIT:	! v	! Splits the window
! :	! Horizontal	! 2	! vertically at
! :	! Vertical Titles	!	! column 2. The
! :	! :	!	! windows are not
! :	! :	!	! linked.
! 6 !	! WINDOW SPLIT	! (EXECUTE)	! Leave windows
! :	! VERTICAL: at	!	! unlinked.
! :	! column: 2 linked?	!	!
! :	! Yes (No)	!	!
! 7 !	! COMMAND: ...Value	! (CHANGE WINDOW)	! Changes the active
! :	! :	!	! window.
! 8 !	! ALPHA/VALUE	! (3) <input type="text" value="→"/>	! The window scrolls
! :	! :	! (EXECUTE)	! to the right.

#1	1	#2	2	3	4
1	ACME COMPANIES	1		COMPARISON OF INTEREST RATES	
2	Net Income Rpt	2 = Starting Value		APARTMENT B	
3	=====	3YEAR 1		=====YEAR 3	
4	COMPANY	4	JANUARY	FEBRUARY	MARCH
5	=====	A5=====	A=====	=====A=	
6		6			
7		7			
8		8			
9		9			
10		10			
11		11			
12		12			
13		13			
14		14			
15		15			
16		16			
17		17			

Using the "inc.rpt" worksheet you'll split two vertical windows to display this view of the worksheet.

Linking Windows

When you link two windows, you can move both around the sheet at the same time. This keeps the titles and headings lined up when you view large worksheets. There are two ways to link windows in Multiplan.

LINKING WINDOWS WITH SPLIT

When you first split a window with the HORIZONTAL or VERTICAL option, you have the choice of keeping the two windows linked or not. When two windows are linked, movement in the opposite direction of the split, either horizontal or vertical, is reflected by the same movement of the other window.

For example, suppose you split a window, choosing the linked option:

WINDOW SPLIT HORIZONTAL at row 10 linked (Yes) No

If you move one window left or right, the other window moves also. However, up or down movement in one will not show up in the other.

LINKING WINDOWS WITH LINK

Another way to link two windows is with the LINK option. With LINK you can link any two windows that were created sequentially. This allows you to change the linkage between two windows at any time. The command option prompts.

WINDOW LINK window number: ____ with window number: ____
linked: (Yes) No

If you try to link two windows that Multiplan will not link, a beep will sound and the message "Cannot link those windows" appears on the message line.

Splitting Titles

This command splits the current window into four windows. This keeps the title in view when you are working with large sheets, giving you a work area with row and column titles always in view. To split the titles, position the cell pointer at the cell where the four windows are to intersect. Then the computer's prepared response for number of rows and columns is correct.

In the procedure, the window at the bottom right scrolls around the sheet to view information. Notice that, as you scroll this window up and down, the window at the left scrolls with it. Similarly, when you scroll the active window left and right, the titles at the top scroll also.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tl inv.quant	!
! !	! !	! (EXECUTE)	!
! 2 !	! COMMAND: ...Goto	! gr 7	! (RETURN)
! !	! !	! 3	! (EXECUTE)
! 3 !	! COMMAND: ...Window	! wst	! WINDOW SPLIT
! !	! !	! !	! TITLES.
! 4 !	! WINDOW SPLIT TITLES:	! (EXECUTE)	! The row and column!
! !	! # of rows: 6	! !	! numbers are those !
! !	! # of columns: 2	! !	! of the active !
! !	! !	! !	! cell.
! 5 !	! COMMAND: ...Goto	! gr 18	! (EXECUTE) Moves the pointer !
! !	! !	! (6) ↓	! to the bottom of !
! !	! !	! !	! the window. !
! !	! !	! !	! Notice that the !
! !	! !	! !	! titles at the left!
! !	! !	! !	! scroll with the !
! !	! !	! !	! rest of the chart.!
! !	! !	! !	!

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 6	! COMMAND: Alpha...	! (10)	! When you scroll	!
!	!	!	! the window hori-	!
!	!	!	! zontally, the	!
!	!	!	! months scroll too.!	!
!	!	!	! Use the arrow keys!	!
!	!	!	! to explore the	!
!	!	!	! sheet.	!
!	!	!	!	!

#1	1	2	#2	3	4	5	6	7
1								
2		I N V E N T O R Y		P R I C E		L I S T		
3		Q U A N T I T I E S S O L D						
4		XXXXXXXXXX		QTY ON	QTY ON	UNIT	XXXXXX	BASE
5	PART #	DESCRIPTION		JAN	FEB	MAR	APR	MAY
6	=====							
#4 7			#3					
8								
9								
10								

The WINDOW SPLIT TITLES option allows you to scroll this worksheet while preserving a view of the titles.

18 External References

At some point you may create very large worksheets that could be better managed if they were divided into smaller pieces. A summary sheet, showing aspects of these small pieces, can be built with external references.

Suppose you manage three departments. Each department manager should control his or her own budget, which includes detailed expense items, such as salary, supplies, equipment, furniture, benefits, and material. However, you want to see only the bottom line department summaries. When a manager makes a budget change, you need to know how the total budget is affected.

Multiplan lets you identify worksheets that contain details, and then pass information from these to other sheets. For example, you can design a checkbook and subtotal it using an expense code. These subtotals can be passed to a summary sheet. It is possible to build a family tree of worksheets.

Now you will learn about the three options of the XTERNAL command, COPY, LIST, and USE, and how they will help you to manage large amounts of information on worksheets.

```
Sheets supporting apt.109
apt.A
apt.B
apt.C
```

```
No sheets depend on apt.109
```

```
Press any key to redraw screen
```

The XTERNAL LIST command displays a screen that tells you what sheets are related to the current worksheet.

The XTERNAL Command

With the XTERNAL command you can get information from other worksheets. Sheets that are the source of copied information are said to support the current sheet. Sheets that receive copied information are said to depend on the current sheet.

Suppose you have a detailed worksheet that includes important totals. You want to use these totals on a summary or master sheet that also needs to use information from other sheets.

- 1 Select the areas of the detailed worksheet that you want to pass to the summary or master sheet. The area can be a cell, row, column, or group of cells.
- 2 Use the NAME command to name each area to be transferred.
- 3 Save the detailed worksheets so that the names are in the current version of the worksheets.
- 4 Load the summary sheet and enter the location in the sheet where you want the information coming from the detailed worksheet to be put.

XTERNAL COPY

A link, or connection, is established between the sheets by using the XTERNAL COPY command. A named area from the selected worksheet is copied into the current sheet. You enter the name of the supporting sheet, the name of the specific area on that sheet, and the location on the current sheet where you want the information deposited. Only the upper left cell of an area being transferred needs to be specified. Decide whether you want to choose the link option or not. If the linked option is not selected, the cells will not change automatically when the supporting worksheets are changed. Formulas are evaluated first and the results are copied. If you select the linked option, all the copied cells are locked; they can be changed only on the source sheet. A linked external reference can be deleted only by selecting XTERNAL COPY and using the BLANK command to blank the "to:" field.

XTERNAL LIST

Once the connections are defined, you can display all the links supporting and depending on the active or master worksheet by using the XTERNAL LIST command. The worksheet portion of the screen is erased and the list is displayed, showing supporting sheets, then dependant sheets. Sheets that are linked to the current sheet include all supporting and dependant sheets. Two sheets are linked only if there is at least one cell that has been copied from one to the other using XTERNAL COPY and the linked option.

XTERNAL USE

Say, for example, that you have several worksheets. On each worksheet you have a detailed expense report which produces a bottom-line summary of numbers. The line to be linked is named summary. In the master or summary sheet you select only one worksheet at a time. You can switch from one supporting sheet to another by using the XTERNAL USE command to select the worksheet you want.

In the first field enter the name of a worksheet. The second field can be an intermediate name. Wherever the intermediate name is encountered, the specified worksheet is used instead, allowing you to draw from each supporting sheet, one at a time, the summary line. You change only the worksheet name to retrieve the summary line from another support sheet. Thus you can switch supporting sheets in a single step.

Load these property management sheets and follow the procedure. The payment logs for individual apartments will be consolidated into a master log.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
!	!	!	!	!
! 2 !	!	! tl apt.mstr	! Loads apt.mstr.	!
!	!	!	! (EXECUTE)	!
!	!	!	! This is the	!
!	!	!	! template for the	!
!	!	!	! payment log for	!
!	!	!	! each apartment.	!
!	!	!	!	!

!Step!	Screen Says	You Type	Comments
! 3 !	! COMMAND: ...Name	! n 	! NAME. Displays
! !	! !	! !	! the first name on
! !	! !	! !	! the sheet.
! 4 !	! NAME: define name:	! (CANCEL)	! !
! !	! table to refer to:	! !	! !
! !	! R5:35 C4:9	! !	! !
! 5 !	! COMMAND: ...Transfer	! t1 apt.A (EXECUTE)	! Views the payment
! !	! !	! !	! log for apt A.
! 6 !	! !	! t1 apt.B (EXECUTE)	! Views the payment
! !	! !	! !	! log for apt B.
! 7 !	! !	! t1 apt.C (EXECUTE)	! Views the payment
! !	! !	! !	! log for apt C.

1	2	3	4	5
1	APT NUMBER: A		PAYMENT RECORD	
2	RENTAL INFORMATION		=====	
3	=====	DATE	AMOUNT	PURPOSE
4	tenant:William T. Anderson	=====	=====	=====
5	SSN:478-94-8970	11/20/82	\$925.00	Deposit, 1st, last
6	tenant:	12/28/82	\$375.00	Rent:January
7	SSN:	1/30/83	\$375.00	Rent:February
8	tenant:	2/29/83	\$375.00	Rent:March
9	SSN:	4/1/83	\$375.00	Rent:April
10	Terms:1 dog	5/1/83	\$375.00	Rent:May
11	no children	5/30/83	\$375.00	Rent:June
12	garbage			
13	water			
14				
15	Deposit:\$275.00			
16	Rent:\$375.00			
17	Start:12/1/82			
18	Pmt due:1st			

This worksheet records log rent payments. There is a worksheet for each apartment and, in the next procedure, you will link each payment log to a master sheet.

Linking Up Sheets

Now, using the individual apartment logs, you will build a master sheet. Each supporting sheet has an area named table which you will link to an area within the master log worksheet.

The following procedure shows you how to use the XTERNAL COPY command, and how to input the name of the area to be linked from the supporting worksheet.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tcy	!
! 2 !	!	! tl apt.log	! Loads apt.log.
!	!	! (EXECUTE)	!
! 3 !	! COMMAND: ...Goto	! gr 6	! XTERNAL COPY.
!	!	! xc apt.A	! Enter the data for!
!	!	! table	! apartment A.
! 4 !	! XTERNAL COPY from	!	! The payment record!
!	! sheet: apt.A	!	! for apt. A is
!	! name: table	!	! copied to the
!	! to: R6C1	!	! current sheet.
!	! linked: (Yes)No	!	! These cells are
!	!	!	! linked to apt. A
!	!	!	! and can be changed!
!	!	!	! only on the source!
!	!	!	! sheet.
! 5 !	! COMMAND: ...XTERNAL	! xc	! Links up the
!	!	! apt.B	! record for apart-
!	!	! table	! (2) <input type="text"/> (RETURN) ment B.
!	!	!	! (EXECUTE)
! 6 !	!	! xc	! Links up the
!	!	! apt.C	! record for apart-
!	!	! table	! (2) <input type="text"/> (RETURN) ment C.
!	!	!	! (EXECUTE)

!Step!	Screen Says	! You Type	! Comments
! 7 !		! x1	! XTERNAL LIST.
! 8 !	! Sheets supporting	! (RETURN)	!
	! apt.log apt.A apt.B		!
	! apt.C. No sheets		!
	! depend on apt.log.		!
! 9 !	! COMMAND: ...Transfer	! ts apt.log	! Saves the new
		! (EXECUTE)	! sheet under the
			! name apt.log.
! 10 !	! TRANSFER SAVE		!
	! filename: apt.log		!
	! Overwrite existing		!
	! file?	! y	!

Now test the model by making changes in a supporting sheet. You will see the different results appear automatically when the master log is retrieved.

!Step!	Screen Says	! You Type	! Comments
! 11 !	! COMMAND: ...Transfer	! t1 apt.C (EXECUTE)	! Loads apt.C.
! 12 !	! COMMAND: ...Goto	! gr 12 (RETURN)	! Moves the cell
		! 3 (EXECUTE)	! pointer to R12C3.
! 13 !	! COMMAND: Alpha...	! a 6/30/83 →	! Enters the infor-
		! 375 →	! mation for the
		! Rent: July	! July payment.
		! (EXECUTE)	!
! 14 !	! COMMAND: ...Transfer	! ts (EXECUTE)	! Saves the sheet
		! y	! after it has been
			! changed.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 15 !		! tl apt.log	! Loads apt. Log.	!
!	!	!	! (EXECUTE) Notice that the	!
!	!	!	! payment for July	!
!	!	!	! is included in	!
!	!	!	! the record for	!
!	!	!	! apt. C.	!
!	!	!	!	!

You may often find it useful to change the sheet linkage when you consolidate information. For example, if you are estimating costs with different machines, processes, or departments, you may frequently need to change the way the sheets feed information to each other.

Here you can see an example of linkage and how XTERNAL USE changes the results. The new supporting sheet must have a named area that is the same as in the prior supporting sheet.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 16 !	! COMMAND: ...Xternal	! xu	! XTERNAL USE.	!
!	!	!	!	!
! 17 !	! EXTERNAL USE	! apt.B	! Switches the link	!
!	! filename:	!	! to a file called	!
!	!	!	! apt.B.	!
!	!	!	!	!
!	! instead of:	! apt.A	! (EXECUTE) Link from apt.A	!
!	!	!	! to apt.B.	!
!	!	!	!	!
! 18 !	! COMMAND: Alpha...	!	! Logs for apart-	!
!	!	!	! ments A and B	!
!	!	!	! have been switch-	!
!	!	!	! ed.	!
!	!	!	!	!

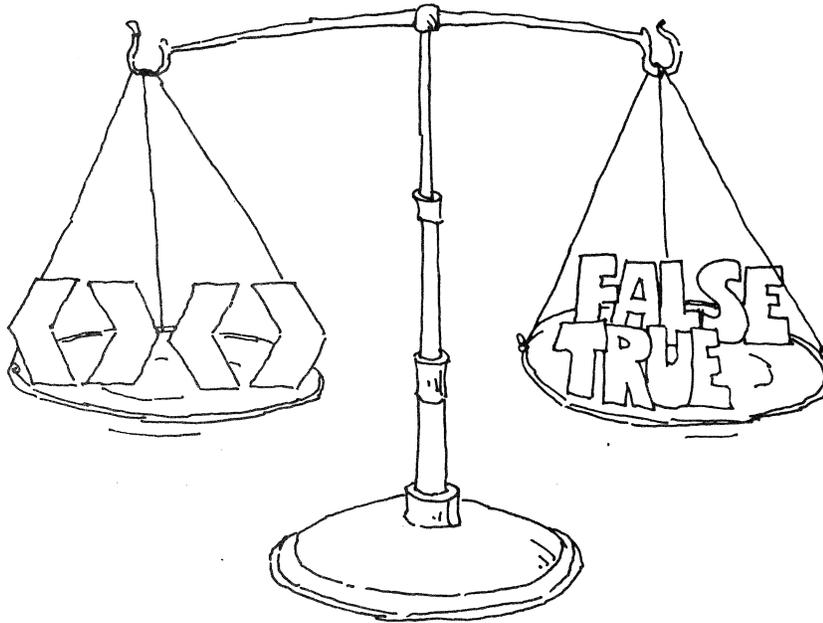
	1	2	3	4	5	6
1						
2	APARTMENT A		APARTMENT B		APARTMENT C	
3	=====		=====		=====	
4	AMOUNT	PURPOSE	AMOUNT	PURPOSE	AMOUNT	PURPOSE
5	=====	=====	=====	=====	=====	=====
6	\$925.00	Deposit, 1st, 1a	\$925.00	Deposit, 1st, 1a	\$925.00	Deposit, 1st,
7	\$375.00	Rent:January	\$375.00	Rent:January	\$375.00	Rent:January
8	\$375.00	Rent:February	\$375.00	Rent:February	\$375.00	Rent:February
9	\$375.00	Rent:March	\$375.00	Rent:March	\$375.00	Rent:March
10	\$375.00	Rent:April	\$375.00	Rent:April	\$375.00	Rent:April
11	\$375.00	Rent:May	\$375.00	Rent:May	\$375.00	Rent:May
12	\$375.00	Rent:June	\$375.00	Rent:June	\$375.00	Rent:June

To create this "apt.log" worksheet, you'll link each apartment to its master sheet. This is done with the XTERNAL COPY command.

The operations so far have been based on the fundamental structures of algebra. Developing formulas with these functions and operators seems quite natural. However, there may be times when you'll want to place certain conditions on your calculations. You can do this with the logical operators and functions of Multiplan.

You've seen three things a cell can display: numbers, strings, and warning displays. The fourth, and final category of cell displays, is logical values. The number of possibilities for strings and numbers is very large. The number of warning displays is six. There are only two logical values -- TRUE and FALSE. These values are similar to the identical expressions in English. TRUE is the value returned when the logical expression is true. FALSE is the value returned when the logical expression is false.

Logical operators and functions have their own rules. Now you'll learn how to use logical values, operators, and functions to build logical expressions.



Using Logical Functions

In many ways, the logical functions are just like those functions that you've already used. They take a value, or values, in the argument and return specific results according to a formula. For logical functions, however, these values are logical values.

TRUE() AND FALSE()

TRUE() and FALSE() are the simplest of the logical functions. Like ROW(), COLUMN(), and PI(), these functions do not have any arguments. The parentheses are needed only to distinguish them from cell names. Both of these functions return logical values. TRUE() returns TRUE. FALSE() returns FALSE.

