

Multiplan Reference Guide

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How to Use This Guide

This guide can be used in several ways: as a follow-up to the training given in the Operator's Guide, as a reference tool when you use Multiplan, or as a complete guide to Multiplan for experienced electronic worksheet users.

If you are learning Multiplan for the first time, you should first work through the Operator's Guide. If you plan to use Multiplan for your own work before completing the Operator's Guide, you may want to keep the Reference Guide close at hand as you work.

If you've had experience with an electronic worksheet program, use this guide to learn how Multiplan differs from other similar programs. To learn more about a Multiplan feature, use the index in the Operator's Guide to locate more detailed information.

This reference guide contains examples of all the screens and explanations for every function, command, and feature of Multiplan. It has five parts: the structure of Multiplan, the procedures and features, commands, functions, and screen messages; and an appendix which is a comparison of Multiplan and VisiCalc[™].

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The Structure of Multiplan

Multiplan is an easy-to-use and powerful electronic worksheet program used with the Fortune 32:16 that helps you create a wide range of worksheets on the screen. The keyboard you use like a typewriter with a few additional keys, and the display screen aids you with menus, messages, and information.

This part contains procedures for turning on the Fortune 32:16 and getting to Multiplan, describes the keyboard and keys you'll use, and presents all the screens.

1 Getting Started

STARTING UP THE FORTUNE 32:16

Follow these steps to start up your Fortune 32:16.

- 1 Plug in the system and turn on/off switch to on.
The cursor blinks on the screen and the message "Fortune Systems 32:16 Please Wait" appears.
- 2 Set the date and time as directed and press the Return key.
The date and time you enter are displayed. System files are then checked.
- 3 To the message "Type in name and press (RETURN)" respond newuser to set up a new account, or your account name. If you have a password enter that at the prompt.
- 4 ___% of the available space is in use.
This message tells you how much disk space is full. To be safe don't fill it beyond 90%.
- 5 FORTUNE SYSTEMS GLOBAL MENU
The global menu lists all the application software available for the Fortune system. You will enter Multiplan from here.

INSTALLING MULTIPLAN

Follow these steps to install the Multiplan application onto your Fortune 32:16. Use the Master Disk located in the plastic pocket at the back of your Multiplan binder. You must be logged on as manager.

- 1 From the Global menu press s5 and the Return key.
This selects Product Maintenance.
- 2 Press i for Install a product, then (RETURN).
- 3 Insert the flexible disk as instructed and press (RETURN).
- 4 A message tells you what the disk contains. Respond y (for yes) to continue the installation.
- 5 Screen messages tell you the progress of the installation. When you see "Multiplan installation successfully completed" press (RETURN) to proceed to your next activity. Remove the disk.

FORMATTING A DISK

You can store Multiplan files on flexible disks. First, though, these disks must be formatted by the computer. Follow these steps to format a disk.

- 1 From the Global menu press s1 and (RETURN).
This selects System Utilities.
- 2 Press 32 and (RETURN).
This selects the formatting utility.
- 3 Read the text on the screen. Then insert a flexible disk.
- 4 To continue the process respond y and (RETURN) to the question "Do you want to continue?"
- 5 Do not press any keys while the message "Please Wait For Completion Message" is displayed.
- 6 When the screen says "Your Flexible Disk Is Now Formatted And Checked. Remove Flexible Disk and press (RETURN)" follow the instructions. You can then proceed to another activity or format another disk.

COPYING A DISK

Make a backup copy of your Multiplan Master disk as soon as possible. You must be logged on as manager to make backups. Follow these steps to copy a disk.

- 1 From the Global menu type s5 then (RETURN) to select Product Maintenance.
- 2 Press 6 then (RETURN) to select Backup existing product.
- 3 Type p1 to select Multiplan from the PRODUCT SELECTION MENU.
- 4 To "Do you want to backup Multiplan?" respond y then (RETURN) to continue the process.
- 5 The screen displays the message "Please label a blank flexible disk:

```
Multiplan
1000772-01
Volume 1
(date)"
```

Do this to identify the disk for future use.

- 6 "Insert the disk into drive #0. Press (RETURN):". The disk must be previously formatted.
- 7 Screen messages report the progress of the formatting. When you see "Multiplan backup is successfully completed. Press (RETURN) for menu or select ahead." Press (RETURN) to proceed to your next activity.

SELECTING MULTIPLAN

Follow these steps to enter Multiplan.

- 1 Type pl (EXECUTE).
Selects Multiplan from Professional Tools category on Global menu. The Multiplan menu appears on the screen.
- 2 Press (EXECUTE).
The Multiplan screen appears.

To use the training models, enter Multiplan as described in the Operator's Guide to Multiplan.

LEAVING MULTIPLAN

Follow these steps to leave Multiplan.

- 1 From Multiplan screen type q y.
Selects QUIT command and confirms with yes. Returns to Multiplan menu screen.
- 2 Press (CANCEL).
Returns to Global menu.

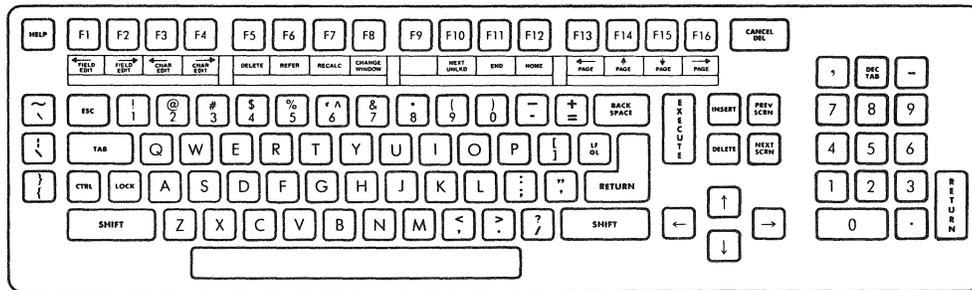
TURNING OFF THE FORTUNE 32:16

Follow these steps to turn off the system. This operation closes and protects your files.

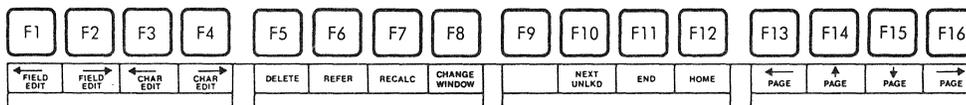
- 1 At the Global menu type s2.
This selects System Management.
- 2 Select 30 to shutdown your computer.
- 3 Read the caution statement first. Then to the prompt "Do you want to continue?" respond yes to continue the shutdown and no to resume your work.
- 4 When you receive the message "Please turn the Fortune Systems 32:16 off" do so.

The Keyboard

The keyboard of the Fortune 32:16, shown in the illustration below, contains all the keys you need for Multiplan. A plastic template fits in a groove below the top row of the keys and identifies their Multiplan function. You will find a description of the keys following these illustrations.