NOT(x) AND(list), OR(list)

Both the values in the arguments and the values returned for the functions NOT(x), AND(list), and OR(list) are logical values. NOT takes a single logical value and reverses it. Thus NOT(TRUE) equals FALSE, and NOT(FALSE) equals TRUE.

Truth tables are often used to indicate the relationships of logical functions. In a truth table, all the possible variations of the arguments are listed with the outcome of each. Here is the truth table for NOT.

<u>x</u>	<u>NOT(x)</u>
TRUE	FALSE
FALSE	TRUE

AND takes a list of arguments and returns TRUE if each one evaluates to TRUE. FALSE is returned if any of the arguments are FALSE. Here is the truth table for AND.

<u>x</u>	<u>y</u>	<u>AND(x,y)</u>
TRUE	TRUE	TRUE
TRUE	FALSE	FALSE
FALSE	TRUE	FALSE
FALSE	FALSE	FALSE

OR returns TRUE if any of the arguments is TRUE. If every argument is FALSE, then OR returns FALSE. Here is the truth table for OR.

<u>x</u>	<u>y</u>	<u>OR(x,y)</u>
TRUE	TRUE	TRUE
TRUE	FALSE	TRUE
FALSE	TRUE	TRUE
FALSE	FALSE	FALSE

LOGICAL FUNCTIONS

TRUE() Returns the value TRUE.

FALSE() Returns the value FALSE.

NOT(x) Returns FALSE if the logical expression x is TRUE.
Returns TRUE if x is FALSE.

AND(list) Returns TRUE if every expression in the list is TRUE.
Returns FALSE if at least one expression in the list is FALSE.

OR(list) Returns TRUE if at least one expression in the list is TRUE.
Returns FALSE if every expression in the list is FALSE.

IF(x,a,b) If the logical expression x is TRUE, a is returned.
If x is FALSE, b is returned. a and b can be strings, numbers, logical values, or formulas.

ISERROR(r) Returns TRUE if r evaluates to an error. Otherwise, it returns the value FALSE.

ISNA(r) Returns TRUE if r evaluates to NA() (Not available). Otherwise, it returns the value FALSE.

Using Logical Operators

With the logical operators you can determine a result considering more than one factor. The result depends on the relationship of the arguments.

Consider the case of multipricing. Here, the price charged for an item depends on how many are purchased. Generally, the prices fall into steps. For example, the price of a left-hand phillips screwdriver is \$3.75 apiece, \$2.85 when 20 to 99 are purchased, and only \$1.75 when 100 or more are bought.

To develop a formula for calculating the price to charge, regardless of how many are bought, you need some way of determining which category to use. For this, you need the logical operators.

GREATER THAN >

All the comparison operators perform similarly. The `>` operator is referred to as the greater than operator. A logical expression using this operator looks like this.

$a > b$
or, with formulas, $RC[-1] > RC[-2]$

When a formula is used, however, it must result in a number, or a #VALUE error message will result.

A logical expression using a comparison operator checks the expression and returns either TRUE or FALSE, depending on the outcome. In this case, the expression

$a > b$

is really asking is a greater than b?

Greater than is the same as larger than. For example, 112 is greater than 100, but .0023 is not greater than .0025. Be careful when working with negative numbers. The number -3 is greater than -5 because numbers that are negative are considered smaller than positive numbers. Here are some examples of these and other logical expressions written in this notation.

112	>	100	returns	TRUE
.0023	>	.0025	returns	FALSE
-3	>	-5	returns	TRUE
0	>	-5	returns	TRUE
-70	>	50	returns	FALSE

LESS THAN <

As you might expect, the < is the less than operator. If a is greater than b, it is also true that b is less than a. This is written in the following way:

$a > b$ is the same as $b < a$

Both of these operators are used in mathematics. Here are some examples of logical expressions containing the less than operator:

3	<	7	returns	TRUE
-5	<	-1	returns	TRUE
88	<	-89	returns	FALSE

GREATER THAN OR EQUAL TO; LESS THAN OR EQUAL TO >= <=

A number cannot be greater than itself, that is, $a > a$ is always FALSE. Similarly, a number cannot be less than itself. $a < a$ is FALSE for any number a.

Sometimes you may need to detect when a number is greater than or equal to another. For example, in the case of the multiple prices for the screwdriver, it is necessary to test whether the number of screwdrivers bought is greater than or equal to 100. Similarly, you may need to test whether a number is less than or equal to another. In either case, you will use > or < with the equals expression.

$a >= b$	means	<u>a</u> is greater than or equal to <u>b</u>
$a <= b$	means	<u>a</u> is less than or equal to <u>b</u>

In particular,

$4 >= 4$ returns TRUE whereas $4 > 4$ returns FALSE

because 4 is equal to 4 in the first expression; 4 is not more than 4 in the second expression.

Equal; Not Equal = <>

The = and <> operators indicate strict equality or inequality. The expression $a = b$ is TRUE only when a and b are equal. For example,

```
2 = 2            returns    TRUE
2 = 3            returns    FALSE
```

The <> operator is just the reverse. The expression $a <> b$ means a is not equal to b.

```
2 <> 2            returns    FALSE
2 <> 3            returns    TRUE
```

LOGICAL OPERATORS

<u>SYMBOL</u>	<u>NAME</u>	<u>OPERATION</u>
$a > b$	Greater than.	Returns TRUE if <u>a</u> is greater than <u>b</u> . Otherwise, returns FALSE.
$a >= b$	Greater than or equal to.	Returns TRUE if <u>a</u> is greater than or equal to <u>b</u> . Otherwise, returns FALSE.
$a < b$	Less than. than <u>b</u> .	Returns TRUE if <u>a</u> is less than <u>b</u> . Otherwise, returns FALSE.
$a <= b$	Less than or equal to.	Returns TRUE if <u>a</u> is less than or equal to <u>b</u> . Otherwise returns FALSE.
$a = b$	Equal.	Returns TRUE if <u>a</u> and <u>b</u> are equal. Returns FALSE if <u>a</u> and <u>b</u> are not equal.
$a <> b$	Not equal.	Returns TRUE if <u>a</u> and <u>b</u> are not equal. Returns FALSE if <u>a</u> and <u>b</u> are equal.

The IF Function

In English, the word if expresses a condition, sometimes leading to a choice between two alternatives. If it is sunny, go outside. If not, stay in. Here, the statement "it is sunny" is tested. If the statement is TRUE, you go outside. If it is FALSE, you stay in. The Multiplan IF function works in a similar way.

The IF function is the only logical function that can have a nonlogical value. Generally, when logical functions are used, they appear in the argument of this function. The result is then a number, or sometimes a string.

THE ARGUMENTS

The arguments of the IF function take the following form:

IF(x,a,b)

x is a logical expression and must evaluate to either TRUE or FALSE. If it evaluates to a number, string, or error display, the result of the function will be the error #VALUE.

The arguments a and b can be values or formulas, and can evaluate to strings, numbers, logical values, or even error displays. The IF function returns the value of a if x is TRUE, or b if x is FALSE.

HOW IF WORKS

To show how the IF function works, here are some examples. The simplest case is the following:

IF(2=3,129,237)	2 = 3 is the <u>x</u> part.
	129 is the <u>a</u> part.
	237 is the <u>b</u> part.

This expression returns the number 237, the b part of the expression, because the first argument, 2 = 3, is always FALSE. A more meaningful use of the IF function occurs when the first argument is a formula. For example, the following expression:

IF(R1C5=3,129,237)

evaluates the contents of cell R1C5. If this is equal to 3, the first argument evaluates to TRUE and the function returns the number 129. If R1C5 does not equal 3, the result is 237.

This next example uses the cell named score and has strings for the last two arguments.

IF(score >= 60, "PASS", "FAIL")

If score is greater than or equal to 60, then the function returns the string "PASS." Otherwise, the result is "FAIL."

In practice, formulas that use the IF function can be quite long. The multipricing example mentioned earlier is a good example of this. The price charged for an item depends on how many are purchased.

<u>Quantity</u>	<u>Unit Price</u>
1 - 19	\$3.75
20 - 99	\$2.85
100 +	\$1.75

Suppose you want to develop a single formula which returns the total charge for any quantity. To simplify matters, give the cell that contains the number sold the name q. Then develop the formula for the first step.

IF(q < 20, 3.75*q, ...)

Here the quantity purchased, q, is compared to 20. If it is less than 20, the price falls into the first step. The unit price is then \$3.75 so the total amount charged is 3.75 * q. But this does not solve the problem for the next two steps. To distinguish between the two, use the IF function again.

IF(q < 100, 2.85*q, 1.75*q)

This time q is compared to 100. If it is less than 100, the price \$2.85 is used. If it is 100 or more, the price \$1.75 is used. Now, put the two expressions together.

IF(q < 20, 3.75*q, IF(q < 100, 2.85*q, 1.75*q))

Nested Function
↓

The third argument is itself an IF function. When a function appears in the argument of itself, as in this case, it is referred to as nesting.

The IF function is used to choose between two alternatives. When you have more than two alternatives, as in the multipricing example, you must use nested IF functions.

In this procedure the worksheet calculates the multipricing example.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! t1 iffunction	! Loads the if	!
! !	! !	! !	! function work-	!
! !	! !	! !	! sheet.	!
! 2 !	! COMMAND: ...Goto	! gr 12 (RETURN)	! !	!
! !	! !	! 5 (EXECUTE)	! !	!
! 3 !	! COMMAND: ...Name	! n	! !	!
! 4 !	! NAME: define name:	! q (RETURN)	! Names column of	!
! !	! !	! r12:15c3 (EXECUTE)	! quantities q.	!
! 5 !	! COMMAND: ...Value	! = DOLLAR(IF(q <	! Enters formula	!
! !	! !	! 20, 3.75* q,IF	! using IF function	!
! !	! !	! (q < 100, 2.85* q,	! and DOLLAR	!
! !	! !	! 1.75* q)))	! function.	!
! !	! !	! (EXECUTE)	! !	!
! 6 !	! COMMAND: ...Copy	! cd 3 (RETURN)	! Copies the formula	!
! !	! !	! r12c5 (EXECUTE)	! down the cost	!
! !	! !	! !	! column.	!
! !	! !	! !	! !	!

1	2	3	4	5
1	Order Form 262 -- Phillips Screwdrivers			
2	Company: Phil's Hardware			
3	-----			
4	Pricing Schedule:			
5	Quantity:	Unit Price:		
6	1 - 19	\$3.75		
7	20 - 99	\$2.85		
8	100 +	\$1.75		
9	-----			
10	Date	Quantity	Cost	
11	-----			
12	1/1/79	140		
13	3/1/79	80		
14	5/1/79	75		
15	7/1/79	105		

Formula: DOLLAR (IF(q<20,3.75*q,IF(q<100)

The IF function lets you choose values according to conditions you determine. In this example you consider variable pricing in determining cost.

Using IF to Build a Check Register

A check register is a log for recording checks as they are written. The illustration shows an example of the format of a typical register, with columns to record the check number, date, and purpose of each check. There is a column X for marking checks that have cleared the bank, and a column each for entering the amount of the check or deposit. The last column contains a formula for keeping a current balance. Using the IF function you can create the formula that makes a checkbook balance itself.

The procedure for creating this register is not complicated. The formula should be the same for each cell in the balance column. Otherwise, the time needed to enter a different formula in each cell would be excessive.

THE FORMULA

The formula for the new balance is:

$$\text{new balance} = \text{old balance} - \text{check amount} + \text{deposit amount}$$

Using relative references which refer to cells a given distance from the current cell, in the same example gives:

$$\text{new balance} = R[-1]C - RC[-2] + RC[-1]$$

This formula would seem to work. The relative references in the formula refer to old balance, check amount, and deposit amount columns respectively. You enter the formula into the first cell in the balance column, and copy the cell down to the end of the register, in this case, 30 cells.

But there is one problem with this solution. Until the first row with no entry, the register appears normal. From this row down, though, the same balance appears in the last column. The balance is displayed even in unused rows. To keep the rows after the last entry completely blank, you need to include the IF function in the formula. The complete formula looks like this:

$$\text{new balance} = \text{IF}(\text{AND}(RC[-2]=0, RC[-1]=0), "", R[-1]C + RC[-1] - RC[-2])$$

HOW THE FORMULA WORKS

The IF function tests the entries for check amount (ck amt) in RC [-2] and deposit amount (dep amt) in RC [-1]. If they are both blank, you want to display a blank cell, the null string " ". This is the second entry inside the parentheses.

If there is an entry in either ck amt or dep amt, the balance should be displayed. The last argument of the IF function contains the formula for the balance: $R[-1]C + RC[-1] - RC[-2]$.

In the following procedure, you'll enter the corrected formula. After you have completed the procedure, test the register by adding a check.

!Step!	Screen Says	You Type	Comments
! 1 !	! COMMAND: ...Transfer	! t1 check.reg.	! Loads check.reg.
! :	! :	! (EXECUTE)	! :
! 2 !	! COMMAND: ...Goto	! gr 6 (RETURN)	! :
! :	! :	! 7 (EXECUTE)	! :
! 3 !	! COMMAND: ...Value	! = if(AND(r c	! Enters the formula!
! :	! :	! [-2] =0, r c [-1]	! into R6C7. The
! :	! :	! =0,	! first argument of
! :	! :	! :	! the IF function
! :	! :	! :	! tests whether the
! :	! :	! :	! entries for check
! :	! :	! :	! amount and deposit!
! :	! :	! :	! amount are both
! :	! :	! :	! blank.
! 4 !	! :	! " ",	! If they are, dis-
! :	! :	! :	! plays a blank,
! :	! :	! :	! (the null string
! :	! :	! :	! " ").
! 5 !	! :	! r [-1] c +r c	! If not, displays
! :	! :	! [-1] -rc [-2])	! the new balance,
! :	! :	! :	! (previous balance
! :	! :	! :	! + deposit - check
! :	! :	! :	! amt). The new
! :	! :	! :	! balance is
! :	! :	! :	! \$1054.95.

!Step!	Screen Says	! You Type	! Comments
! 6 !	! VALUE: if(AND(R C -2	! (EXECUTE)	! :
! :	! =0, R C -1 =0,	! :	! :
! :	! " ",R -1 C + RC	! :	! :
! :	! -1 -R C -2)	! :	! :
! 7 !	! COMMAND: ...Copy	! cd 30 (EXECUTE)	! Copies the
! :	! :	! :	! formula down 30
! :	! :	! :	! cells. The new
! :	! :	! :	! balances are cal-
! :	! :	! :	! culated but when
! :	! :	! :	! there is no entry,
! :	! :	! :	! the balance is
! :	! :	! :	! blank.

1	2	3	4	5	6	7
1		C H E C K	R E G I S T E R			
2		=====				
3	CK #	DATE	PAY TO	X CK AMT	DEP AMT	BALANCE
4						
5						\$179.95
6	105	8/20/82	Deposit	x	\$875.00	
7	1000	8/22/82	Ace Sporting Goods	x	\$85.45	
8	1001	8/25/82	Gas Company		\$60.73	
9	1002	8/25/82	Acme Towing		\$40.00	
10	1003	8/29/82	Telephone Company		\$37.55	
11	106	8/30/82	Deposit		\$800.00	
12	1004	9/1/82	Rent		\$550.00	
13	1005	9/4/82	Water Company		\$25.00	
14	1006	9/9/82	AAA Supermarket		\$125.00	

This check register automatically calculates each new balance after every entry. The IF function is needed to display a blank balance when a row has no entry.

The ISERROR, ISNA, and NA Functions

Certain formulas may lead to results you do not expect, and create unusual error messages. The ISERROR, ISNA, and NA functions allow you to detect and control this possibility.

ISERROR and ISNA are logic functions. You give them a cell, and they tell you whether or not that particular cell will return an error message. ISERROR and ISNA return either TRUE or FALSE.

The NA function returns the #N/A (not available) value. It requires parentheses but no argument, and provides you with a way to avoid error messages. You use it in conjunction with the ISNA function.

ISERROR

A common error in Multiplan is to specify the division of two numbers where the divisor, or number on the bottom, is zero. Division by zero is incorrect mathematics. Zero goes into a number an infinite number of times, and the computer cannot express the value for infinity. The message #DIV/0 indicates this problem. To protect yourself and other future users, you should test for a division ERROR by using the function ISERROR (cell). If an error is present, you can print blanks or a zero. For example, consider the following:

```
bananas is the name of cell R3C1
monkeys is the name of cell R3C2
```

You want to say that meal is the name of cell R3C3, which is bananas per monkey. Let meal = bananas/monkey (R3C3 = R3C1/R3C2). It would be better, though, to define cell R3C3 like this:

```
IF (ISERROR (bananas/monkeys) "no monkeys", bananas/monkey)
      ↑                               ↑
      Print this if error             Print this if
      is true.                       error is not true.
```

In this way you avoid the #DIV/0 message you would receive if there weren't any monkeys.

ISNA and NA

The ISNA function is similar to ISERROR. It will tell you if a cell contains a #N/A (not available) message. You can use it with the IF function to return an appropriate response. For example, in the following procedure enough rows have been allotted to calculate the mileage on ten cars. Some cells are not currently in use. They have been filled with NA(), indicating that the information is currently not available.

```
IF ((cars R) > car, NA( ), " ")
```

In this formula IF tests to see if the total number of cars (cars) is greater than the number of the car in the current row (cars R). If this is true, N/A appears, otherwise the cell is empty.

The ISNA function then refers to those cells, named gals.

```
IF(ISNA(gals), " ", miles/gals)
```

IF and ISNA test for gals that are not available. If they are not, a blank appears. Otherwise, the mileage is computed.

In this procedure you will work with these formulas. Play around with other columns, entering numbers to familiarize yourself with the ISNA function.

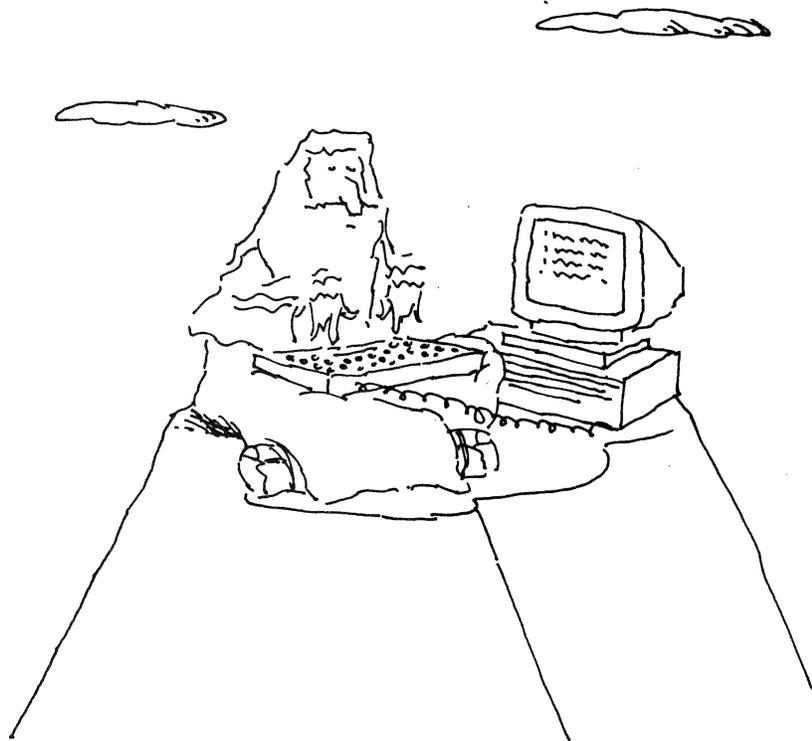
!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer	! tcy tl logical	! Loads logical
! !	! !	! (EXECUTE)	! worksheet.
! 2 !	! COMMAND: ...Goto	! gr 5	! (RETURN) Goes to R5C5.
! !	! !	! 5	! (EXECUTE)
! !	! Goto row: 5 column: 5!	! !	! !
! 3 !	! COMMAND:	! = IF(ISNA	! Enters ISNA
! !	! VALUE:	! (gals), " ",	! formula.
! !	! !	! miles/gals)	! !
! !	! !	! (EXECUTE)	! !
! 4 !	! COMMAND: Alpha...	! cd 9	! (EXECUTE) Copies formula
! !	! Copy down number of	! !	! down 9 cells.
! !	! cells 9 starting	! !	! !
! !	! at: R5C5	! !	! !

1	Car Mileage Chart				
2	Number of Cars:	5			
3					
4	Car#	Miles	Gallons	Mileage	
5	1	425	34	12.5	
6	2	332	22	15.090909	
7	3	550	65	8.4615385	
8	4	240	12	20	
9	5	334	11	30.363636	
10	#N/A	#N/A	#N/A		
11	#N/A	#N/A	#N/A		
12	#N/A	#N/A	#N/A		
13	#N/A	#N/A	#N/A		
14	#N/A	#N/A	#N/A		

Using the ISNA function combined with N/A, you can enter figures on this worksheet without receiving unexpected error messages.

The advanced features of Multiplan can be combined to produce results that go beyond the limitations of other spreadsheet programs. You can accomplish tasks that usually require the use of BASIC programming.

Examples in this chapter show the types of advanced modeling possible using the full power of your Multiplan application. These include the TRANSFER OPTIONS and the OPTIONS iteration commands and the LOOKUP and INDEX functions.



The TRANSFER OPTIONS Command

TRANSFER OPTIONS gives you the power to work with another person's files and save worksheets in other formats for use with other applications. With the TRANSFER OPTIONS command, you can choose one of three modes or formats in which to save your worksheet: Normal, Symbolic, and Other.

MODES

Normal is the Multiplan format or language. This is the default choice (the one automatically chosen), and the one to use for normal use of Multiplan.

Symbolic puts your worksheet into a more universal format to translate your worksheet into a new code or language using the Symbolic form as an intermediate step. Symbolic files consist of ASCII (standard alphabet) character sequences separated by carriage returns, line feeds, or both. The files are easy to read, write, and understand. Symbolic is a format which can be read by BASIC programs. It can also read files written by BASIC programs. You can read more about Symbolic files in the Multiplan Reference Guide.

Other translates your sheet into the Visicalc format or vice versa. With this command you can automatically take your Visicalc worksheet into Multiplan.

SETUP

Setup takes you to another directory, or library. You can access to Multiplan files on your Fortune system.

Use the return or tab key to highlight the setup field. Then enter /usr/directory name indicating the library you wish to access. Press (EXECUTE). For example,

TRANSFER OPTIONS mode: (Normal) Symbolic Other Setup: /usr/accounting

Use the TRANSFER LOAD filename command with an arrow key to view the new directory.

If you have trouble loading a file, be sure that you are in the correct directory. When you change directories after entering Multiplan the name of the directory continues to be displayed in the setup area so you can check at any time which is your current directory.

Circular References

Multiplan normally requires the standard sequence of arithmetic in formulas, a non-circular path down columns or across rows. A calculation sequence usually does not double back on itself in a circular reference. Suppose you have three cells A, B, and C. Cell B depends on A, C upon B, and A upon C. This is a circular reference, and usually happens only by accident. Multiplan automatically detects this problem and gives you the message "Circular references unresolved" and a beep unless you have chosen the iteration option of the OPTIONS command.

In this example the formula row (row 6) is part of the formula. This is a circular reference.

	<u>Circular reference</u>		<u>Normal sequence</u>	
	1	2	1	2
1	45		1	45
2	62		2	62
3	14		3	14
4	9		4	9
5			5	
6	sum(R1:6C1)		6 sum(R1:4C1)	

The completion test is a conditional formula that may include one of two Multiplan functions designed to work specifically with the iteration option:

DELTA ()	Returns the maximum change in the value of cells from one iteration to another.
ITERCNT ()	Returns #N/A (not available) during normal recalculation and the iteration count (starting with 1) during iteration.

Iteration ends when the completion test evaluates to TRUE.

It is possible to write a sequence of formulas that, when repeated, give the correct IRR, with NPV equal to zero. An estimated value of IRR must get closer and closer to the real value of IRR. Using OPTIONS iteration Multiplan enters a new estimate for IRR as it recalculates. The completion test in the next procedure is the formula

`OR(ABS(npv) < accr, ITERCNT() > 5)`

which says: If the absolute value of npv(a named cell) is less than accr (degree of accuracy, a named cell) or if the number of iterations is more than 5 then this is TRUE. When TRUE is returned, the iteration stops.

You can experiment with the worksheet to see the effect of changing dollar amounts, the degree of accuracy, or the estimated interest rate in the Start cell (R6C6). If the recalculate cell (R11C6) says yes you have chosen a start value, an estimated interest rate that does not work. Try another value.

You might want to calculate intermediate results, and to use the results to feed back into the calculation process until a certain condition is achieved. The iteration option of the OPTIONS command allows you to include formulas with circular references. Turn it on by typing yes. You should also include the location of a completion test, a condition you set that determines the end of Multiplan's recalculation (iteration).

For example, there is no direct solution to the problem of finding the internal rate of return, or IRR, of a series of future cash flows. The problem is to find the exact interest rate which, when given to the Net Present Value (NPV) function, will cause the NPV to exactly equal zero. At that interest rate your cash outflows would exactly equal the inflows.

In this procedure you'll use recalculation to come up with the NPV.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!		!		!
! 1	! COMMAND: ...Transfer	!	tcy	!		!
!	!	!		!		!
! 2	!	!	t1 irr	!	(EXECUTE)	!

!Step!	Screen Says	! You Type	! Comments
! 3 !	! COMMAND: Alpha	! .07 (EXECUTE)	! Enters 7% in start!
! :	! :	! :	! cell. This is !
! :	! :	! :	! your estimated !
! :	! :	! :	! interest rate. !
! :	! :	! :	! :
! 4 !	! Circular references	! :	! Screen message and!
! :	! unresolved	! :	! beep tell you you !
! :	! :	! :	! have circular !
! :	! :	! :	! references. !
! :	! :	! :	! :
! 5 !	! COMMAND: ...OPTIONS	! o	! Chooses circular !
! :	! :	! (2) (RETURN)	! references option !
! :	! :	! y (RETURN)	! and indicates !
! :	! :	! r10c6 (EXECUTE)	! completion test !
! :	! :	! :	! at R10C6. !
! :	! :	! :	! :
! :	! Net Present Value=	! :	! Multiplan automat-!
! :	! 0.2417971	! :	! ically stops re- !
! :	! :	! :	! calculating !
! :	! :	! :	! because NPV is !
! :	! :	! :	! less than 1. !
! :	! :	! :	! :

	1	2	3	4	5	6
1	Internal Rate of Return					
2						
3						
4	Year	in \$MM				
5	-----			Accuracy		1
6	1982	-100		Start		6.00%
7	1983	-50		Step		0.005
8	1984	20		Interest rate =		5.00%
9	1985	30		Net present value =	0.2417971	
10	1986	50		Completion test	TRUE	
11	1987	80		Recalculate	no	
12	-----					

You can use circular references to calculate the Internal Rate of Return as in this worksheet.

The LOOKUP Function

As its name implies, LOOKUP allows you to look up an entry somewhere on your worksheet, and to use it somewhere else on the worksheet. This function greatly extends the range of problems you can solve with Multiplan.

Many problems require relating one set of numbers to another. Say you want to look up and use tax rates based on taxable income. These figures are stored in a worksheet. In this example, you want to relate the values of taxable income to the proper rates of taxation.

The LOOKUP function is entered in a cell. The form of the LOOKUP function is LOOKUP (value, range of cells). For example,

LOOKUP (25000, R2:3C1:5)

finds the closest value less than or equal to 25,000 in R2C1:5 where row 2 represents income and row 3 represents rates of taxation.

#1	1	2	3	4	5	6	7
1							
2	6000	10000	15000	20000	30000	40000	50000
3	5	10	12	15	20	33	45
4							

The value 25,000 falls between 20,000 and 30,000. LOOKUP returns the value in the cell immediately below 20,000, that contains a 15.

You may also arrange your LOOKUP table as two columns of information. For example:

#1	1	2
1	6000	5
2	10000	10
3	15000	12
4	20000	15
5	30000	20

LOOKUP retrieves information from the rightmost column.

As another example, ranges of monthly pay are linked to a ranking of values 1 to 5 by LOOKUP tables. Here is the pay LOOKUP table:

	1	2	3	4	5	6	7
1	500	1000	1800	2500	5000	9000	
2	1	2	3	4	5		
3							

Take home pay of 1500 results in the value 2 since the number 1000, which corresponds to 2, is the closest value less than or equal to 1500.

This third example of LOOKUP tables gives you years-at-address. Linked to that is ranking of 1 to 5, a table that could be used to determine insurance risk. For two and one half years at the same address, the table gives the rank four.

	1	2	3	4	5	6	7
1	.5	1.0	1.5	2.0	4.0	10.0	
2	1	2	3	4	5		

The following procedure gives an example of the LOOKUP function.

!Step!	Screen Says	! You Type	! Comments	!
! 1 !	! COMMAND: ...Transfer	! tcy	!	!
! 2 !	!	! t1 lookup	! Loads LOOKUP work-	!
!	!	! (EXECUTE)	! sheet.	!
! 3 !	! COMMAND: ...Goto	! gn income	! Goes to cell named!	!
!	!	! (EXECUTE)	! income.	!
! 4 !	! COMMAND: ...Value	! 35000	! (EXECUTE)!	!
!	!	!	! Enters taxable	!
!	!	!	! income and charges!	!
!	!	!	! tax rate.	!
! 5 !	! COMMAND: ...Goto	! gn rate	! (EXECUTE)!	!
!	!	!	! Goes to cell named!	!
!	!	!	! rate. Shows LOOK-	!
!	!	!	! UP function.	!

The INDEX Function

The INDEX function allows you to retrieve one value from a table or a list of values. It resembles the LOOKUP function but differs in that it can also choose from many rows and columns. You can retrieve either numeric or text values using the INDEX function. Computer programmers will recognize this function as the ability to retrieve information from a one or two-dimensional array.

The function is written

INDEX (location of table, row, column)

if the location is an area, and row and column indicate a specific cell within that area.

If you supply the row and column, the INDEX function returns a table value. For example, using the following table of numbers, INDEX (R5C1:R7C6,2,4) returns the value 21.

#1	1	2	3	4	5	6
5	3	23	11	23	32	31
6	4	32	14	21	34	35
7	5	44	13	24	29	22

The power of INDEX is significant when you realize that you can determine the proper row or column in a separate calculation, or in a LOOKUP function. This gives you the ability to rate several tables of information in ways similar to that found in high-level computer languages such as BASIC and FORTRAN.

With the INDEX function you can also access text information from a table of text values, given a row and column input. Suppose you want to classify a list of credit applicants as ACCEPT, STUDY, or REJECT. You'll base your classification on a pay ranking value from 1 to 5 and year-of-stay ranking from 1 to 5, both determined in LOOKUP tables in the prior LOOKUP example. The pay rank and the years rank are used to access the text ACCEPT, STUDY, or REJECT.

The second ability of INDEX is to retrieve a value from a vector, a list. To do this, write

INDEX (location of list, row or column)

For example,

INDEX(R1C1:5,2)

returns the 4 in row 1 column 2 from the following list:

	1	2	3	4	5	6
1	5	4	3	7	8	
3						

If the vector you are using is a row, the second argument is a column number and indicates the intersection point. Likewise, a column vector requires a row number as a second argument.

In the following table, the INDEX function pulls out a text value. The formula INDEX(R11C1:R15C5,2,4) returns the word STUDY.

	1	2	3	4	5	6	7
11	REJECT	REJECT	STUDY	STUDY	ACCEPT		
12	REJECT	STUDY	STUDY	STUDY	ACCEPT		
13	REJECT	STUDY	STUDY	ACCEPT	ACCEPT		
14	REJECT	STUDY	ACCEPT	ACCEPT	ACCEPT		
15	STUDY	STUDY	ACCEPT	ACCEPT	ACCEPT		

The LOOKUP and INDEX features of Multiplan are two very powerful functions. They can be even more powerful if they are combined, as you'll see from this next example.

!Step!	Screen Says	You Type	Comments
!	!	!	!
! 1 !	! COMMAND: ...Transfer	! tcy	!
!	!	!	!
! 2 !	!	! t1 index (EXECUTE)	! Loads index work-
!	!	!	! sheet.
!	!	!	!
! 3 !	! COMMAND: ...Goto	! gn row (EXECUTE)	! Goes to cell
!	!	!	! named row.
!	!	!	!
! 4 !	! COMMAND: Alpha...	! 3	! Changes row
!	!	!	! pointer to 3.
!	!	!	!
! 5 !	! COMMAND: Alpha...	! 2 (EXECUTE)	! Changes column
!	!	!	! pointer to 2.
!	!	!	! INDEX function
!	!	!	! retrieves the
!	!	!	! value in row 3 and
!	!	!	! column 2 of the
!	!	!	! table.
!	!	!	!

	2	3	4	5	6	7
1						
2	INDEX FUNCTION Example -- Retrieve values from a table					
3						
4	Row:	1				
5	Column:	1				
6						
7	Result:	oranges				
8						
9		oranges	apples	pears	bananas	
10		penalty	no charge	tax-free	lawsuit	
11		Howard	Joan	Edward	Mandra	

The INDEX function can be used with the LOOKUP function to make Multiplan even more powerful.

Managing Worksheets

Managing worksheets that you create with Multiplan is similar to managing the paper work in your office. You must know when to throw things out, as well as when to save them. When you save worksheets, you must decide where to keep them and how to organize them. To help you with these basic decisions you can use the Multiplan maintenance activities.

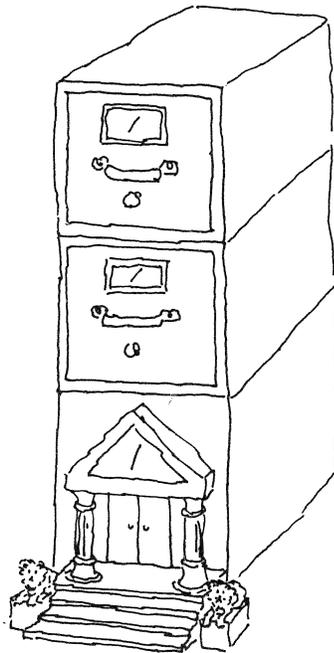
In the next five chapters you'll learn about:

- Using libraries
- Saving worksheets
- Copying, renaming, and deleting worksheets
- Archiving worksheets
- Making an index
- Taking care of flexible disks
- Organizing and labeling your flexible disks

21 Libraries

A library is a collection of worksheets, like a drawer in a filing cabinet. All the worksheets you create are part of one library or another. By creating and keeping all of one person's worksheets in the same library, you are automatically grouping the worksheets under one heading. This makes it easier for you to find your own worksheets. Functions for changing, making, and removing libraries are part of the supervisory functions activity on your Multiplan menu.

A library of worksheets in Multiplan works like a library of books. Every library has a scheme for keeping books on the same subject together. You can group worksheets for a library in any way you want. It can contain all the worksheets produced by a person, or department, or of a particular type, like budgets.



Setting Up Libraries

Take a few minutes to think about your business. Do you create many worksheets of a particular type, for example, budgets? You can create and keep each type in its own library. Are there departments in your company? Worksheets of each department can have their own library. There's no limit to the number of libraries you can have, but you should consider the disk space that worksheets in that library take up. Archiving worksheets regularly leaves room on your disk for libraries with many worksheets.