THE FUNCTION KEYS



<u>Key</u>	<u>Function</u>
← FIELD EDIT	Moves the cursor one field back through the text on the command line.
→ FIELD EDIT	Moves the cursor one field forward through the text on the command line.
← CHAR EDIT	This edit key moves the cursor one character back through the text on the command line, without erasing anything.
→ CHAR EDIT	This edit key moves the cursor one character forward through the text on the command line, without erasing anything.
(DELETE)	This edit key deletes one character at a time, moving to the right on the command line.
(REFER)	Changes a relative reference to an absolute reference. Also used to put named cells into a formula.
(RECALC)	Manually recalculates all formulas on a worksheet.
CHANGE WINDOW	Moves the cell pointer to the next numbered window, making it the active window. Moves from the last back to the first.
NEXT UNLKD	Moves the cell pointer to the next unlocked cell.
(END)	Moves the cell pointer to the last cell used on the worksheet, the intersection of the highest numbered row and column.
(HOME)	Moves the cell pointer to R1C1.
← PAGE	Scrolls the screen to the left an entire page.

Key

Function



Scrolls the screen upward an entire page.

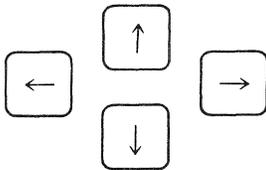


Scrolls the screen downward an entire page.



Scrolls the screen to the right an entire page.

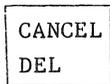
OTHER KEYS



Arrow keys or direction keys move the cell Pointer and cell in the direction of the arrow. These keys may also be used to combine movement with entering text or numbers. You make an entry on the command line, press an arrow and the entry appears on the screen.

(BACK SPACE)

Deletes characters entered on the command line backward one at a time.



Ends a command and returns you to the command line.

(CTRL)

This key has no function in Multiplan.

(ESC)

This key has no function in Miltiplan.

(EXECUTE)

Carries out a command and returns you to the command line.

(HELP)

Provides information about any Multiplan command you select.

(RETURN)

Moves the cursor through the command fields.

(SPACE BAR)

Moves the cursor through the command names and types spaces in text.

(TAB)

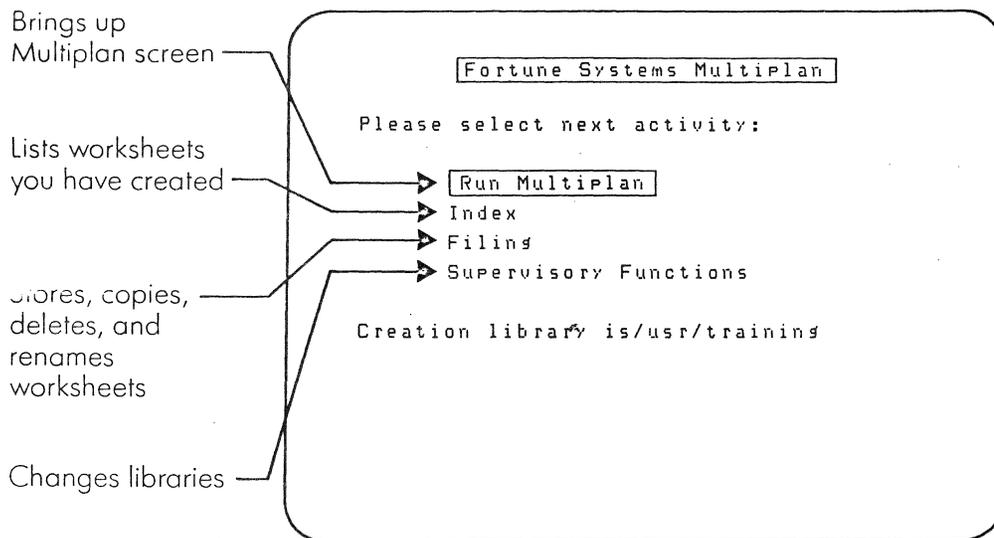
Moves the cursor through the command fields. Interchangeable with (RETURN).

The Screen Structure

The global menu screen is the entry way to Multiplan. A second set of screens allows you to choose what aspect of Multiplan you will utilize as well as which file you will work on. Multiplan has its own screen for building worksheets, plus two other reference screens.

THE MULTIPLAN MENU

The Multiplan menu screen displays all the activities available to you. Selecting any activity on this menu leads to another menu screen.



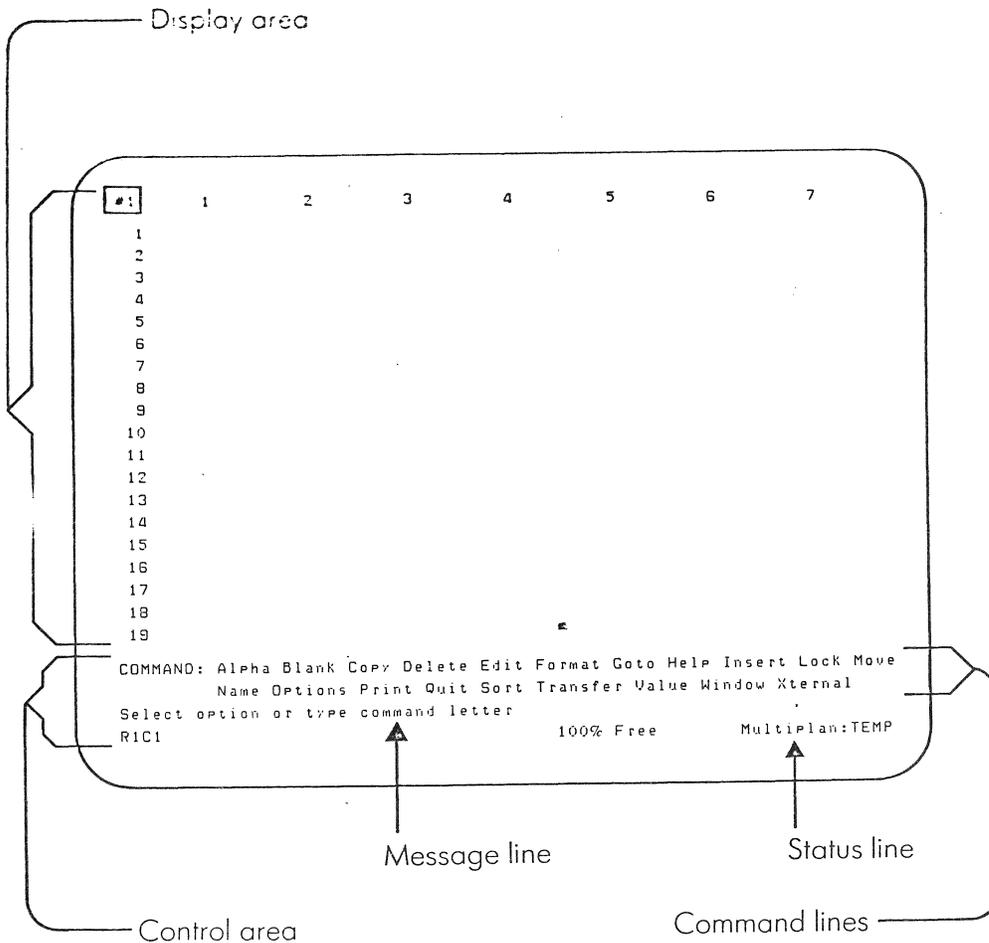
The Multiplan Screen

Use the Multiplan screen to create, revise, and print worksheets. The screen has two parts, the display area and the control area.

The display area shows a portion of a worksheet. It is divided into columns, numbered across the top of the screen from left to right, and into rows numbered down the left side of the screen. The intersection of a row and column is called a cell. The active cell is highlighted by the cell pointer, a bright rectangle on the screen.

The control area contains the command lines from which you can select a command, highlighted by the edit cursor. The message line shows you screen messages that give you information or point out an error. The status line identifies the cell where you are currently working, its contents, how much workspace is left, and the name of the current worksheet.

The elements of the Multiplan screen are shown in the illustration below.



Index Menu

You can see a list of Multiplan worksheets in normal (binary) format, symbolic format, or other format, or sublibraries by using the Index menu.

```

                                INDEX MENU
Please select one from each column:

      TYPE OF INDEX          SOURCE
      Multiplan             Current library
      Symbolic              Archive disk
      Other
      List sublibraries

Current library is /usr/trainings

```

Filing Menu

The filing menu contains activities for managing worksheets including moving and copying worksheets onto an archive disk. You can copy the three types of files: Multiplan, symbolic, and other.

```

                                FILING MENU
Please select next activity:

      OPERATION              FILE TYPE:
      Copy                  Multiplan
      Delete                Symbolic
      Rename                Other
      Copy to archive
      File to archive
      Retrieve from archive
      Delete from archive
      Insert disk
      Remove disk

Current library is /usr/trainings

```

Supervisory Functions Menu

Changing, creating, and removing libraries and sublibraries are activities available on this menu.

SUPERVISORY FUNCTIONS MENU

Please select next activity:

Change library

Make library

Remove library

Current library is /usr/training

Procedures and Features

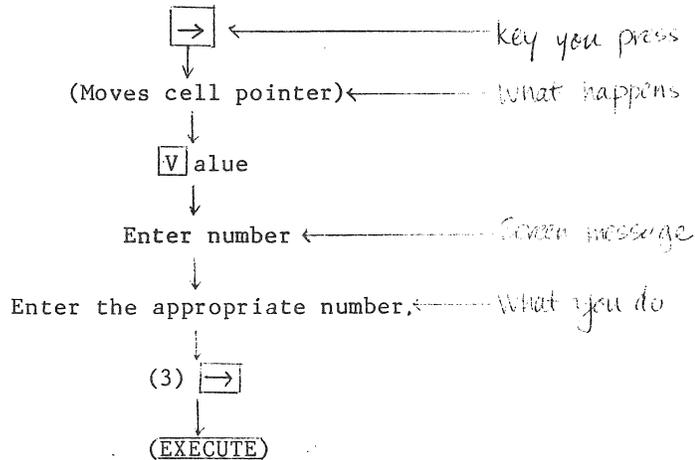
The following pages show you the procedures and features of Multiplan, from the basics of creating a worksheet, to working with the worksheet, and on to formatting and filing worksheets.

Most items in this part also contain a procedure chart to show you what to do. In contrast to the procedure charts in the Operator's Guide, these charts do not contain much explanatory information.

Read the chart from top to bottom, as shown by the arrows. The keys are shown in the same manner as in the Operator's Guide. (RETURN) for example, means press the Return key. Screen messages like "Enter Number" are shown boldfaced: **Enter Number**. Information about what has happened on the screen is shown in parentheses. Other instructions are not enclosed in parentheses.

The illustration below shows each element of a procedure chart in this guide.

Direction to read



1 Worksheet Basics

The specific steps you take to produce a worksheet are in Parts 2 through 5 of this Reference Guide.

Developing a Model

Before you enter a worksheet onto the system, it's helpful to use paper and pencil to create a model as a guide. Here are the steps in model development.

- 1 Define the problem to be solved. Examine the current conditions. Be very specific.
- 2 Consider the elements of the problem -- time, for example, some factors occur on a regular basis -- daily, weekly, quarterly, seasonally, etcetera. Some occur only occasionally. Some elements are in your control; some are not.
- 3 Organize the worksheet. Decide how elements will be represented by rows and columns. Write the mathematical formulas that solve the problem.
- 4 Set specific goals for your worksheet. Focus on the factors you control. Consider when you will use the model. Decide whether or not your needs have been met.

The Worksheet Structure

The Multiplan screen actually represents only 1/115 of the entire space (which consists of 255 rows and 63 columns) that is available for a worksheet. The screen is considered a window on the worksheet. You can display more than one area of the worksheet on the screen at one time.

Moving Around the Screen

Two bright rectangles appear on your screen, the cell pointer and the edit cursor. Following is a list of keys that move each one on the screen. Each of these keys is described in Part 1. Notice that GOTO and EDIT are commands rather than keys. To use the GOTO command, type G or g; to use EDIT, type E or e. In the procedures that follow, type the key that is enclosed in a box: GOTO, EDIT.

CELL POINTER

The cell pointer is an illuminated rectangle on the display portion of the screen that highlights the active cell. It is moved with the arrow keys, the GOTO command, and the (END), (HOME), (CHANGE WINDOW) and (PAGE) keys.

Moving the Cell Pointer

Cell pointer is positioned anywhere
on the worksheet.

↑ or ↓ or → or ←	One cell in direction of arrow.
← PAGE or → PAGE or	One screen in direction of arrow.
↑ PAGE or ↓ PAGE	
(HOME)	To row 1, column 1.
(END)	To intersection of last row and column in use.
G OTO	To row and column you name.
CHANGE WINDOW	To next window.

EDIT CURSOR

The edit cursor is the bright rectangle located on the command line. It can be moved over text and numbers with the edit function keys, the two field edit keys, the two character edit keys, and the delete and backspace keys. It can be moved over commands with (SPACE BAR) or (BACK SPACE) or by typing the first letter of a command name.

Moving the Edit Cursor Over the Commands

(CANCEL)	
(Sets the command line to a ready position)	
	↓
(SPACE BAR)	To next command
(BACK SPACE)	To previous command
(Enter first letter of command name)	To that command
(RETURN)	To next command
(TAB)	To next command

Moving the Edit Cursor Over Text

Use [A]LPHA to enter text.
or
Use [E]DIT to modify text in cell.