A library isn't a physical thing like a worksheet, but rather a grouping technique. When you learn about archiving worksheets later in this part, you'll learn that archiving only involves individual worksheets. When you archive worksheets and move them from your disk to flexible disks, they lose their association with a library name. If you're archiving all the worksheets in a library onto one flexible disk, be sure to label the disk so that you'll always use the right one for archiving and retrieving. Procedures and information about labeling disks is presented in the last chapter of this section.

NAMING LIBRARIES

Each library you create needs a name. Library names are similar to worksheets names. The difference is that they are preceded with a /. Your training library is called /usr/training. Take a look on the Multiplan menu screen. The current library name, the one you've been using during your training, is shown below the list of activities.

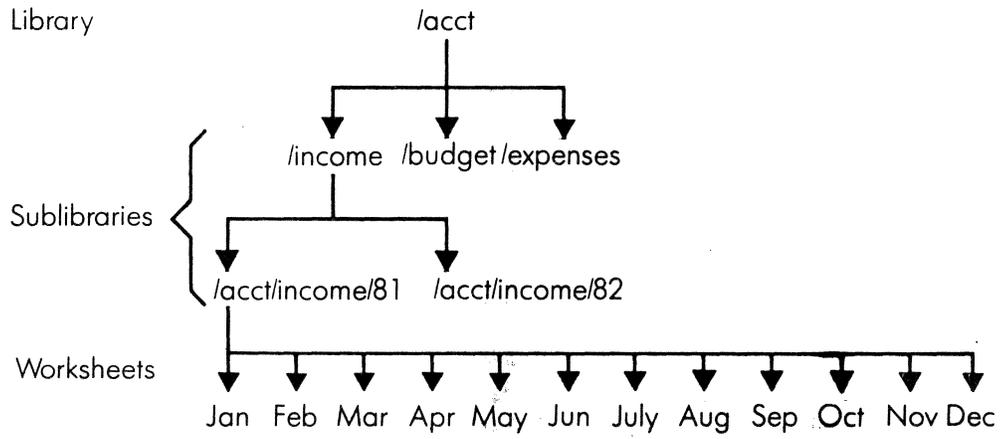
Since the / is a special character identifying a library name for Multiplan, you can't use a / in a worksheet name. As with naming worksheets, you should give your libraries names that you can easily identify and type in. For example, you could use /acct as a library name for the accounting department's worksheets, or /if you want to keep all budgeting worksheets together.

SUBLIBRARIES

Another way to give structure to your worksheets as groups is with sublibraries. Think of sublibraries as part of a tree structure. The library is the trunk, sublibraries are the major limbs, and worksheets branch off from there. See the illustration on the next page. You can have many sublibraries, each one containing many worksheets.

If you used /acct for the accounting department's library, you could use /income and /expenses for sublibraries. To define a sublibrary, you must also include the library name. For example, to access worksheets in the /income sublibrary of the /acct library, you type the library name /acct/income.

On the Multiplan menu screen you always see the name of the library you're currently working with, /acct for example. If you want to use worksheet Jan.82 from the /acct/budget sublibrary, you can do this in one of two ways. You can change the library to /acct/budget with the supervisory functions menu and then type in the worksheet name. Or, you can type in the whole sublibrary name and worksheet name when you're asked for the worksheet name. Multiplan can then locate the specific worksheet you want.



Libraries and sublibraries resemble a tree structure.

Making a New Library

Making a new library is part of the supervisory functions activity shown on the Multiplan menu, which is pictured on the next page. The second activity is make library. You can move to this choice by using the `↓`, `↑`, (RETURN), or (SPACE BAR).

Use the following procedure to make a new library.

!Step!	Screen Says	! You Type *	! Comments
! 1 !	! Multiplan	! s	! Goes to the super-
! !	! Run Multiplan	! !	! visory function. !
! 2 !	! Supervisory Functions!	! (EXECUTE)!	! !
! 3 !	! SUPERVISORY FUNCTIONS!	! ↓	! Moves the cursor !
! !	! MENU	! !	! to the Make !
! !	! Change library	! !	! Library selection.!
! !	! Current library	! !	! !
! !	! is/usr/training	! !	! !
! 4 !	! Make library	! (EXECUTE)!	! !
! 5 !	! Enter new library	! /new	! The current !
! !	! !	! (RETURN)!	! library name is !
! !	! !	! !	! shown. Just type !
! !	! !	! !	! the new name, !
! !	! !	! !	! "new," over it. !
! !	! !	! !	! !
! !	! Change library	! !	! The marker goes !
! !	! Current library	! !	! back to the first !
! !	! is /usr/training	! !	! choice on the menu!
! !	! !	! !	! to show you that !
! !	! !	! !	! the Make library !
! !	! !	! !	! function is com- !
! !	! !	! !	! plete. You must !
! !	! !	! !	! use the Change !
! !	! !	! !	! library function !
! !	! !	! !	! to use your new !
! !	! !	! !	! library. !

SUPERVISORY FUNCTIONS MENU

Please select next activity:

Change library

Make library

Remove library

Current library is /usr/trainings

Functions for working with libraries are on the supervisory functions menu.

Making a Sublibrary

Making a sublibrary uses the same process as making a library. The difference is that you must be using the library you want the sublibrary to be a part of.

This is true also for making sublibraries of sublibraries. You must change the library to the sublibrary you want, and then make a new sublibrary.

Since the library has been changed to /new, try making a sublibrary under that.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
!	! 1 ! SUPERVISORY FUNCTIONS!	!	!
!	! ! MENU	!	!
!	! ! Change library	! (RETURN)	!
!	! ! Current library	!	!
!	! ! is /new	!	!
!	!	!	!
!	! 2 ! Make library	! (EXECUTE)	!
!	!	!	!
!	! 3 ! Enter new library	! (4) <input type="text" value="→"/>	! Cursor moves to
!	! ! Name: /new	!	! end of current
!	!	!	! library name.
!	!	!	!
!	! 4 ! /new	! /lib	!
!	!	!	!
!	! 5 ! Enter new library	! (EXECUTE)	! Makes a sublibrary!
!	! ! Name: /new	!	! for /new, called
!	!	!	! /new/lib.
!	!	!	!
!	! 6 ! Change library	! (EXECUTE)	! Changes to the
!	! ! Current library is	!	! sublibrary.
!	! ! /new	!	!
!	!	!	!
!	! 7 ! Change library to:	! (4) <input type="text" value="→"/>	!
!	! ! / new	!	!

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 8 !	! / new	! /lib	! Cursor moves to	!
!	!	!	! end of library	!
!	!	!	! name and adds sub-	!
!	!	!	! library name.	!
!	!	!	!	!
! 9 !	! /new/lib	! (EXECUTE)	! Completes the	!
!	!	!	! process.	!
!	!	!	!	!
! 10 !	! Change library	!	! Any worksheets you!	!
!	! Current library is	!	! create will be in !	!
!	!	!	! this sublibrary. !	!

Removing a Library

You'll occasionally need to eliminate a library from your disk. For instance, once you complete the training, you should remove any libraries or sublibraries that aren't needed to make room for your own worksheets.

Before doing this, you must remove all the sublibraries and worksheets that are part of this library. So don't attempt this without giving it some thought. Removing a library is a long process unless you just created it and don't have any sublibraries or worksheets connected with it.

To learn how to remove a library, use the procedure below to remove the sublibrary and library you just created. To delete worksheets use TRANSFER DELETE or a process you'll learn later.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! SUPERVISORY FUNCTIONS!	! <u>(EXECUTE)</u> !	!
!	! MENU	!	!
!	! Change library	!	!
!	! Current library	!	!
!	! is /new/lib	!	!
!	!	!	!
! 2 !	! Change library to	! /usr/traing	! Changes back to
!	! /new/lib	! <u>(EXECUTE)</u> !	! the /usr/training
!	!	!	! library.
!	!	!	!
! 3 !	! Change library	! (2) 	! Moves the marker
!	! Current library	!	! to the remove
!	! is /usr/training	!	! library activity.
!	!	!	!
! 4 !	! Remove library	! <u>(EXECUTE)</u> !	!
!	!	!	!
! 5 !	! Enter library	! /new/lib <u>(EXECUTE)</u> !	! Enters the sub-
!	!	!	! library you just
!	!	!	! created.
!	!	!	!
! 6 !	! Change library	! <u>(EXECUTE)</u> !	! Changes back to
!	!	!	! the sublibrary.
!	!	!	!
! 7 !	! Change library to	! /new/lib <u>(RETURN)</u> !	! Enters deleted
!	!	!	! sublibrary name.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	8 ! No such library	!	(CANCEL) ! This message tells!	!
!	!	!	! you that the sub- !	!
!	!	!	! library you wanted!	!
!	!	!	! is gone. Use !	!
!	!	!	! (CANCEL) to end !	!
!	!	!	! this. !	!
!	!	!	!	!
!	9 ! Change library	!	(CANCEL) ! Goes back to the !	!
!	!	!	! Multiplan menu. !	!
!	!	!	!	!
!	! Multiplan	!	!	!
!	! Run Multiplan	!	!	!

22 Filing Worksheets

Worksheets can exist in two places. When you create new worksheets and edit them, they are on your system disk. To save or archive them, you put them on a flexible disk. To use them again, however, you'll have to transfer the worksheets back to the system disk. Worksheet filing is a group of functions that help you perform these tasks.

Filing is an activity on the Multiplan menu and has its own separate menu. The first three functions on the filing menu, copy, delete, and rename, are used for worksheets on your system disk. The rest of the functions are used for archive disks, the flexible disks you use to store and save worksheets.

In the second column you select what file type you wish to work in, Multiplan (normal), symbolic, or other (VisiCalc). Your files will be manipulated in the file type you choose.

Look at the filing menu to locate the functions you can use.

FILING MENU

Please select next activity:

OPERATION	FILE TYPE:
<div style="border: 1px solid black; display: inline-block; padding: 1px 5px; margin-bottom: 5px;">COPY</div> Delete Rename Copy to archive File to archive Retrieve from archive Delete from archive Insert disk Remove disk	<div style="border: 1px solid black; display: inline-block; padding: 1px 5px; margin-bottom: 5px;">Multiplan</div> Symbolic Other

Current library is /usr/training

The filing menu has functions to manage your worksheets.

Changing A Worksheet Name

You may need to rename a worksheet if you have many related worksheets that have very different names. For instance, you may have many business plans that you've named ames.plan, carl.plan, lorry.plan and so forth. You may now want to give each one the general name of ltr and then follow it with a code. By renaming them and grouping them, you can see the relationship between them.

The key to changing worksheet names is to make the new name easily identifiable. If you change spec.23 to wilson.4, will you be able to find it again? Until you remember the new names, you may want to keep a written record of them or print an index.

You can change a worksheet using the TRANSFER RENAME command or the copy option of the Filing Menu. Use the procedure to learn about changing worksheet names with the Filing Menu.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! FILING MENU	!	r	!	!	!
!	! Copy	!	!	!	!	!
!	!	!	!	!	!	!
!	2 ! Rename	!	(EXECUTE)	!	!	!
!	!	!	!	!	!	!
!	3 ! Old Worksheet Name:	!	(EXECUTE)	!	Multiplan remem-	!
!	! e dit.2	!	!	!	bers the last	!
!	!	!	!	!	worksheet name	!
!	!	!	!	!	used.	!
!	!	!	!	!	!	!
!	4 ! New worksheet name:	!	revise (EXECUTE)	!	Change name to	!
!	!	!	!	!	revise.	!
!	!	!	!	!	!	!
!	! FILING MENU	!	!	!	!	!
!	! Copy	!	!	!	!	!

Deleting A Worksheet

You should consider carefully before you delete a worksheet. When you delete it, it's gone. Unless you have it on an archive disk, you won't be able to work with it again. Even though this sounds major, and it is, deleting worksheets is a necessary part of good worksheet management. This makes room for you to create new worksheets and eliminates confusion.

Before you delete a worksheet, take a moment to think about it. Perhaps you want to file or copy it to an archive disk instead. Filing a worksheet removes it from the system disk, but doesn't erase it completely. So if in doubt, archive.

As you have learned TRANSFER DELETE is one method for deleting worksheets. Use this procedure to learn about deleting worksheets using the Filing Menu.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! FILING MENU	! d	!
!	! Copy	!	!
!	!	!	!
! 2 !	! Delete	! <u>EXECUTE</u>	!
!	!	!	!
! 3 !	! Worksheet name:	! <u>EXECUTE</u>	! Deletes the work-
!	! revise	!	! sheet you renamed.!
!	!	!	!
! 4 !	! ARE YOU SURE?	!	! You could change
!	!	!	! your mind here by
!	!	!	! pressing <u>CANCEL</u>
!	!	!	! to stop the
!	!	!	! delete. Use
!	!	!	! <u>EXECUTE</u> to
!	!	! <u>EXECUTE</u>	! complete it.
!	!	!	!
! 5 !	! FILING MENU	!	!
!	! Copy	! <u>CANCEL</u>	! Leaves the filing
!	!	!	! menu.
!	!	!	!
!	! Multiplan	!	!
!	! Run Multiplan	!	!

Archiving is a key part of worksheet management. It is the process of saving or storing worksheets on a flexible disk. Just as you occasionally need to clean out a filing cabinet, the same is true for your system disk. The filing menu, which you've just seen, has activities for copying and filing worksheets to an archive disk, as well as deleting and retrieving worksheets from an archive disk.

Copying a worksheet to an archive disk is like copying text. It saves the original as well as a duplicate because you must give the duplicate a new name. Filing is similar to moving text. The worksheet moves from the system disk to the archive disk. You can't edit it until you put it back on the system disk.

Keep in mind the following points about archiving:

Check your system disk often to see how much room you have available. For maximum performance, it should be no more than 75 percent full. You'll learn the procedure for calculating your disk capacity.

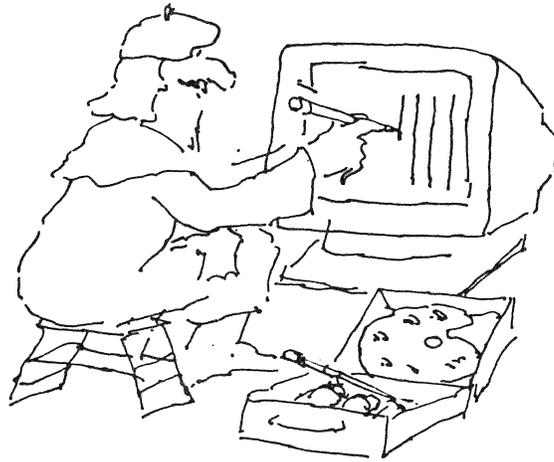
Keep your most-used worksheets on the system disk. Otherwise, file them onto an archive disk.

Copy or file a worksheet onto only one disk. You may get confused if you have a copy on several different disks and you'll have difficulty determining which one is the most up-to-date.

Since you cannot have two worksheets with the same name, you'll need to give worksheets you archive new names on the same disk. Make the new name similar to the original name.

Keep archive disks no more than 70% full. This allows room for worksheets to grow in length from when you first archived them. You may want to print an index of each archive disk. You'll learn how to do this in the next chapter.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	7 ! SYSTEM UTILITIES MENU!	(RETURN)	! You can format	!
!	!	!	! some more disks	!
!	!	!	! now by repeating	!
!	!	!	! this procedure.	!
!	!	!	! Then return to the	!
!	!	!	! global menu. Be	!
!	!	!	! sure to write an	!
!	!	!	! identifying code	!
!	!	!	! or number on a	!
!	!	!	! disk label and	!
!	!	!	! attach it to the	!
!	!	!	! disk.	!
!	!	!	!	!
!	! FORTUNE SYSTEMS	!	!	!
!	! GLOBAL MENU	!	!	!



Inserting and Removing a Flexible Disk

In the process of formatting your flexible disk for archiving, you put it in the disk drive. When you want to archive worksheets, there are special features on the filing menu that you use to let Multiplan know that you're putting in a disk, or taking it out.

Now that you have an archive disk prepared, use the process below to insert the disk.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
! 1 !	! Multiplan	! f	! Chooses the filing!	!
!	! Run Multiplan	!	! <u>(EXECUTE)</u> menu for inserting!	!
!	!	!	! and removing	!
!	!	!	! disks.	!
!	!	!	!	!
! 2 !	! Filing	!	!	!
!	!	!	!	!
! 3 !	! FILING MENU	!	!  Moves the marker	!
!	! Copy	!	! down to the insert!	!
!	!	!	! disk activity.	!
!	!	!	!	!
! 4 !	! Insert disk	!	! <u>(EXECUTE)</u> Put the disk in	!
!	!	!	! the drive, close	!
!	!	!	! the door, and	!
!	!	!	! press <u>(EXECUTE)</u> .	!
!	!	!	!	!
! 5 !	!	!	! <u>(EXECUTE)</u> In case you press	!
!	!	!	! <u>(EXECUTE)</u> before	!
!	!	!	! you put in the	!
!	!	!	! disk, Multiplan	!
!	!	!	! reminds you again.	!
!	!	!	!	!
! 6 !	! Disk ID is.....	!	! <u>(EXECUTE)</u> Multiplan shows	!
!	! Press <u>(EXECUTE)</u> to	!	! you the disk ID.	!
!	! continue, or <u>(CANCEL)</u>	!	! If you had inser-	!
!	! to remove disk	!	! ted the wrong	!
!	!	!	! disk, you could	!
!	!	!	! remove it now and	!
!	!	!	! start over.	!

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 7 !	! FILING MENU	! r r r	! (EXECUTE) ! The insert is com-
!	! Copy	!	! plete, and the !
!	!	!	! disk ID shows !
!	!	!	! <u>above</u> the current !
!	!	!	! library name <u>below</u> !
!	!	!	! the activities. !
!	!	!	! Now use the remove!
!	!	!	! activity. !
!	!	!	!
! 8 !	! Remove disk	!	! (EXECUTE) ! (EXECUTE) here !
!	!	!	! completes the !
!	!	!	! process. !
!	!	!	!
! 9 !	! FILING MENU	!	! Notice that the !
!	! Copy	!	! disk ID is gone. !

Copying Worksheets onto an Archive Disk

Copying a worksheet onto an archive disk makes a duplicate of the worksheet on the archive, but also leaves it on the system disk. This is helpful when you're working on long worksheets. When you save a copy on an archive disk, and work on the original on your system disk, you can refer to the copy if you make some serious editing changes you later decide you don't want.

Use your newly prepared archive disk to copy a file, and insert the disk again.

Step	Screen Says	You Type	Comments
1	FILING MENU Copy	(3) 	
2	Copy to archive	EXECUTE	
3	Press EXECUTE after inserting disk	EXECUTE	You cannot copy a worksheet without having the archive disk in place. Multiplan will remind you. Press EXECUTE to continue this.
4	Disk ID is Press EXECUTE to continue or CANCEL to remove disk	EXECUTE	You can end the process here by using CANCEL. Go on to copy a worksheet to the archive disk.
5	Source worksheet Name:	edit EXECUTE	Type in the name of the worksheet you want to copy. Use edit.
6	Destination worksheet name:	test EXECUTE	

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
!	7 ! Destination	!	! When you copy the !
!	! document name:	!	! worksheet to an !
!	! test	!	! archive, you may !
!	!	!	! give it a new !
!	!	!	! name. If it isn't!
!	!	!	! already on the !
!	!	!	! disk, or use the !
!	!	!	! same name. !
!	!	!	!
!	8 ! FILING MENU	!	! The archiving is !
!	! Copy	!	! complete. Now you!
!	!	!	! can use another !
!	!	!	! filing activity. !

Filing a Worksheet

Filing a worksheet is helpful when you don't need it on your system disk. Filing worksheets makes room on your system disk, and you can always retrieve a worksheet when needed again. Filing is the way to make a permanent archive.

Filing a worksheet removes it from the system disk and moves it to the archive. Use the retrieve from archive activity when you want to revise it, rename it, or delete it.

The steps you follow for filing are very similar to those for copying. Try filing a worksheet and you'll see how it works.

!Step!	Screen Says	You Type	Comments
!	!	!	!
! 1 !	! FILING MENU	!	!
!	! Copy	! (4) 	!
!	!	!	!
! 2 !	! File to archive	!	! (EXECUTE)
!	!	!	!
! 3 !	! Source Worksheet	!	! Try filing the
!	! Name: test	!	! same worksheet.
!	!	!	!
! 4 !	! Destination	!	!
!	! Worksheet Name:	!	!
!	! test	!	!
!	!	!	!
! 5 !	! Worksheet already	!	! Multiplan tells
!	! exists	!	! you that you al-
!	!	!	! ready have a work-
!	!	!	! sheet by that name!
!	!	!	! on your archive
!	!	!	! disk. Type in a
!	!	!	! new name for it,
!	!	! printer	! (EXECUTE) "printer".
!	!	!	!
! 6 !	! Copy	!	! (EXECUTE) The filing is com-
!	!	!	! plete. Try to
!	!	!	! copy the original
!	!	!	! worksheet again.
!	!	!	!
! 7 !	! Source worksheet	! test	! (EXECUTE)
!	! Name:	!	!

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	8 ! Worksheet doesn't	!	(CANCEL)	!	The message tells !	!
!	! exist	!		!	! you that the work-!	!
!	!	!		!	! sheet is no longer!	!
!	!	!		!	! on the disk. Press!	!
!	!	!		!	! (CANCEL) to end !	!
!	!	!		!	! this process. !	!
!	!	!		!	!	!
!	! FILING MENU	!		!	!	!
!	! Copy	!		!	!	!

Retrieving a Worksheet

When you copy or file a worksheet to an archive disk, you can still recover it when needed. This process is called retrieving a worksheet.

When you retrieve a worksheet, Multiplan moves a copy of it from the archive disk and puts it back on the system disk. If you look for it later on the archive, it will still be there. You can retrieve it again if you want still another copy on your system disk.

If you need to delete a worksheet from an archive disk, use the process that follows this one.

Try retrieving a worksheet with the procedure below.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! FILING MENU	! rr	!
!	! Copy	!	!
!	!	!	!
! 2 !	! Retrieve from archive!	! r r <u>EXECUTE</u> !	!
!	!	!	!
! 3 !	! Source worksheet	!	! <u>EXECUTE</u> !
!	! name: printer	!	! Brings back the
!	!	!	! worksheet you just!
!	!	!	! filed onto the
!	!	!	! archive disk.
!	!	!	!
! 4 !	! Destination	!	! <u>EXECUTE</u> !
!	! worksheet name:	!	! If you want it to
!	! printer	!	! have the same
!	!	!	! name, just press
!	!	!	! <u>EXECUTE</u> !
!	!	!	!
!	! FILING MENU	!	!
!	! Copy	!	!

Deleting a Worksheet from the Archive Disk

Sometimes you'll find that you need to remove worksheets from the archive disk. You'll probably do this as the number of your archive disks increases. Then, you should review the contents of each disk and determine which worksheets can be eliminated.

Use this procedure to delete a worksheet from the archive disk.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! FILING MENU	! (2) 	!
!	! Copy	!	!
!	!	!	!
! 2 !	! Delete from archive	! <u>EXECUTE</u>	!
!	!	!	!
! 3 !	! Worksheet name:	! <u>EXECUTE</u>	! Since you brought
!	! p rinter	!	! back a copy with
!	!	!	! retrieve, this
!	!	!	! worksheet is still!
!	!	!	! on the archive
!	!	!	! disk.
!	!	!	!
! 4 !	! ARE YOU SURE?	! <u>EXECUTE</u>	! Here's a double-
!	!	!	! check to make sure!
!	!	!	! you want to delete!
!	!	!	! the worksheet.
!	!	!	!
! 5 !	! Copy	! <u>CANCEL</u>	! Returns to the
!	!	!	! Multiplan menu.
!	!	!	!
!	! Multiplan	!	!
!	! Run Multiplan	!	!

An important part of worksheet management is knowing what worksheets you have and where they are. Multiplan's index function, an activity listed on the Multiplan menu, gives you a list of your worksheets to view on the screen, or printed on paper for a permanent record.

You can have an index of your system or archive disks, in alphabetical order by worksheet name, author or operator, and also an index of your sublibraries. In addition, Multiplan tells you how much space each worksheet occupies.

Look at the index menu illustrated on the next page. You can move the cursor around in the menu the same way as on every other menu. Below the index menu is a portion of a sample index.

INDEX MENU

Please select one from each column:

TYPE OF INDEX	SOURCE
<div style="border: 1px solid black; display: inline-block; padding: 2px 5px;">Multiplan</div>	<div style="border: 1px solid black; display: inline-block; padding: 2px 5px;">Current library</div>
Symbolic	Archive disk
Other	
List sublibraries	

Current library is /usr/training

This is the worksheet index menu.

Types of Indexes

Since Multiplan does all the work of creating an index, it takes very little of your time to have an index. You can display an index in any way that suits your needs.

When you see an index of all your worksheets in the procedure below, notice that the entries are in alphabetical order by worksheet name. They are also divided into three categories: Multiplan (normal) format, Symbolic format, and other (VisiCalc) format.

You can move the cursor to different parts of the index by press , , (PREV SCR), or (NEXT SCR). Or you can go to particular worksheets by indicating the beginning letter of the worksheet name. For example, for names beginning with W, press W. This works whether the index is Multiplan, Symbolic, or Other.

Look at a Multiplan index.

!Step!	Screen Says	! You Type	! Comments	!
!	!	!	!	!
!	! Multiplan	!	!	!
! 1	! Run Multiplan	! i	!	!
!	!	!	!	!
!	! Index	!	! Chooses index.	!
!	!	!	!	!
! 2	! INDEX MENU	! (EXECUTE)	! The top choice in	!
!	! Multiplan	!	! each column is	!
!	!	!	! bright. Pressing	!
!	!	!	! (EXECUTE) gives	!
!	!	!	! you an index of	!
!	!	!	! all the worksheets!	!
!	!	!	! in the current	!
!	!	!	! library in the	!
!	!	!	! Multiplan (normal)!	!
!	!	!	! format.	!
!	!	!	!	!
! 3	! Opening Worksheet	!	!	!
!	! Index	!	! (EXECUTE) This screen mes-	!
!	!	!	! sage tells you	!
!	!	!	! what's going on.	!

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
!	!	!	! You'll see the
!	!	!	! index. Use the
!	!	!	! cursor keys to
!	!	!	! move around in it.!
!	!	!	! Then press (NEXT
!	!	!	! SCREEN).
!	!	!	!
! 4 !	!	! (NEXT SCREEN)	! You see another
!	!	!	! screenfull of
!	!	!	! index entries.
!	!	!	! Now use a charac-
!	!	!	! ter to find a
!	!	!	! document.
!	!	!	!
!	!	! c	! The pointer is
!	!	!	! located on the
!	!	!	! first document
!	!	!	! name that begins
!	!	!	! with a "c", copy.
!	!	!	!
!	! copy	!	! Now try an index
!	!	!	! of the documents
!	!	!	! prepared by a par-
!	!	!	! ticular operator.
!	!	!	!
! 5 !	! INDEX MENU	!	! Returns you to the!
!	! Multiplan	!	! index menu.

How Much Space Is Used?

Besides showing you the worksheets you have, the Index also shows you how much space is used on your disk.

Text is being written and will be available soon.

Indexing an Archive Disk

Making an index of your archive disk is one way to keep track of your worksheets. You can also use this function to make sure there is enough space on your archive disk for more worksheets before you add worksheets to it.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! INDEX MENU	!	!
!	! Multiplan Files	!	!
!	!	! (2) (NEXT SCREEN)	!
!	!	!	!
! 2 !	! SOURCE	! 	!
!	! Current library	!	!
!	! Archive disk	!	!
!	!	!	!
! 3 !	! Archive disk	! (EXECUTE)	! If you don't have !
!	!	!	! a disk in the !
!	!	!	! drive, put one in.!
!	!	!	!
! 4 !	! Press (EXECUTE) after!	! (EXECUTE)	! Check the disk ID !
!	! inserting disk.	!	! to make sure you !
!	!	!	! have the disk you !
!	!	!	! want. !
!	!	!	!
! 5 !	! Disk ID is	!	! From the index you!
!	! Press (EXECUTE) to	!	! can note the disk !
!	! continue or (CANCEL)	!	! and the amount of !
!	! to remove disk	! (EXECUTE)	! space used. !
!	!	!	!
! 6 !	! INDEX MENU	! (CANCEL)	! Returns to index !
!	! Multiplan Files	!	! menu. !

How you organize and label your flexible disks depends, to a certain extent, on the kinds of documents you're creating and editing. For instance, if you're continually editing long documents, you should archive them often. This requires many disks and systematic labeling to find the documents later. If you create many small documents, you may only need a few extra disks. In either case, you should devise a scheme that works for you.

You might make use of the following suggestions when you organize your disks.

- If you have many disks, organize them by department.
- When you need only a few disks, you may make the classifications much broader.
- Use color coding by attaching removable colored labels to differentiate between disks you're currently using and your archive disks.
- Store your old archive disks in a safe place and keep the ones you're currently working on close at hand.

Labeling Disks

Labeling disks is as important as deciding how to organize them. It saves you time when you want to locate a specific document, and allows you to file disks containing similar documents together for easy retrieval.

You should have two labels on each disk. Be careful; you should never write directly on a disk. Always write on the label before you put it on the disk. The first label should be permanently attached to your disk. Write a number on it for identification purposes. The second label should contain information about the documents you've archived on this disk. Use a self-sticking, removable disk label. The information on this label should include:

- Disk ID. When you begin an archive disk, choose an identification code. This could be the name of the department or individual the documents belong to. No matter what kind of ID you use, choose unique ones that you can easily identify. Further information on this was given in the earlier chapter on archiving.
- Disk type. The disk type tells you what to use it for. For example, the copy of your training disk should be labelled as training disk copy. An archive disk should be labelled archive disk.
- Date. Note the date that you first used the disk. This will help determine later when the useful life has been reached, and when you may need to replace the disk.
- Description. You may want to write more complete information about the contents of the disk, perhaps something that isn't readily apparent from the disk ID. For instance, if the ID is "Training Disk," the description might read "Copy of Training Disk."

When you attach a label to the disk, press the label in place gently. Putting too much pressure on the disk could damage it.

As information about the contents of the disk change, you should update the label. You'll need to remove the label, or put another one over it. To remove a label, lift up one corner and gently peel it away from the disk. Be careful not to bend the disk.

Caring for Flexible Disks

By taking proper care of your flexible disks you can assure yourself of good documents and proper performance from your FORTUNE 32:16. When you take good care of a flexible disk it should last approximately 200 hours, or 8 hours a day for 25 days of continual use. Since archiving takes very little time, your disks should last a long time.

HELPFUL HINTS

- Never touch or scratch the exposed magnetic surface of the disk.
- Keep the disk away from magnetic fields produced by electrical appliances such as TV sets, CRTs, electric pencil sharpeners, or air conditioners.
- Never write on the disk label while it is attached to a disk.
- Avoid extremes of temperature where your flexible disks are stored. Don't leave them in direct sunlight.
- Protect your disks against excessive humidity. Keep them within the 20 to 50 percent-humidity range.
- When you're not using a disk, return it to its protective sleeve and store it in a container with other disks.
- Do not bend, fold, staple, or otherwise mutilate your disk.
- Avoid spilling any liquids or cigarette ashes on the disk.

Remember, disks aren't fragile, but they do require a certain amount of tender loving care.



Models

One of the best ways to learn a new subject is to have a good set of examples as a reference point. Now that you have learned all the features and functions of Multiplan, you'll want to start using it for your own worksheets. The examples in the following pages will help you solve your record-keeping problems with Multiplan.

Earlier, you were introduced to the concept of the model. Now you'll learn how to create your own models. Then you can examine models on the training disk designed for specific problems. These are:

- General business models
- Professional financial models
- Special business models

How do you create a model? Where do you begin? What factors should be considered in developing a model? In the following pages, you'll find some answers to these questions.

THE PROBLEM SITUATION

Recognizing a problem is the most important step toward its solution. Consider the case of a typical new business, Golden Gate Sales, a distributor of electronic parts. Assume you are the new controller of Golden Gate. Your immediate objective is to take charge of the financial aspects of the company.

RECOGNIZE THE PROBLEMS

First, you must consider the problems you are going to encounter. In this case, you recognize that the problem is the risk of being short of money. Despite an excellent record of sales, cash is frequently not available when it is needed. At other times, Golden Gate has a surplus of idle funds.

CONSIDER SOLUTIONS

Once a problem is recognized, the solution usually suggests itself. As the controller of Golden Gate Sales, you believe that a solution to the problem of lack of funds lies in better timing of short-term cash investments. This suggests that you should look at the different kinds of investment over time. To do this, set out to project when cash comes in and goes out.

EXAMINE THE ELEMENTS

Although you have recognized the problem, there is no solution until you have a document in hand -- a Multiplan worksheet -- showing that you have control or at least understand the problem. So the next step is to examine elements of the problem so that you can design a successful Multiplan Model.

Factors and Alternatives

The hypothetical problems you solve as Golden Gate's controller are not too different from those you may encounter in your own company.

Think about the problem situation of shortages and surplus funds. Isolate factors in the problem that seem important. Consider the conditions that exist, what the real problems are, what factors you cannot control, and what alternatives you have. Here are some factors you would probably single out for consideration.

FACTORS

One all-important factor is timing. The balance of the cash account is important each day.

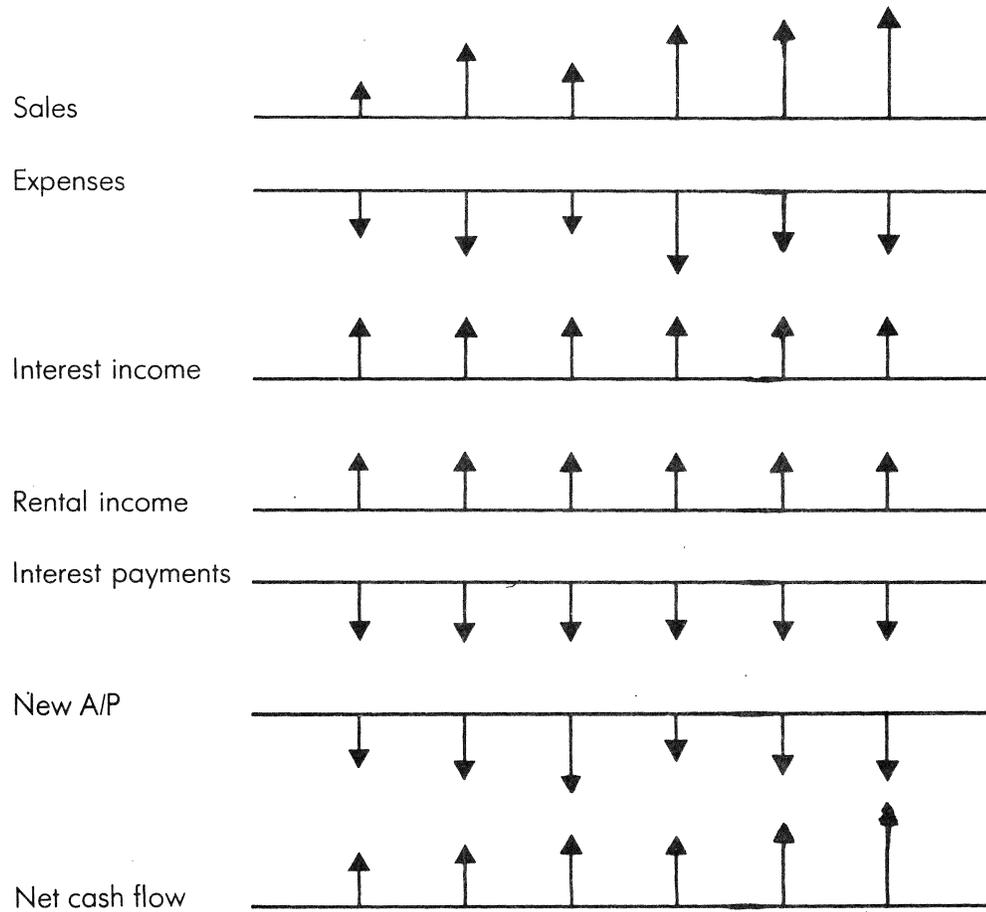
Now consider the elements of your budget. Some revenues are fixed and regular, such as rental income. Other sources of revenue are nonmonthly, like T-bill interest and royalties. You can expect to have regular expenses like mortgage payments on office space. Other expenses occur at irregular intervals, like major building repair. Finally, you'll have some expenses, such as utilities, that vary with the seasons.