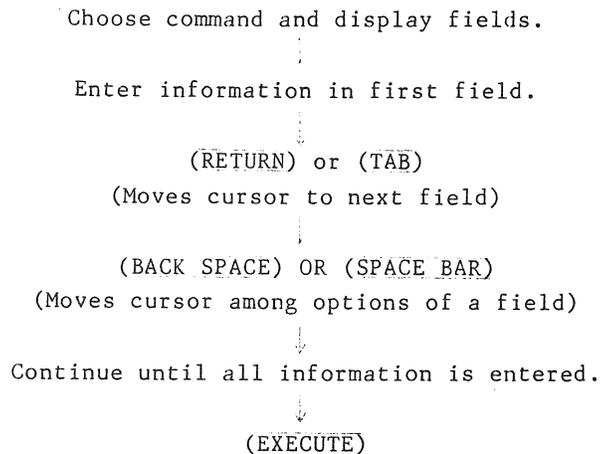
	↓
(DELETE)	Erases character to right.
(BACK SPACE)	Erases character to left.
[CHAR EDIT]	Cursor moves one character to right.

Commands

Every action taken to create or change a worksheet requires a command. Choose a command by moving the cursor to highlight that command or by pressing the first letter of the command's name. Command options are chosen in the same way. The command chart below shows all the Multiplan commands and their options. The commands are listed in alphabetical order, with any options also in alphabetical order. You will find a description of each command in Part 3 of this guide.

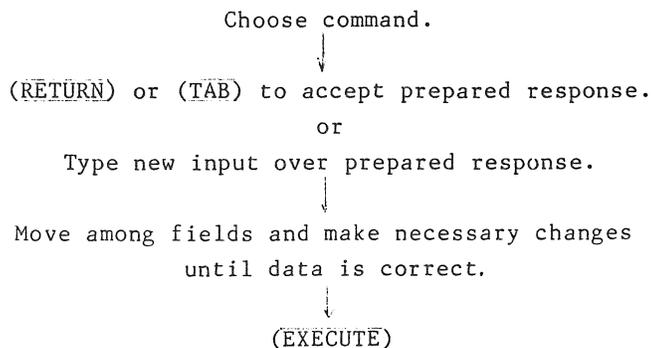
Command Fields

Command fields are 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 usually fills it with a prepared response, which you may use or not. Move among fields with the (RETURN) or (TAB). Move among options in a command field with (BACK SPACE) or (SPACE BAR).



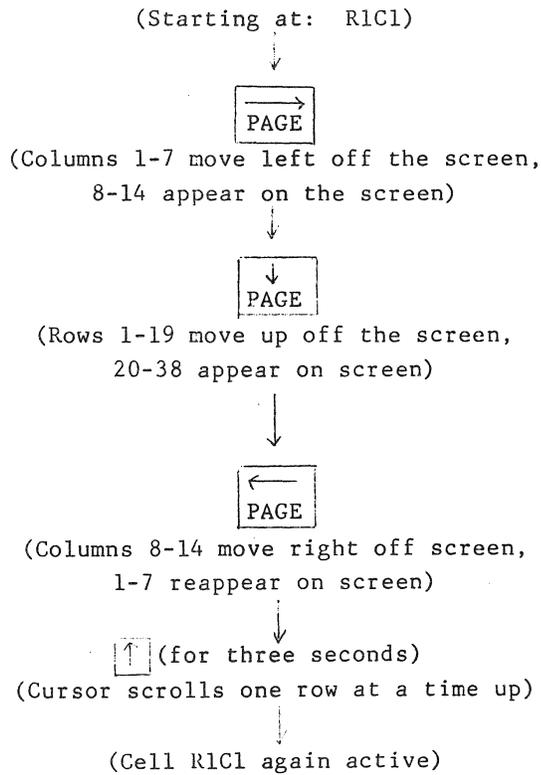
Prepared Responses

Multiplan gives prepared responses in most fields to most commands. These prepared responses are the most likely choice taken from your previous input. Move to the next field or press (EXECUTE) to accept the prepared response. To enter something else, simply type it in.



Scrolling the Worksheet

When you begin, the screen shows 7 columns and 20 rows, but 63 columns and 255 rows exist. To see columns numbered higher than 7 or rows numbered higher than 20, use the arrow keys to move the cell pointer to the right or down. The pointer will remain still as the columns or rows scroll by. You may also use the page keys to scroll the worksheet in any direction by a screen at a time. Holding down a key causes it to automatically repeat its action.



Formulas and Functions

Formulas are entered on the command lines. Type =, +, or v, type in a formula, and press (EXECUTE) to enter it on the worksheet.

FORMULAS

Formulas in Multiplan can consist of cell references, mathematical operators, functions, and names. The operators are:

- + Arithmetic addition
- Subtraction
- * Multiplication
- / Division
- ^ Exponentiation
- % Percent, same as multiplication by 100
- & Text string concatenation
- () Groups operations together. Operations inside the parentheses are calculated first.

Logical operators are:

- > Greater than
- < Less than
- >= Greater than or equal to
- <= Less than or equal to
- = Equal
- <> Not equal

Three operators define groups (sets) of cells:

<u>Key</u>	<u>Name</u>	<u>Meaning</u>
space	intersection	The cells shared by both sets
,	union	The cells of both sets combined
:	range	The smallest rectangular collection of cells that includes all cells in either group or cells

Multiplan processes operators in the following order.

1. () Parentheses
2. ^ Exponentiation
3. *, / Multiplication and division
4. +, - Addition and subtraction

Within each category, the processing order is from left to right.

Entering a Formula

Move pointer to cell to contain formula.

↓
= or + or VALUE or (

↓
Enter a formula

↓
(EXECUTE)

(The result of the formula displays
in the cell where it was entered.

The formula shows on the status line.)

FUNCTIONS

Functions are short cuts, formulas contained in Multiplan for your use. They can be used alone or as part of a formula you write.

Functions fall in five categories:

- Area functions manipulate groups of cells of your worksheet.
- Mathematical functions allow you to perform standard trigonometric and exponential functions.
- Numeric functions change the form of numbers.
- Text functions control text entries containing nonnumeric entries.
- Logical functions set conditions, compare values, and then return a value.

Each function is followed by parentheses that are either left empty or filled with specific input, depending on the function. This information and a description of all the functions are in the part on functions.

Entering a Function

Move pointer to cell to contain function.

↓
[=] or [+] or [VALUE] or [(

↓
Enter a formula

↓
Enter a function or a formula including a function.

↓
(EXECUTE)

Basic Worksheet Development

This procedure builds a sample worksheet. Remember that you can use lower case letters to enter commands. For example, in Step 2, to set a default cell format, enter fdc.