Isolate the problems that occur throughout a year. For instance, you have to balance irregular amounts of income with uneven expenses. You also have to balance regular expenses against regular income.

The company also has savings accounts to be developed for special capital expansion projects. You need to determine how much money should be set aside for these accounts each month. Finally, you must also maximize interest received on idle funds.

ALTERNATIVES

Now that you know the factors involved in the problem, consider your alternatives. You can shift funds between savings and checking accounts, and between short-term investments and savings. You can allocate cash for expected periods of shortages, and you can defer expenses on plant and equipment if necessary.



Here you see the cash inflows and outflows in a budgeting problem.

Organizing a Worksheet

Now that you have some feel for the factors involved in Golden Gate's problem, consider the best way to relate them to the Multiplan worksheet. Think about different ways to represent your problem in rows, columns, and formulas.

DEFINE USE OF ROWS AND COLUMNS

When planning the worksheet, choose the meaning of the rows and columns. This is important because it affects the appearance as well as the format of your solution. When defining rows and columns, ask yourself, "What are the most important elements of the problem?"

Because timing is so important, you may want to use time units, such as days, weeks, or months, for rows or columns. Your concern for income and expenses suggests that these elements also be used for rows or columns.

Most Multiplan users prefer to represent time periods horizontally across a row. If there are several time periods (more than 24), you'll be better off to make time periods increase down the columns. In this way, you can show 50 time periods on a single page.

Because Multiplan has more rows than columns, you should use rows to represent whichever factor has the greater number of parts. For example, you might assign time units to rows if there are many time periods defined.

In the case of Golden Gate, assume that one week is the unit of time, and three months is long enough for planning. So you would choose time to be the columns of the worksheet, advancing horizontally across a row.

SELECT FACTORS

Multiplan sheets can include an area dedicated to what-if factors such as the average age of accounts receivable, prime interest rates, or a percentage of monthly income to be transferred to a savings account. Control factors make Multiplan models very useful. These factors should be selected to reflect the problems to be solved by your worksheet.

Cash Flow estimate							
Item	Jan	Feb	Mar	Apr	May	Jun	Jul
Units Sold	5	6	7	8	9	10	11
Sales							
COGS							
Expenses							
Net Income							
Collect in 30 days							
" " 60 "							
" " 90 "							
" " 90+ "							
Bad debts							
New A/R							
Payments in 30 days							
Payments in 60 "							
New A/P							
A/C rec financing							
Interest paid							
A/C rec repayments							
Total inflow							
Total outflow							
Net Cash Flow							
Net cash balance							

You should represent the problem in terms of rows and columns.

Specifying Goals

It is essential to set specific goals for your model, so that you can tell precisely when your needs have been met. Without goals, it is easy to overlook the design and purpose of the model and add nonessential features and details.

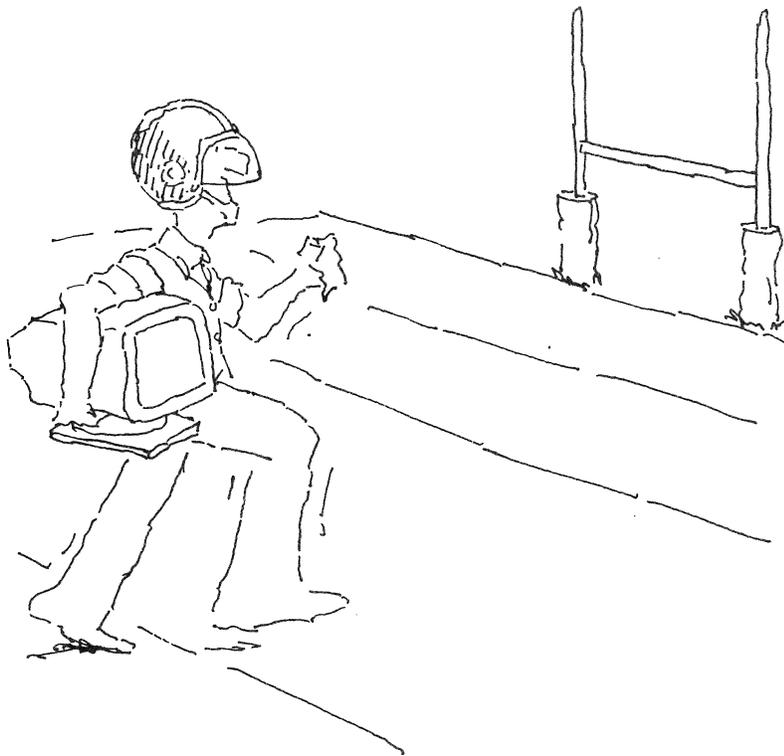
You will benefit more completely from Multiplan by making your goals specific. For example, you have realized that your primary goal as Golden Gate's controller is to find out in which months the company is most likely to be short of cash.

Knowing your goals will suggest the type of formulas to design into your model. For example, finding the weeks of cash shortage means focusing your attention on the number of negative cells, if any, in the row showing weekly cash flow. You need to count the number of negative cells, or turn on a warning message in each column with a negative cash flow.

As you use Multiplan, try to define other goals, other courses of action, and their resulting outcome. Since Golden Gate is occasionally short of funds, you want to maximize return on idle funds. To do this, add two rows to reflect the flow of cash into and out of T-bills each week. Add interest earned and show the profile of cash shortages.

Now you can use your model to justify the need for short-term financing with your bank. With the worksheet, your banker sees why, when, and how large your shortfalls are projected to be. Then you can add rows to reflect short term borrowing, repayment, and interest paid.

Finally, you want the cushions of idle funds to be small but stable. Combine short term investments and borrowing to achieve the most stable level possible.



You just saw one way to translate accounting problems into a Multiplan solution. Your own applications may not be as complex as those of the fictional controller. Or perhaps the problems faced by Golden Gate's controller seem mundane compared to those you want to solve with Multiplan.

Whatever your problems, it helps to see examples of how Multiplan worksheets are used for typical business applications. In the next examples, you'll see Multiplan models that handle specific business applications.

The general business models illustrate some of the easiest, most effective applications of Multiplan in the business environment. These applications are accounting oriented, and cover the following business areas:

- Accounts receivable list
- Cash flow projections: receivables and payables
- Department budget planning
- Profit/loss projections

Accounts Receivables List

This model keeps track of an accounts receivable list of outstanding invoices. It can assist in tracking accounts receivables by simply providing you with a list of unpaid invoices and giving a total value for accounts receivables.

GOALS

The goal of the model is to provide a method to supplement an existing accounts receivable package, if one is being used. It allows the person responsible for collections to track the up-to-date status of receivables.

INFORMATION PRESENTED

The columns of information to be entered include customer name, customer's purchase order number, your invoice number, invoice date, and the dollar amount of the invoice. When invoices are paid, enter the word PAID in the Days Late column, replacing the formula for late status.

RESULTS

This model gives the up-to-date total for accounts receivable, shows which customers are late, and computes the average length of accounts receivable.

FEATURES

The accounts receivables list uses a simple method for calculating the age of each account. To make the dates look more conventional, you could enter dates as text strings and the MID and VALUE functions to extract day and month numbers.

Perform the procedure to see the effect of paying one bill.
 Consider what happens to the average age of receivables.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer	!	tl	!	Transfer load.	!
!	!	!	!	!	!	!
!	2 ! Filename: _____	!	ar.list	!	Load ar.list.	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Goto	!	gr	!	GOTO.	!
!	!	!	!	!	!	!
!	4 ! GOTO row: 1 column: 1	!	6	!	(RETURN) ! GOTO row 6 column	!
!	!	!	6	!	(RETURN) ! 6.	!
!	!	!	!	!	!	!
!	5 ! COMMAND: ...Value	!	0	!	(RETURN) !	!

Accounts Receivable List - Today's Date:				04/28/82	148		
CUSTOMER NAME	P.O. No.	Invoice #	Inv.Date	Original \$Amount	Outstand. \$Amount	Days Overdue	
Ben Jurson	J32K2	1237	01/09	\$224.55	\$224.55	109	
Glen Watercups	D10-09	1238	02/13	345.11	345.11	75	
James Electric	G23S4	1239	02/15	215.44	215.44	73	
Advertisers Ltd	G1122	1240	02/18	561.44	0.00	0	
Jones Lawns	K3211	1241	03/05	1246.22	1246.22	53	
Silverman Inc.	L3441	1242	03/07	456.77	456.77	51	
English Tea Co.	M34MJ-1	1243	03/09	457.22	0.00	0	
Youth of Asia	0992 K3	1244	03/15	5.92	5.92	43	
Density Supply	L554 FPW	1245	04/05	564.44	564.44	23	
Total \$:				\$4077.11	\$3058.45		
Average age of account receivable:				47.4 days			

This worksheet is a model of an accounts receivables list you can develop.

Department Budget Planning

Budget planning is necessary with the changing of the seasons. This next model shows how you can project a department's requirements, taking constant, regularly increasing, and one-time expenditures into account.

GOALS

You want to comprehensively estimate all items and considerations of a budget, including one-time expenses. You may have viewed hiring a new employee as just a salary cost, without being aware of any related expenses. Now you want to develop an estimate of total expenses that are related to the addition of a new employee.

INFORMATION PRESENTED

Control factors of the worksheet include average monthly salary and hiring or firing costs for both exempt and nonexempt staff. Salary increment and payroll additives are provided as percentages. One-time expenses are furniture, equipment, and recruiting. Monthly variable expenses per person are supplies and materials.

RESULTS

The model in the procedure determines a monthly budget for each department of a company over a six-month period. If you manage several departments, you might want to use the XTERNAL commands to link together models for several departments, in order to have one consolidated worksheet for all departments.

FEATURES

The one time expense -- in this case, hiring a new employee -- is a new feature presented in this model. It is controlled by changing the number of individuals hired. But you normally don't have a one time negative cost when your staff is reduced. Use the MAX function with zero in the worksheet to prevent staff layouts from causing a minus cost for recruiting and relocation.

In the next procedure, you'll change salaries and see the results. On your own, change other items like supplies, cost, and number of initial exempt staff to see how easy it is to study the typical "what-if" budgeting questions you may face.

!Step!	Screen Says	! You Type	! Comments
! 1 !	COMMAND: ...Transfer	! t1 dept.A	!
! 2 !	TRANSFER LOAD:	!	!
!	dept. A	! (EXECUTE)	!
! 3 !	COMMAND: ...Goto	! gn adds	! GOTO adds.
! 4 !	GOTO NAME: adds	! (EXECUTE)	!
! 5 !	COMMAND: Alpha...	! 3	! Changes new hires
!	!	! (EXECUTE)	! from 2 to 3 and
!	!	! (RECALC)	! recalculates.

1	2	3	4	5	6	7
1	Department A - Projected Budget for 1983					
2		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
3	=====					
4	New Hires	2	1	4	1	8
5	Headcount	4	5	9	10	10
6	Salaries	22000	21500	47500	39000	130000
7	Telephone	1300	1100	2750	1850	7000
8	Supplies	180	150	380	250	960
9	Manuals	700	575	1475	950	3700
10	Travel	1800	1875	3925	3500	11100
11	-----					
12	Total	25980	25200	56030	45550	152760
13		FIXED	VARIABLE			
14	Salaries	4000	3500			
15	Telephone	350	150			
16	Supplies	50	20			
17	Manuals	200	75			
18	Travel	250	325			
19	-----					
20						
21						
22						
23						
24						
25						

This worksheet might be used for departmental budget plannings.

Profit/Loss Projection

A particularly common use for a business worksheet is to estimate profit and loss, especially for the analysis of investment, credit, or an acquisition. You can develop quarterly projections similar to this model for your own purposes.

GOALS

The goal of the worksheet named proforma is to project future profit or loss conditions of the firm by estimating each category of revenue and expense over the next six months.

INFORMATION PRESENTED

The sources of revenue to be entered are sales, commissions, and royalties. Expenses cover depreciation of capital equipment, consulting, etcetera. Each item is projected in a unique manner.

RESULTS

Total income, total expenses, and net income are calculated for each quarter in the model, and for the annual totals.

FEATURES

This very simple model is probably the most common format worksheet regularly used by almost all businesses.

!Step!	Screen Says	! You Type	! Comments
1	COMMAND: ...Transfer	t1 proforma (EXECUTE)	
2	COMMAND: ...Goto	gr 5 (RETURN) 2 (EXECUTE)	GOTO sales row.
3	COMMAND: ...Value	22000 (EXECUTE)	Changes sales from: \$20,000 first quarter to \$22,000.

Proforma P/L Projection --		Growth Factor =		1.05	
		Commission =		0.05	
Income	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
Sales	\$20000.00	\$21000.00	\$22050.00	\$23152.50	\$86202.50
Commissions	\$1200.00	\$1260.00	\$1323.00	\$1389.15	\$5172.15
Royalties	\$2000.00	\$2100.00	\$2205.00	\$2315.25	\$8620.25
TOTAL	\$16800.00	\$24360.00	\$25578.00	\$26856.90	\$93594.90
Expenses					
Salaries	\$9000.00	\$9450.00	\$9922.50	\$10418.63	\$38791.13
Supplies	\$3000.00	\$3150.00	\$3307.50	\$3472.88	\$12930.38
Benefits	\$2000.00	\$2100.00	\$2205.00	\$2315.25	\$8620.25
TOTAL	\$14000.00	\$14700.00	\$15435.00	\$16206.75	\$60341.75
NET INCOME:	\$2800.00	\$9660.00	\$10143.00	\$10650.15	\$33253.15

This is a typical worksheet for estimating profit and loss, a format used by almost all businesses.

This group of models is used for financial applications. They would be of particular interest to accountants, auditors, tax consultants, investment advisors, real estate agents, stock brokers, and insurance agents.

You will find examples here of amortization and depreciation models.

Amortization

This model can be used to determine the future year-end principal and interest payments. Principal paid to date is desirable for declarations of net worth. Interest paid is tax-deductible.

GOALS

The purpose of the model is to determine the exact principal value retained in a cash investment.

INFORMATION PRESENTED

The purchase price, interest rate, term in years, down payment, and month of asset acquisition are required for the amortization worksheet.

RESULTS

You get a monthly payment, as well as a reported schedule over a term of 30 years of principal balance left unpaid, annual principal and interest paid for taxes, and principal paid to date.

FEATURES

You can specify the month placed in service. This recognizes that investments can start any time of year, not just in January. The model determines the number of months' investment in the first and last calendar year of the loan.

You can work with the amortization worksheet in the procedure to see the effect of a change in principal.

```

!Step!      Screen Says      !      You Type      !      Comments      !
!          !          !          !          !          !
! 1 ! COMMAND: ...Transfer! tl          !          !
!          !          !          ! amortize (EXECUTE)!          !
!          !          !          !          !          !
! 2 ! COMMAND: ...Goto    ! gn          ! Goes to call named!
!          !          !          ! principal          ! principal to input!
!          !          !          !          !          ! (EXECUTE)! number of
!          !          !          !          !          ! principal.
!          !          !          !          !          !
! 3 ! GOTO name: principal!          !          !
!          !          !          !          !          !
! 4 ! COMMAND: Alpha...   ! 20000      ! (EXECUTE)! Enters 20000 as
!          !          !          !          ! the principal to
!          !          !          !          ! be amortized.
!          !          !          !          !

```

AMORTIZATION SCHEDULE											
=====											
\$25000.00 = Principal			Payments = \$403.34								
15.0000% = Interest rate											
10 = # of Years											
PMT #	INTEREST PAID	TOTAL INTEREST	REMAINING BALANCE	PMT #	INTEREST PAID	TOTAL INTEREST	REMAINING BALANCE	PMT #	INTEREST PAID	TOTAL INTEREST	
===	=====	=====	=====	===	=====	=====	=====	===	=====	=====	
1	\$312.50	\$312.50	\$24909.16	51	\$234.29	\$14144.11	\$18573.91	101	\$88.73	\$22520.93	
2	\$311.36	\$623.86	\$24817.19	52	\$232.17	\$14376.29	\$18402.74	102	\$84.80	\$22605.73	
3	\$310.21	\$934.08	\$24724.07	53	\$230.03	\$14606.32	\$18229.44	103	\$80.82	\$22686.55	
4	\$309.05	\$1243.13	\$24629.78	54	\$227.87	\$14834.19	\$18053.97	104	\$76.78	\$22763.33	
5	\$307.87	\$1551.00	\$24534.32	55	\$225.67	\$15059.87	\$17876.31	105	\$72.70	\$22836.03	
6	\$306.68	\$1857.68	\$24437.66	56	\$223.45	\$15283.32	\$17696.43	106	\$68.57	\$22904.61	
7	\$305.47	\$2163.15	\$24339.79	57	\$221.21	\$15504.52	\$17514.29	107	\$64.39	\$22968.99	
8	\$304.25	\$2467.40	\$24240.70	58	\$218.93	\$15723.45	\$17329.88	108	\$60.15	\$23029.14	
9	\$303.01	\$2770.41	\$24140.37	59	\$216.62	\$15940.08	\$17143.17	109	\$55.86	\$23085.00	
10	\$301.75	\$3072.16	\$24038.79	60	\$214.29	\$16154.37	\$16954.12	110	\$51.52	\$23136.51	
11	\$300.48	\$3372.65	\$23935.94	61	\$211.93	\$16366.29	\$16762.71	111	\$47.12	\$23183.63	
12	\$299.20	\$3671.85	\$23831.80	62	\$209.53	\$16575.83	\$16568.91	112	\$42.66	\$23226.30	
13	\$297.90	\$3969.74	\$23726.36	63	\$207.11	\$16782.94	\$16372.68	113	\$38.16	\$23264.45	
14	\$296.58	\$4266.32	\$23619.60	64	\$204.66	\$16987.60	\$16174.00	114	\$33.59	\$23298.04	
15	\$295.25	\$4561.57	\$23511.51	65	\$202.18	\$17189.77	\$15972.84	115	\$28.97	\$23327.01	
16	\$293.89	\$4855.46	\$23402.06	66	\$199.66	\$17389.43	\$15769.16	116	\$24.29	\$23351.30	
17	\$292.53	\$5147.99	\$23291.25	67	\$197.11	\$17586.55	\$15562.94	117	\$19.55	\$23370.86	
18	\$291.14	\$5439.13	\$23179.06	68	\$194.54	\$17781.08	\$15354.14	118	\$14.75	\$23385.61	
19	\$289.74	\$5728.87	\$23065.46	69	\$191.93	\$17973.01	\$15142.73	119	\$9.90	\$23395.51	
20	\$288.32	\$6017.19	\$22950.44	70	\$189.28	\$18162.29	\$14928.68	120	\$4.98	\$23400.49	
21	\$286.88	\$6304.07	\$22833.98	71	\$186.61	\$18348.90	\$14711.95				
22	\$285.42	\$6589.49	\$22716.07	72	\$183.90	\$18532.80	\$14492.51				
23	\$283.95	\$6873.44	\$22596.68	73	\$181.16	\$18713.96	\$14270.33				
24	\$282.46	\$7155.90	\$22475.80	74	\$178.38	\$18892.34	\$14045.37				
25	\$280.95	\$7436.85	\$22353.41	75	\$175.57	\$19067.90	\$13817.60				
26	\$279.42	\$7716.27	\$22229.49	76	\$172.72	\$19240.62	\$13586.98				
27	\$277.87	\$7994.13	\$22104.02	77	\$169.84	\$19410.46	\$13353.48				
28	\$276.30	\$8270.43	\$21976.99	78	\$166.92	\$19577.38	\$13117.06				
29	\$274.71	\$8545.15	\$21848.36	79	\$163.96	\$19741.34	\$12877.69				
30	\$273.10	\$8818.25	\$21718.13	80	\$160.97	\$19902.31	\$12635.32				
31	\$271.48	\$9089.73	\$21586.27	81	\$157.94	\$20060.26	\$12389.93				
32	\$269.83	\$9359.56	\$21452.76	82	\$154.87	\$20215.13	\$12141.46				
33	\$268.16	\$9627.72	\$21317.58	83	\$151.77	\$20366.90	\$11889.90				
34	\$266.47	\$9894.19	\$21180.71	84	\$148.62	\$20515.52	\$11635.18				
35	\$264.76	\$10158.94	\$21042.14	85	\$145.44	\$20660.96	\$11377.28				
36	\$263.03	\$10421.97	\$20901.83	86	\$142.22	\$20803.18	\$11116.16				
37	\$261.27	\$10683.24	\$20759.76	87	\$138.95	\$20942.13	\$10851.78				
38	\$259.50	\$10942.74	\$20615.92	88	\$135.65	\$21077.78	\$10584.09				
39	\$257.70	\$11200.44	\$20470.28	89	\$132.30	\$21210.08	\$10313.05				
40	\$255.88	\$11456.32	\$20322.82	90	\$128.91	\$21338.99	\$10038.63				
41	\$254.04	\$11710.35	\$20173.52	91	\$125.48	\$21464.47	\$9760.77				

This is a sample amortization worksheet. By changing the amount of principal you can see the changes in interest payments.

Depreciation Methods

Under the 1981 Economic Recovery Act, depreciation rules were changed for assets placed in service after January 1, 1981. You may choose between the old and new methods for assets placed in service before 1980. Here you are given the depreciation schedule for the new method, accelerated recovery system (ACRS).

GOALS

The goal of the model is to calculate the allowable depreciation under the ACRS rules.

INFORMATION PRESENTED

On the worksheet you'll enter, for each class of property, the year placed in service and the original base value of the asset.

RESULTS

The model calculates allowable depreciation values for the proper years under the appropriate property class column. It is possible to change the asset values, year placed in service, and class of property.

FEATURES

The IF function is used to match the property class with the appropriate column. You should seek the advice of a qualified tax consultant, rather than rely on this model alone, since the ACRS allows options beyond the scope of this model.

The following procedure shows you the depreciation model.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer!	!	t1	!	!	!
!	!	!	!	!	!	!

!Step!	Screen Says	! You Type	! Comments
2	TRANSFER LOAD		
	filename:	depreciate	
	_____	(EXECUTE)	
		(2) ↓	
		(6) →	
3	COMMAND: ...Value	10 (EXECUTE)	Changes 15-year
			class to 10-year
			class.

Depreciation Schedule Using ACRS - Accelerated Recovery System					
Value of the asset: \$10000.00		Property Class(yrs):15			
Year in service: 1981		Class of Property			
Year	3-year	5-year	10-year	15-year	
1981					500
1982					1000
1983					900
1984					800
1985					700
1986					700
1987					600
1988					600
1989					600
1990					600
year of recovery	3-year	5-year	10-year	15-year	
1		25	15	8	5
2		38	22	14	10
3		37	21	12	9
4			21	10	8
5			21	10	7
6				10	7
7				9	6
8				9	6
9				9	6
10				9	6
11					6
12					6
13					6
14					6
15					6
16					6
17					6

This is an example of a depreciation worksheet that calculates the allowable depreciation under the ACRS rules.

Special business models apply to more specialized worksheets within certain areas of business, such as production, finance, and sales.

There is virtually an unlimited supply of examples of special business models. The following three cases are a sample of the possible applications.

- Price quotations
- Bill of materials -- build quantities
- Sales commission tracking

Price Quotations

During a sales call, a salesman normally offers a price quotation. This next worksheet presents a small application with a great potential for improving sales production.

GOALS

Suppose you are a dealer in the computer retail business. You want to give your customer, Mr. Howard Jameson, a quotation for a computer system. Your goal is to quickly select and specify the items for your customer in the form of a proposed price quotation.

INFORMATION PRESENTED

You'll type in the customer's name and address, perhaps both shipping and billing. From a standard file, you have a list of most commonly purchased items. Simply delete rows that are not part of the order.

RESULTS

This worksheet quickly and accurately adds your parts list. As you discuss your customer's needs and the possible trade-offs, you can play "what if" by changing rows as desired. Each time, you get an accurate quotation that can be neatly printed for the customer's review.

FEATURES

The functions for SUM, sales tax, and delivery fee enable you to be more creative in responding to the customer's "what if" questions.

In the procedure use the price quote worksheet to see a sample that gives a quotation for a customer order.

!Step!	Screen Says	! You Type	! Comments
!	!	!	!
! 1 !	! COMMAND: ...Transfer!	! t1	!
!	!	! price.quote	!
!	!	! (EXECUTE)	!
!	!	!	!
! 2 !	! COMMAND: ...Goto	! gn	! GOTO cell name.
!	!	!	!
! 3 !	! GOTO name:	! qty	! (EXECUTE) ! The cell moves to !
!	!	!	! the quantity cell !
!	!	!	! for accounts !
!	!	!	! payable. !
!	!	!	!
! 4 !	! COMMAND: ...Value	! 1	! (EXECUTE) ! Enters order for !
!	!	!	! 1 ABC Computer. !

Southland Computer Store - Invoice			
Ship to:	Howard Jameson Jameson Fastner 11322 Hawthorne Blvd. La Cienga CA 95102	Bill to:	Howard Jameson Jameson Fastner P.O. Box 13422 La Cienga CA 95102
Description	Price	Quantity	Extension
ABC Computer	\$4995.00	2	\$9990.00
256K RAM	\$995.00	1	\$995.00
Hard Disk Drive	\$2995.00	1	\$2995.00
Commun. Intf.	\$495.00	1	\$495.00
Printer	\$1995.00	2	\$3990.00
Accounting SW	\$895.00	1	\$895.00
SUBTOTAL			\$19360.00
Sales Tax (6%)			\$1161.60
TOTAL AMOUNT DUE			\$20521.60

Use a worksheet like this for price quotations.

Bill of Materials

Production planning is an area rich with potential Multiplan applications. For example, production of a large kitchen cabinet means you have to figure out how much of each part is required. Worksheets can speed up production planning significantly.

GOALS

You need to determine the total number of parts required to meet a customer's request. You also need to know the actual cost and the variance from bid cost, in case the job was underbid. If it was, you need to know what to do to reduce costs.

INFORMATION PRESENTED

Once the given cabinet configuration is a standard product, the key elements are build quantity and amount bid. However, change of parts, quantity per assembly, or material or labor costs per part might also be adjusted if custom work is required.

RESULTS

The results of the following worksheet specify a build quantity of 24 and a bid amount of \$47,573. By recalculating one time, you determine that total cost is \$1,967. over the bid. You also have total build quantities and costs for each part. The variance is 3.97%, which you may wish to ignore.

FEATURES

This worksheet also helps you reduce cost. The rightmost column displays percentage of total cost for each part. Scanning the list shows that part 23327, cooktops, accounts for the largest percentage of cost. You now know where to find the greatest opportunity for

cost reduction. For example, by showing this worksheet to the vendor of cooktops, you can explain how important this product is to you, and make a strong case for a quantity discount in order to bring the variance down to zero.

!Step!	Screen Says	!	You Type	!	Comments	!
!	!	!	!	!	!	!
!	1 ! COMMAND: ...Transfer!	!	tl	!	!	!
!	!	!	bom.bq	!	(EXECUTE)	!
!	!	!	!	!	!	!
!	2 ! COMMAND: ...Goto	!	gn	!	Goes to build.gty.	!
!	!	!	build.qty	!	!	!
!	!	!	!	!	(EXECUTE)	!
!	!	!	!	!	!	!
!	3 ! COMMAND: ...Value	!	32	!	(EXECUTE)	!
!	!	!	!	!	Changes the build	!
!	!	!	!	!	quantity from 24	!
!	!	!	!	!	to 32.	!

Custom Woodworks and Manufacturing								
3921 Industrial Road								
Belmont, California 94402 DATE: June 15, 1983								
Bill of Materials for Cabinet Z432H						No. Units:	24	
Part #	Description	Labor Cost	Mat'l Cost	Unit Cost	Qty/ Assy	Build Qty	Build Cost	Pct Cost
23316	BACK	15.50	65.71	81.21	3	72	5847	10.21%
23317	TOP	5.80	23.41	29.21	2	48	1402	2.45%
23318	SIDE	6.45	18.43	24.88	4	96	2388	4.17%
23319	DWR BACK	0.65	3.11	3.76	12	288	1083	1.89%
23320	DWR SIDE	0.65	2.06	2.71	24	576	1561	2.73%
23321	DWR BOTTOM	1.25	4.09	5.34	12	288	1538	2.69%
23322	DWR FRONT	0.75	3.85	4.60	12	288	1325	2.31%
23323	DWR HANDLE	0.55	3.21	3.76	12	288	1083	1.89%
23324	DWR ROLLER	0.55	3.08	3.63	24	576	2091	3.65%
23325	COUNTER TOP	25.55	231.87	257.42	2	48	12356	21.58%
23326	COUNTER FCNG	10.25	65.23	75.48	2	48	3623	6.33%
23327	COOKTOP	25.50	563.22	588.72	1	24	14129	24.68%
23328	SINK UNIT	35.70	138.57	174.27	1	24	4182	7.30%
23329	DOOR	2.25	11.36	13.61	6	144	1960	3.42%
23330	DOOR HINGE	0.45	2.16	2.61	12	288	752	1.31%
23331	PANEL	0.90	5.62	6.52	6	144	939	1.64%
23332	BRACKET	0.35	0.65	1.00	8	192	192	0.34%
23333	SCREW	0.15	0.08	0.23	64	1536	353	0.62%
23334	NAIL	0.05	0.02	0.07	136	3264	228	0.40%
23335	GLUE (OZ)	0.05	0.24	0.29	21	504	146	0.26%
23336	DOOR HANDLE	0.25	0.51	0.41	8	192	79	0.14%
TOTAL COST:						57258	100.00%	

A worksheet of this type can be used for a bill of materials.

Sales Commission Tracking

Outside sales staff and their managers need to keep track of sales, commission amounts, amounts paid, and unpaid commissions. This next worksheet helps track their sales.

GOALS

The goal of the model is to provide a method to record salesmen's commissions and their payments, ensuring prompt payments.

INFORMATION PRESENTED

Key information includes commission rate, amounts paid, and invoice items. Invoices should include order date, customer name, purchase order number, invoice number, and total invoice before tax (the commissionable amount).

RESULTS

By loading the invoice information and amounts paid, you can see how much your payables lag behind the actual sales data.

FEATURES

By using the sort feature, it is possible to subtotal by any column, such as total amounts per customer, or total amounts per month. This adds benefits like building a central file of information (database), and is valid for salesmen with fewer than 200 invoices (200 rows). You can enhance commission structures by using look-up tables to accelerate commission rates, or a running monthly subtotal to trigger a bonus commission.

The following procedure shows an example of a sales commission tracking model.

!Step!	Screen Says	! You Type	! Comments
! 1 !	! COMMAND: ...Transfer!	! tl	!
! :	! :	! sales.com	!
! :	! :	! (EXECUTE)	!
! 2 !	! COMMAND: ...Goto	! gn pctcom	! Goes to pctcom.
! :	! :	! (EXECUTE)	!
! 3 !	! COMMAND: ...Value	! .18	! (EXECUTE) Changes commission!
! :	! :	! :	! from 15 to 18
! :	! :	! :	! percent.

Valve & Fittings Corporation								
Salesman's Commission Tracking:				Tax Rate:		6.5%		
				Commission Rate:		15.0%		
Order Date	Customer Name	Pur. Order Number	Invoice Number	Total Amount	W/O Tax	Commission Due	Amount Paid	Cumul Due
Jun 23	Bechtel	G123-221	1221	\$234.55	\$220.23	\$33.04		\$33.04
Jun 25	Fluor	L4320	1222	6543.88	6144.49	921.67		954.77
Jun 28	Kaiser	AR-52..11	1223	234.00	219.72	32.96		987.63
Jul 2	IECO	Q-5-RR222	1224	6574.88	6173.60	926.04		1913.73
Jul 3	Parsons	N12-J23-K	1225	1234.77	1159.41	173.91	2000.00	87.63
Jul 7	Brown	R43249-33	1226	6574.33	6173.08	925.96		1013.59
Jul 9	KLH	L23-33	1227	432.33	405.94	60.89		1074.48
Jul 10	FSO Inc.	Q54-L987	1228	8765.00	8230.05	1234.51		2308.99
Jul 14	Bechtel	G123-221	1229	12443.88	11684.39	1752.66	3000.00	1061.63
Jun 23	Fluor	L4320	1230	23411.00	21982.16	3297.32		4358.95
Jun 23	Kaiser	AR-52..11	1231	895.00	840.38	126.06	1500.00	2985.00
Jun 23	IECO	Q-5-RR222	1232	1245.00	1169.01	175.35		3160.35
Jun 23	Parsons	N12-J23-K	1233	3214.00	3017.84	452.68	2000.00	1613.00
Jun 23	Brown	R43249-33	1234	543.00	509.86	76.48		1689.53
Jun 23	KLH	L23-33	1235	23.00	21.60	3.24	1500.00	192.77
Jun 23	FSO Inc.	Q54-L987	1236	1234.00	1158.69	173.80		366.57
Jun 23	Parsons	H43200-1	1237	6345.00	5957.75	893.66		1260.23

This is a worksheet for sales commission tracking.

Appendix A
Command Chart

The chart below gives a brief description of each Multiplan command and its options.

COMMAND	OPTIONS	DESCRIPTION
ALPHA	None	Used for entering characters into the active cell.
BLANK	None	Erases the contents of all specified cells.
COPY		Copies the contents of some cells into other cells.
	COPY DOWN	Copies the contents of a cell into one or more cells beneath it.
	COPY FROM	Copies the contents of one or more cells to another location on the worksheet.
	COPY RIGHT	Copies the contents of a cell into one or more cells to its right.
DELETE		Deletes rows or columns of cells.
	DELETE COLUMN	Removes all or part of a column of columns.
	DELETE ROW	Removes all or part of a row or rows.
EDIT	None	Displays the contents of the active cell for editing through use of the first five function keys.

COMMAND	OPTIONS	DESCRIPTION
FORMAT		Presents a choice of arrangements for cells and columns.
	FORMAT CELLS	Sets a specific numeric format and alignment for one or more cells.
	FORMAT DEFAULT	Sets a default numeric format and alignment for all cells on the worksheet, and a default width for a column.
	FORMAT OPTIONS	Presents a selection of commas and formulas to be displayed on the worksheet.
	FORMAT WIDTH	Defines the width for one or more specified columns.
GOTO		Moves the cell pointer to a specified location on the worksheet.
	GOTO NAME	Moves the cell pointer to an area with a specified name.
	GOTO ROW ___ COL ___	Moves the pointer to a designated cell.
	GOTO WINDOW	Moves the pointer to the upper left corner of a designated window.
HELP	None	Gives on-screen descriptions of the commands and functions of Multiplan.
INSERT		Inserts new cells into the worksheet.
	INSERT COLUMN	Inserts blank cells in the shape of all or part of a column or columns.
	INSERT ROW	Inserts blank cells in the shape of all or part of a row or rows.