1. CLEARING THE SCREEN

[T]RANSFER



[C]LEAR



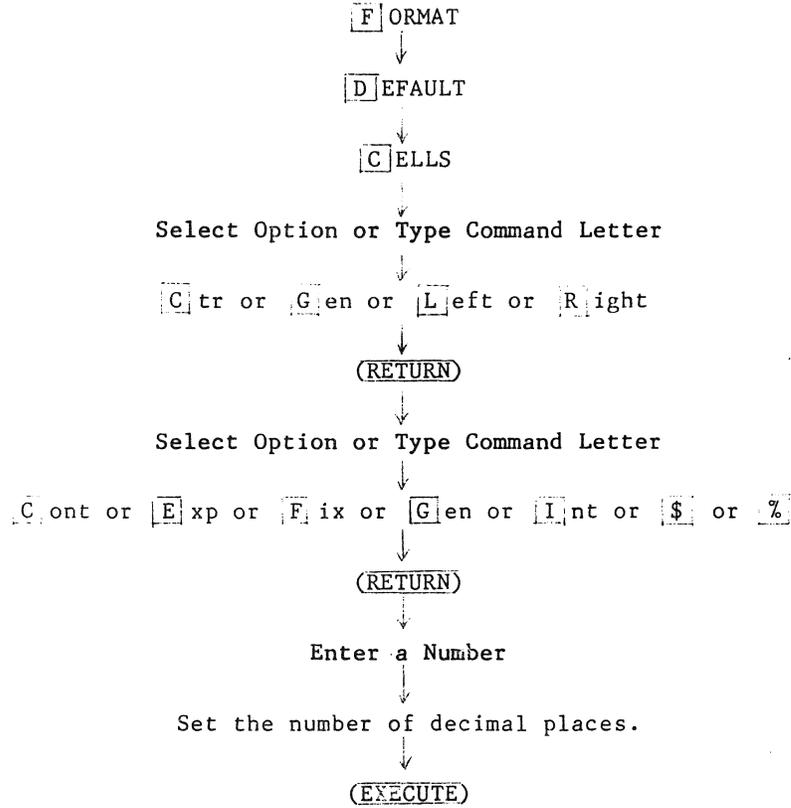
Enter Y to confirm



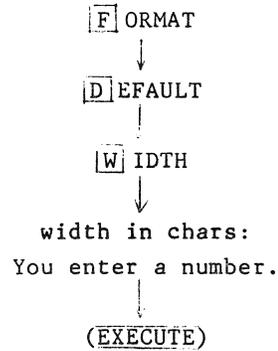
y

2. PREPARING THE SCREEN

Set a Default Cell Format



Set a Default Column Width



3. ENTERING DATA ON THE SCREEN

Enter Characters into a Cell

Using arrow keys, move pointer to the cell to receive characters.

↓
A LPHA

↓
Enter text, no double quotes.

↓
(EXECUTE)

Enter Numbers into a Cell

Move pointer to a cell to receive characters.

↓
Type the numbers.

↓
VALUE: your number

↓
(EXECUTE)

Enter Formulas into a Cell

Move pointer to the cell receiving the formula.

↓
= or + or VALUE or (

↓
VALUE: Enter a Formula

↓
Type the formula, using numbers, mathematical or logical operators, functions and cell references.

↓
(EXECUTE)

4. SAVING THE WORKSHEET

T RANSFER

S AVE

Filename:

Type the name of the worksheet.

(EXECUTE)

Overwrite existing file?

Type y or n to replace old
file with new.

(EXECUTE)

5. PRINTING THE WORKSHEET

P RINT

P RINTER

(Prints the worksheet)

Working with the Worksheet

Multiplan has features that help you organize the worksheet including many ways to format numbers and text and to divide, or "window" the screen into sections that provide views of different areas of the worksheet. Two types of cell references, absolute and relative, allow you to relate various portions of the worksheet in formulas. With the symbolic format worksheets can be used in other computer programs. You can also link worksheets together to automatically draw necessary data from one to another.

Cell References

Cells on the worksheet may be addressed by either absolute or relative references. An absolute reference gives a specific, nonchanging location such as R4C6, the intersection of row 4 and column 6. Relative references on the other hand, may change. For example, you may address a cell as R -3 C2, which means the cell three rows higher than the current row in column 2. References must be enclosed in brackets, for example, R -1 C +2 .

Cells may also be referred to in groups and by name. A range, or group of cells, is indicated by: R1:5C2:6. For example, R1:5C2:6 means rows 1 through 5, columns 2 through 6, creating a rectangle five rows by five columns. This area, or any area from one cell to a whole worksheet in size, can be named using the NAME command.

References are used primarily in formulas. The arrow keys can be used to enter relative references in formulas. The Refer key turns a relative reference as you enter a formula into an absolute reference.

ENTERING CELL REFERENCES

Move pointer to cell to contain formula.

↓
[=] or [+] or [VALUE] or []

↓
Enter a formula

↓
[] or [↓] or [←] or [↑]

(To arrive at cell belonging in formula.)

↓
(REFER)

(To make reference absolute.)

↓
Finish entering formula.

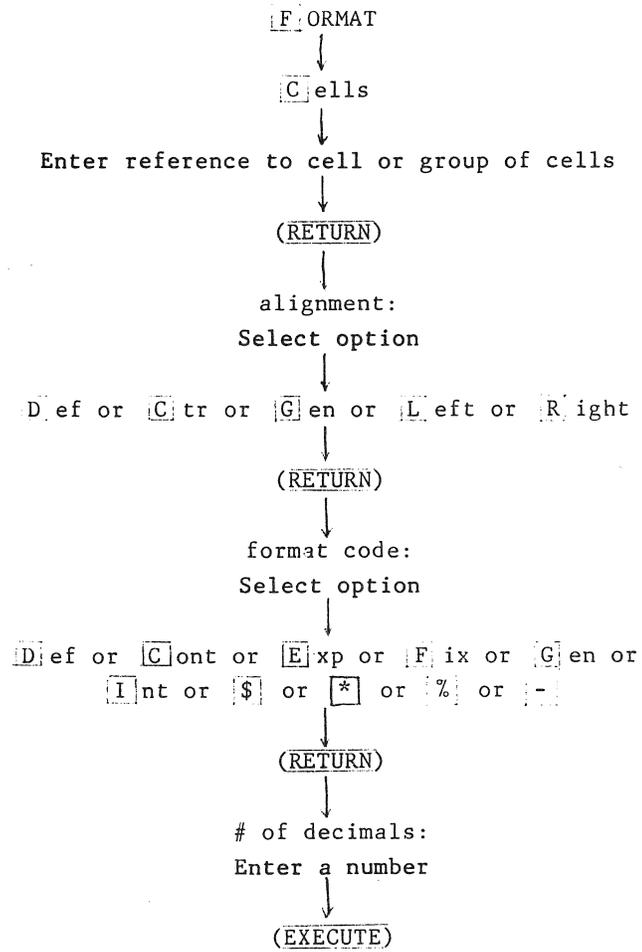
↓
(EXECUTE)

Formatting a Worksheet

The options of the FORMAT command give you a wide range of ways to display data. You control cell alignment, format codes (the form in which a number displays), the number of decimal places, and whether you display formulas or results of formulas on the entire worksheet. You can also change any cell or group of cells to display another way. For a description of alignments and codes and each option of this command, see FORMAT in the command section of this guide.