COMMAND	OPTIONS	DESCRIPTION
LOCK		Protects indicated cells from unintentional change.
	LOCK CELLS	Protects indicated cells from unintentional change.
	LOCK FORMULAS	Protects all cells on the worksheet containing formulas or text.
MOVE		Moves cells from one location on a sheet to another.
	MOVE COLUMN	Shifts one or more columns to the left or right.
	MOVE ROW	Shifts one or more rows up or down.
NAME	None	Assigns a name to a cell or group of cells.
OPTIONS		Sets and resets options provided by Multiplan.
	OPERATIONS ITERATION	Turns the circular reference option on or off.
	OPTIONS MUTE	Turns the warning beeper off or on.
	OPTIONS RECALC	Turns automatic recalculation off or back on.
PRINT		Performs printer-related operations.
	PRINT FILE	Sends a worksheet formatted for printing to a disk, rather than to the printer.
	PRINT MARGINS	Sets up the margins for the printed worksheet.

COMMAND	OPTIONS	DESCRIPTION
	PRINT OPTIONS	Permits the printing of four optional features: printing only part of the worksheet, printing a title for the worksheet, printing formulas rather than values in a cell, or printing row and column numbers.
	PRINT PRINTER	Sends the worksheet to the printer for printing.
QUIT	None	Leaves Multiplan, returning you to the master menu.
SORT	None	Arranges any column on the worksheet in ascending, descending, or alphabetical order.
TRANSFER	TRANSFER CLEAR	Clears the active worksheet from the screen.
	TRANSFER DELETE	Removes a specified worksheet from a disk.
	TRANSFER LOAD	Loads a worksheet from a disk, or displays your worksheet directory.
	TRANSFER OPTIONS	Saves the worksheet in Normal, Symbolic, or Other formats. Also enables you to use Multiplan files not in your directory.
	TRANSFER RENAME	Renames the active sheet.
	TRANSFER SAVE	Saves the active worksheet on a disk.
VALUE	None	Enters a number or formula into a cell.

COMMAND	OPTIONS	DESCRIPTION
WINDOW		Performs actions involving windows.
	WINDOW BORDER	Draws a line around a window.
	WINDOW CLOSE	Removes a window from the screen.
	WINDOW LINK	Causes two windows to scroll in the same direction.
	WINDOW SPLIT HORIZONTAL	Splits the active window horizontally.
	WINDOW SPLIT TITLES	Splits the active window to form two or four windows.
	WINDOW SPLIT VERTICAL	Splits the active window vertically.
XTERNAL		Performs operations drawing information from other worksheets into the active sheet.
	XTERNAL COPY	Copies an area of an outside worksheet into the active sheet.
	XTERNAL LIST	Presents a list showing the relationship between the active sheet and other worksheets.
	XTERNAL USE	Gives a supporting worksheet a substitute name.

Appendix B
Function Chart

Multiplan has many built-in functions for use in formulas. The following chart briefly describes each function and its arguments.

FUNCTION	DESCRIPTION
ABS(n)	Returns the absolute value of the number <u>n</u> .
AND(list)	Gives TRUE as a result if all the values in a list are true.
ATAN(n)	Calculates the arctangent function of n, an angle in radians.
AVERAGE(list)	Determines the average of all cells in a list.
COLUMN()	Gives the number of the current column. Parenthesis are required with this function.
COS(n)	Calculates the cosine of the angle n given in radians.
COUNT(n or ref)	Counts the cells containing numbers or numeric formulas in the area defined by <u>n</u> or ref.
DOLLAR(n)	Produces a character string representing the value <u>n</u> in dollar format.
EXP(n)	Calculates e(2.718218) to the power <u>n</u> .
FALSE()	Represents the logical value FALSE. Parentheses are required.

FUNCTION	DESCRIPTION
FIXED(n,m)	Produces a character string representing <u>n</u> as a fixed decimal number having <u>m</u> decimal digits.
IF(f,a,b)	Examines the argument <u>f</u> . If <u>f</u> is true, argument <u>a</u> is returned. If false, <u>b</u> is returned.
INDEX(vector,n)	Returns the nth element in the vector.
INDEX(area,n,m)	Returns the value in the nth row and mth column of a rectangular area.
INT(n)	Truncates the argument <u>n</u> to the right of the decimal.
ISERROR(n)	Returns TRUE if <u>n</u> is an error value.
ISNA(n)	Returns TRUE if <u>n</u> is an NA (not available) value.
LEN(t)	Gives the length of the string <u>t</u> in characters.
LN(n)	Calculates the base <u>e</u> logarithm of <u>n</u> .
LOG10(n)	Calculates the base 10 logarithm of <u>n</u> .
LOOKUP(n,area)	Searches for <u>n</u> in the first row or column of area. Returns the contents of a corresponding cell in the second row or column of the area.
MAX(list)	Returns the largest numeric value in the list.
MID(t,n,m)	Returns the characters n through m of the text value <u>t</u> .
MIN(list)	Returns the smallest value in the list.

FUNCTION	DESCRIPTION
MOD(n,m)	Calculates the remainder of the division of <u>n</u> by <u>m</u> .
NA()	Returns the NA (not available) value.
NOT(f)	Returns the opposite logical value of <u>f</u> .
NPV(d,list)	Produces the net present value of annual future receipts represented by list, given the discount rate <u>d</u> .
OR(list)	Returns TRUE if any values in a list are true. Otherwise, returns FALSE.
PI()	Gives the value of pi (3.1416...) to 13 decimal places. Parentheses are required.
REPT(t,n)	Produces a character string of the text <u>t</u> repeated <u>n</u> times.
ROUND(n,m)	Produces the value <u>n</u> , rounded to <u>m</u> number of decimal places.
ROW()	Returns the current row number. Parentheses are required.
SIGN(n)	Returns a -1 if <u>n</u> is negative, 0 if <u>n</u> = 0 or 1 if <u>n</u> is positive.
SIN(n)	Returns the sine of the angle <u>n</u> specified in radians.
SQRT(n)	Returns the square root of <u>n</u> .
STDEV(list)	Gives a sample standard deviation of the values in a list.
SUM(list)	Calculates the sum of the values in list.

FUNCTION	DESCRIPTION
TAN(<u>n</u>)	Calculates the tangent of the angle <u>n</u> in radians.
TRUE()	Represents the logical value TRUE. Parentheses are required.
VALUE(<u>t</u>)	Returns the value of the numeric constant represented by <u>t</u> .

Glossary

ABSOLUTE REFERENCE

A reference to a cell that uses specific row and column numbers, such as R17C12, as opposed to relative reference, such as R +1 C -2 .

ACTIVE

Something in use right now and currently recognized by the computer, such as the active window, active cell, or active field of a command.

ACTIVE CELL

The cell indicated by the cell pointer. The contents of the active cell can be seen on the status line and may be edited with the EDIT command.

ACTIVE WINDOW

The window containing the active cell, marked on the screen by a highlighted window number. A window becomes active when created with WINDOW SPLIT, or when it is selected by (NEXT-WINDOW).

ALIGNMENT

The rule for the horizontal positioning of the display of a cell.

AREA (OF CELLS)

A group of cells; usually a rectangular area but may be any shape. See also Intersection, Range, Reference, and Union.

ARGUMENT

The values upon which a function works. Some functions have names rather than symbols; their arguments are given inside parentheses after the name.

ARITHMETIC OPERATORS

The five functions of addition (+), subtraction (-), multiplication (*), division (/), and exponentiation (^). Each is represented by a single character and operates on two arguments, given one on either side of the symbol.

ARROW KEYS

Keys that move the cell pointer. The up, down, left, and right keys move the pointer one cell at a time. The home key moves it to the cell in the upper left corner of the active window.

BACKUP COPY

A copy of a file or of an entire disk, made as insurance against the loss of the original.

BINARY

A number system, base two, especially well adapted for computer hardware use.

BUFFER

Temporary storage area in the computer for information.

BYTE

A unit of computer storage.

CALCULATE

To produce the value of a formula by first finding the value of each item named in the formula, and second, combining those values according to the rules of the functions named in the formula.

CATENATE (CATENATE OPERATOR)

To join end to end. In Multiplan, text is catenated with the ampersand (&) symbol.

CELL

One position on the worksheet, a place where data or a formula may be stored. A cell has a location and may be referred to by one or more names. The contents of a cell determine its value; the cell's format determines how its value is displayed.

CELL FORMAT

The way a number is displayed in a cell.

CELL POINTER

An illuminated pointer that selects one cell from all the cells in the worksheet.

CELL RANGE

A group of cells which represents a rectangular area. The colon is used to separate the cell positions indicating the boundaries of the range. For example, R1:6C2:4.

CHARACTER

A symbol that can be displayed on the screen; includes letters, digits, punctuation, and special characters such as \$, +, and %.

CHARACTER KEYS

Keys that type characters, as opposed to function keys, edit keys, and arrow keys.

CHOICE

One selection from a list of alternatives.

CLOSE

To close a window is to remove it from display.

COLUMN

A vertical line of cells down the worksheet. There are 63 columns, designated by the numbers 1 through 63.

COMMAND

A sequence of prompts and fields instructing Multiplan to do something. You tell Multiplan to carry out a command by pressing (EXECUTE) or tell Multiplan to cancel a command by pressing (CANCEL).

COMMAND CHOICE

The state of Multiplan while it is awaiting your next command.

COMMAND LINE

The third and fourth lines from the bottom of the screen, upon which commands are built.

CONSTANT

A number or string typed by you that will never change under calculation.

CONTENTS (OF A CELL)

Whatever has been put into a cell. The cell is empty and its contents are blank, or it contains data (text or a number) or a formula.

CONTROL AREA

The bottom portion of the screen. Shows available commands, their prompts, where the pointer is located, and other useful information.

CURSOR

See Edit Cursor.

DATA

A string of characters or a number, information.

DEFAULT

In general, what Multiplan assumes when it is not told differently. Multiplan usually makes the default action visible as a proposed response in a command field.

DEPENDENT WORKSHEET

A worksheet that uses values from another worksheet. It is linked by the XTERNAL COPY command.

DIRECTORY

The table of filenames kept on each disk by the operating system.

DISK

Rotating disks coated with magnetic material upon which the computer can write.

DISPLAY AREA

Multiplan's visible presentation of the active worksheet on the terminal screen.

EDIT

To alter a response in a field of command, using the edit keys and the character keys.

EDIT CURSOR

The highlighted part of a command on the command line, which may be as small as one character or as large as an entire field. The edit cursor is moved with edit keys.

EDIT KEYS

Keys that move the edit cursor within the command line. Includes (FIELD EDIT) word keys and (CHARACTER EDIT) character keys, and (BACK SPACE) and (DELETE) which both delete characters one at a time.

EMPTY

The condition of a cell containing nothing but blank spaces.

EXECUTE KEY

Key that causes Multiplan to carry out the command you have entered.

EXPONENTIATION

The arithmetic function of multiplying a number by itself some number of times (also known as "raising a number to a power"). Exponentiation is symbolized in a formula with the ^ symbol.

FACTOR

A number used to divide several other numbers.

FIELDS

The portions of a command in which you type a response to instruct Multiplan in some detail of the command's work. When Multiplan first shows a field, it fills it with a proposed response. Also refers to a portion of a line being edited, a group of characters.

FILE

A named unit of data stored on a hard disk or flexible disk. When a worksheet is saved, it is written into a file. Not all files represent saved worksheets, but those that are can be loaded or linked to other worksheets.

FILENAME

The name by which the system recognizes a file. The filename must be given when a worksheet is saved, loaded, or linked to another sheet. It is limited to 11 characters in length.

FORMULA

A recipe for how a value is to be calculated from data and functions.

FUNCTION

An operation combining one or more values according to some rule to produce a result.

HARDWARE

The mechanical and electronic parts of a computer system, as opposed to the software (program) that runs the hardware. The relationship of hardware to software is similar to the relationship between a tape recorder and the music on the tape.

INACTIVE

Applies to something that exists but is not presently in use.

INTERSECTION

A reference to the common cells of two areas. An intersection is indicated by writing references to the two areas side by side. For example, R1C8 is the intersection of the cells in row 1 and the cells in column 8, a single cell.

KEYBOARD

The typewriter-like arrangement of keys used to control Multiplan. See also Arrow keys, Character keys, and Edit keys.

LINK

The use of data from an inactive sheet in calculations on the active sheet. Also refers to the connection between two windows causing them to scroll together.

LOAD

To make a saved worksheet active again using the TRANSFER LOAD command.

LOCATION

The position of a cell on the worksheet, given as its row and column numbers in that order (R2C3).

MESSAGE

A notice posted by Multiplan on the message line to explain a problem or suggest what kind of input the system is waiting for.

MESSAGE LINE

The next to the last line on the display, where Multiplan gives instructions.

MODEL

Identifies a business problem, its elements, and those factors you can control. Multiplan worksheets are developed from models.

NAME (OF A CELL OR GROUP)

A label or tag, associated with a cell or area of cells by the NAME command.

NESTING

A function is used as an argument to another function.

NUMERIC VALUE

A value, either specified as a constant or arising from calculation of a formula, that is a number.

PRINT

To cause all or part of the worksheet to be displayed on paper by the system's printer device.

PROGRAM

See software.

PROPOSED RESPONSE

Response supplied by Multiplan. It is usually based on the most recent responses by the user or on the current status of Multiplan.

RANGE

The smallest rectangular area of cells containing two references. A range is designated by a colon (:).

REFERENCE

The specification of a cell or an area of cells.

RELATIVE REFERENCE

A reference to a cell relative to the cell containing the reference, such as R -1 , meaning "the row above, in this column."

RESPONSE

What you type in a field of command.

ROW

A horizontal line of cells across the worksheet. There are 255 possible rows, designated by the numbers 1 through 255.

SAVE

The operation of making a permanent copy of the active worksheet. The copy is placed in a file on disk using the TRANSFER SAVE command.

SCROLL

To move the display of the worksheet across the screen one row or column at a time. Scrolling is done with the arrow keys and page keys.

SET

A group of similar items such as cells, rows, or columns.

SOFTWARE

General term for computer programs. A program is a list of machine instruction codes, expressed as numbers, recorded in a file.

STATUS LINE

Bottom line of the screen, where Multiplan presents status information such as the location of the active cell and its contents.

STRING

A sequence of characters, also called text.

SUPPORTING SHEET

A sheet that provides values to another sheet. The supporting sheet supports the other sheet (the dependent sheet) with data that have been designated with the XTERNAL COPY command.

SYSTEM

The computer, its attached devices (terminal, printer, disks), and its operating system. The system provides the medium in which Multiplan executes your commands.

TEMPLATE

A plastic strip that lies in a channel on the keyboard below the function keys and identifies the function of each.

UNION

A combination of two or more rectangular areas on the sheet. A union is specified as references connected with commas.

VALUE

The contents of a cell: its numeric value if it contains a number; its string if it contains a string; or, if it contains a formula, the result of calculating that formula.

VARIABLE

A part of a cell's contents that may change from one calculation to the next.

VECTOR

A one-dimensional array; a list.

WINDOW

A rectangular portion of the display area within which Multiplan displays a part of the worksheet. As many as eight windows may be open at once; they are opened or closed with the WINDOW command.

WORKSHEET

The simulated worksheet that Multiplan presents to its user; an array of cells, each of which may contain a value.

Multiplan™

Fortune Systems Corporation
1501 Industrial Road
San Carlos, CA 94070

Ordering Multiplantm

Order Numbers: 1000201-01 for the complete binder with disks
 1000770-01 for the complete binder without disks
Consult an authorized Fortune Systems dealer for copies of manuals
and technical information.

How to Use This Guide

This guide is designed to help you learn how to use Multiplan. To learn how it works, you'll use some sample information that's familiar: an invoice, cash flow projection, and budget to name a few. This information is on the training disk in the back of this binder.

This comprehensive guide covers the full range of capability and power of Multiplan. There may be more information here than you are likely to use. If you're just beginning with Multiplan and want to learn simple procedures, you should read and follow the instructions through at least Part 2. With the basics, you can do your own work with Multiplan. Later on, when you want to use more advanced functions, return to this guide and resume your training.

If you've used something similar to Multiplan, like VisiCalc, you will find that this guide is comprehensive and useful. You may want to try some of the examples or pick out chapters that explain what you're interested in learning. Then, read Part 5, Advanced Features, which explains the uniqueness and power of Multiplan over other spreadsheet applications.

Finally, if you want to know just enough about Multiplan to do everyday tasks such as updating information or printing reports, read Part 2. The Multiplan Reference Guide is a quick resource to all the Multiplan features.

How to Use This Package

Each item in this package is important in your application. It's important that you know how each one is used before you begin.

- Plastic template strip. This strip identifies the use of the function keys at the top of the keyboard. Place it in the channel below the top row of keys.
- An Operator's Guide to Multiplan. Use this guide with your training disk to learn how to use Multiplan.
- Multiplan Reference Guide. This "quick-look" guide details all the Multiplan commands and functions and how they're used.
- Multiplan reference card (available soon) Tear the card out from the binder along the perforated line and keep it alongside your Fortune 32:16.
- Master disk. This disk contains Multiplan. You'll learn how to copy it onto your Fortune 32:16 to use Multiplan.
- Training disk. This training disk contains sample information you'll copy onto your Fortune 32:16 to use with the Operator's Guide. When you complete your training, you can remove this sample information.
- Fortune Systems software registration card. This postpaid card registers your disk. Be sure to fill it out and mail it to Fortune Systems.

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