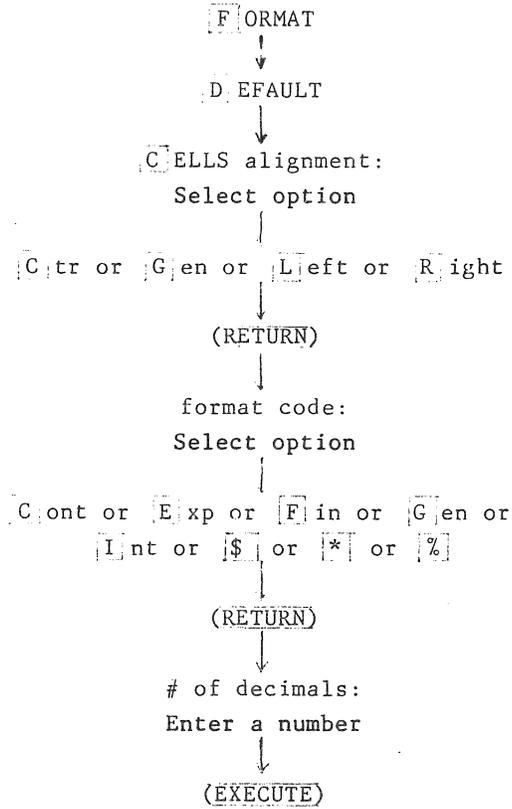
USING FORMAT CELLS

This command sets the format for specific cells.



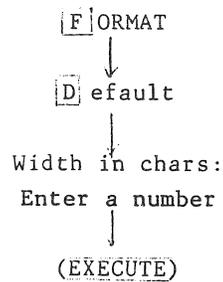
USING FORMAT DEFAULT CELLS

Sets the default format for the entire worksheet.



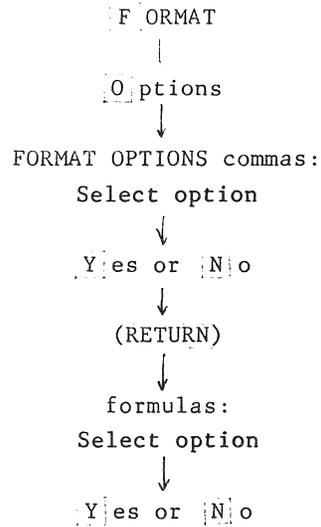
USING FORMAT DEFAULT WIDTH

Sets the default column width for the entire worksheet.



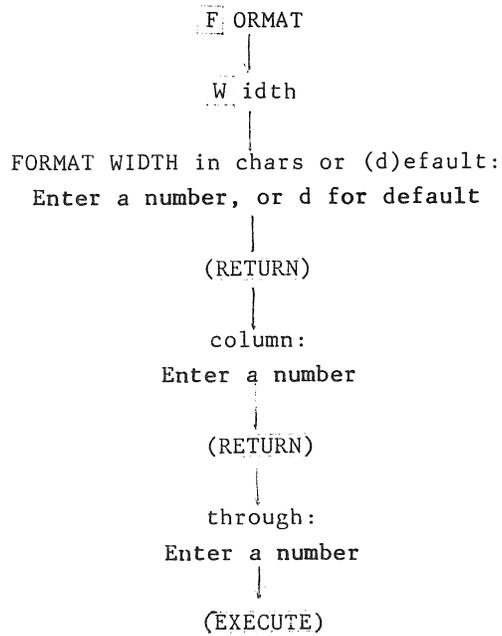
USING FORMAT OPTIONS

Sets the entire worksheet to display numbers with commas and formulas to display rather than results of formulas to display. The default setting is No.



USING FORMAT WIDTH

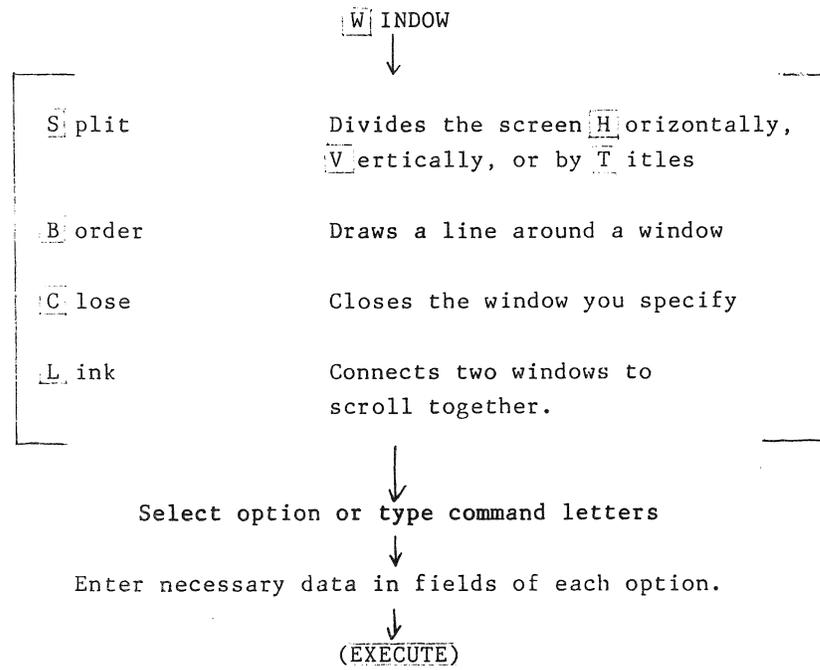
Sets the width of individual columns.



Windows

As you begin to build larger worksheets, the window feature helps you manage the view you have of the worksheet. By using the WINDOW command, you can bring areas from different portions of the worksheet to the screen at the same time. You'll learn more about windows in the Command part of this guide.

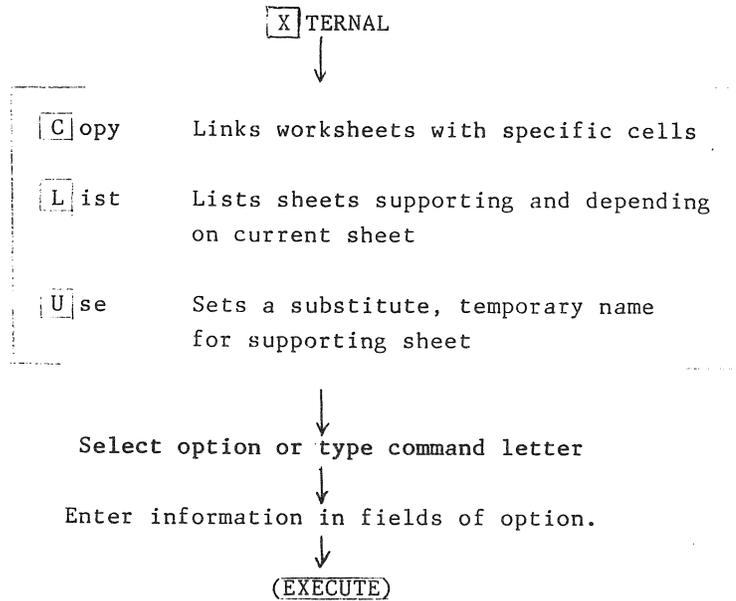
USING THE WINDOW COMMAND



Linking Worksheets

Sometimes you may find that you will need a summary sheet, one that uses information from several other worksheets. Using the XTERNAL command you can draw values from one sheet to another.

USING THE XTERNAL COMMAND



Symbolic Files

Symbolic files allow various programs to "talk to" each other. That is, files created by one program can be translated into a symbolic file which can, in turn, be read by another program. Symbolic files can be read and written by programs running under any disk-based language processor for example, BASIC, FORTRAN, COBOL, Pascal. This means you can use information from Multiplan files and other program files interchangeably.

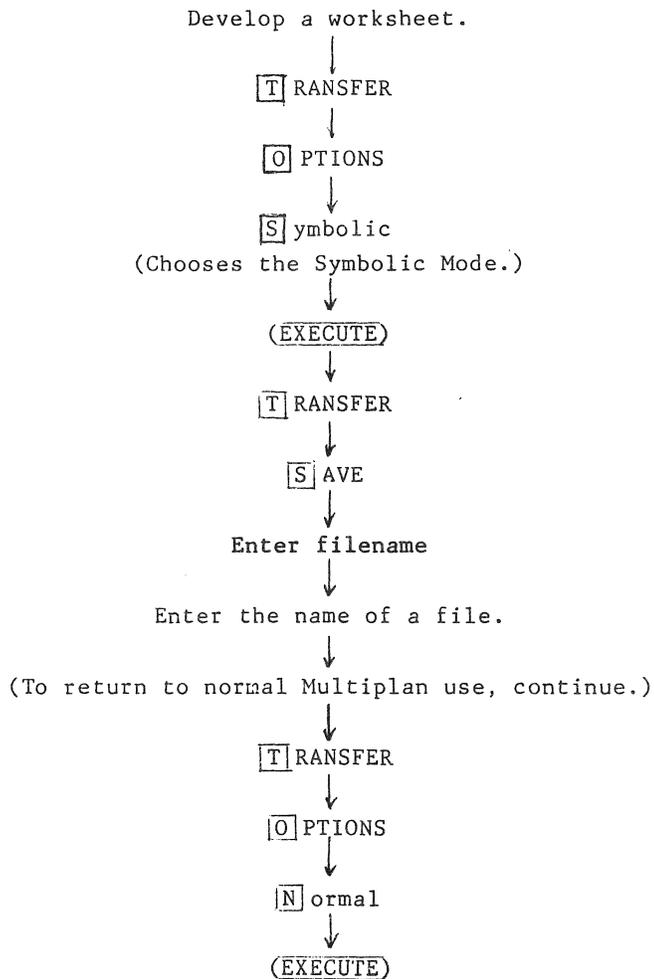
Symbolic files can contain three types of information (worksheet data, formulas, worksheet calculations) in any combination of text and numbers.

The symbolic format stores data in records and fields that define:

- The location of data on the sheet
- The type of data (number, formula, text)
- Whether cells are locked or not
- The end of the file.

The files consist of many short ASCII (alphabetic and numeric) character sequences. The files are easy to read, write, and understand.

CREATING A SYMBOLIC FILE



Managing Worksheets

Managing worksheets includes activities for archiving, copying, deleting and renaming worksheets as well as for looking at a directory or index, and making libraries.

Archiving

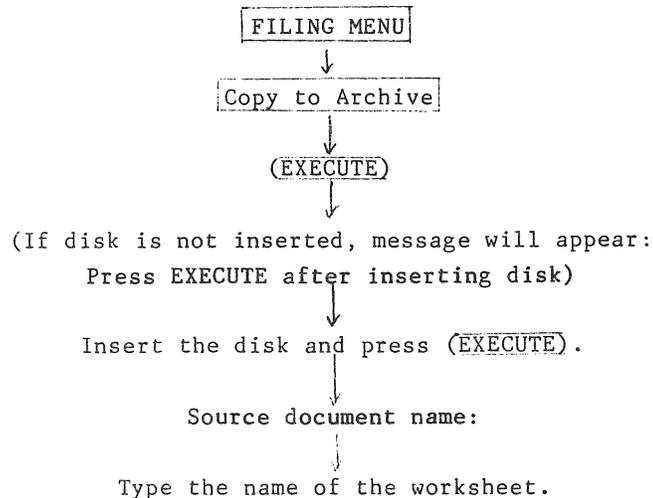
Archiving is the process of saving or storing worksheets on a flexible disk, which has been prepared for archiving, called an archive disk.

Archiving worksheets is done with the filing menu. The two processes are filing and copying. Filing removes a worksheet from the system disk and moves it to an archive disk. Copying puts a copy on an archive disk but the worksheet remains on the system disk. Retrieving moves a copy of the worksheet from the archive disk back to the system disk.

Archive Disk Preparation

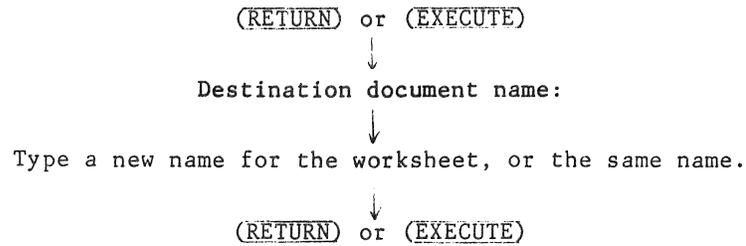
Text is being written and will be available soon.

Copying a Worksheet to an Archive Disk

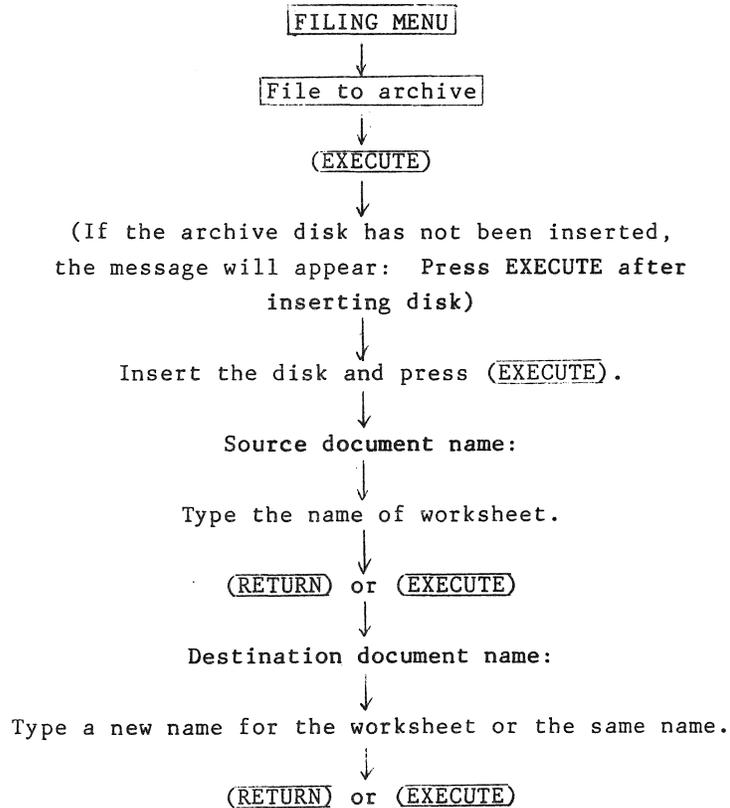


(Procedure continued on next page.)

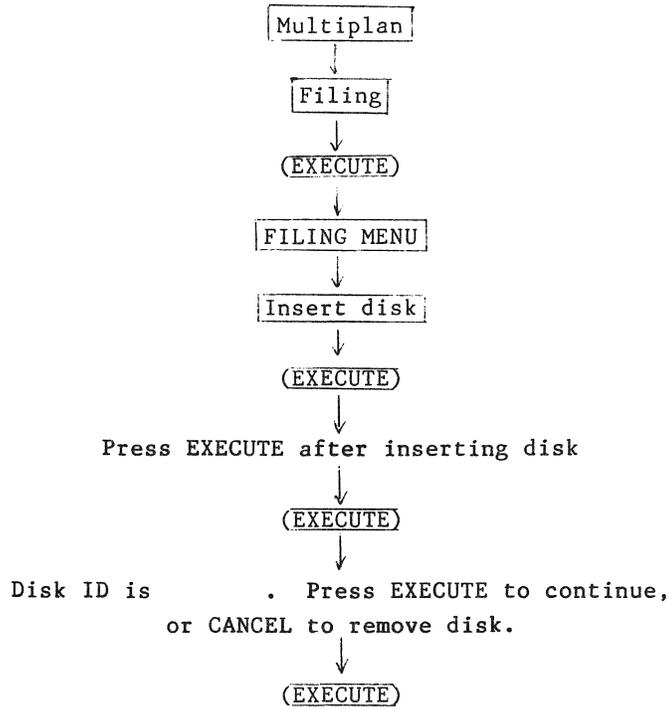
Copying a Worksheet to an Archive Disk continued



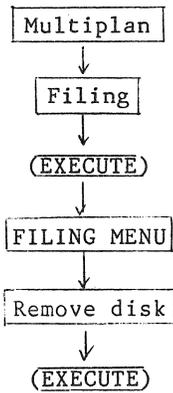
Filing a Worksheet to an Archive Disk



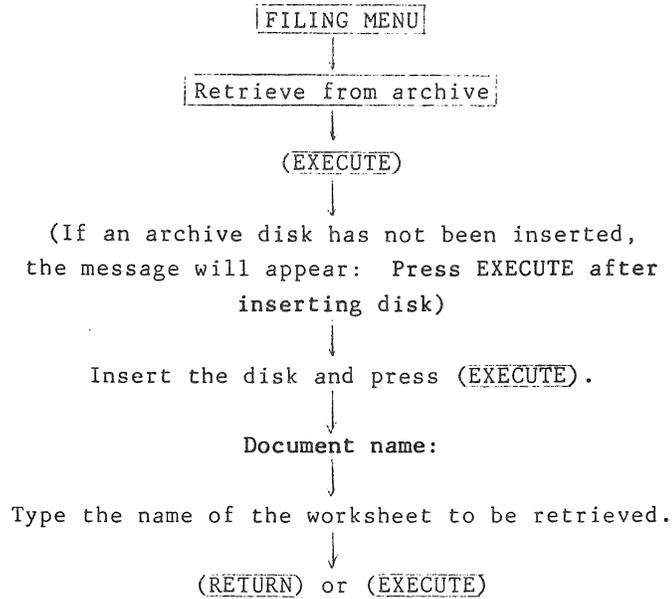
Inserting an Archive Disk



Removing an Archive Disk

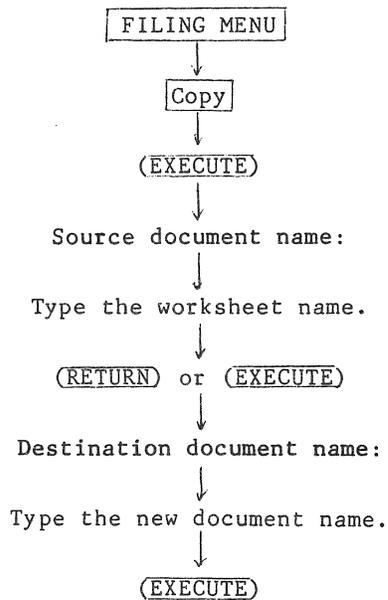


Retrieving a Worksheet from an Archive Disk



Copying a Worksheet on the System Disk

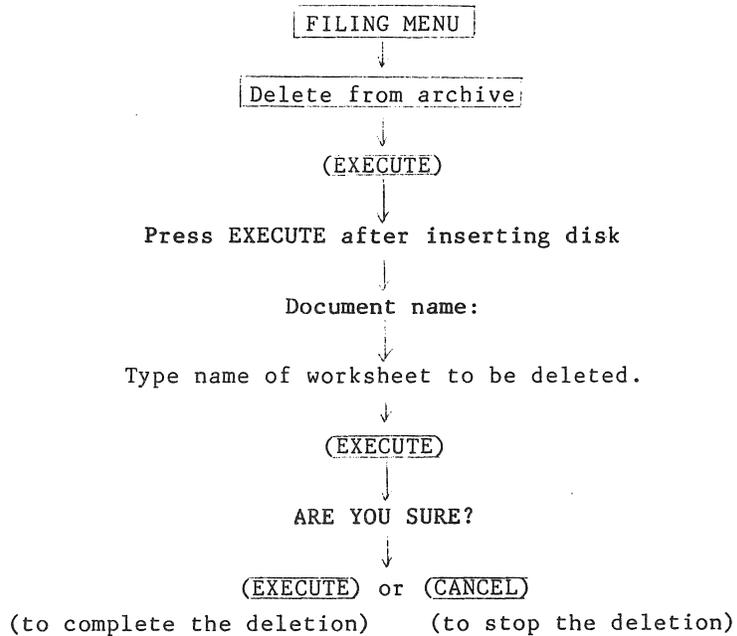
This function on the filing menu duplicates a worksheet on the system disk.



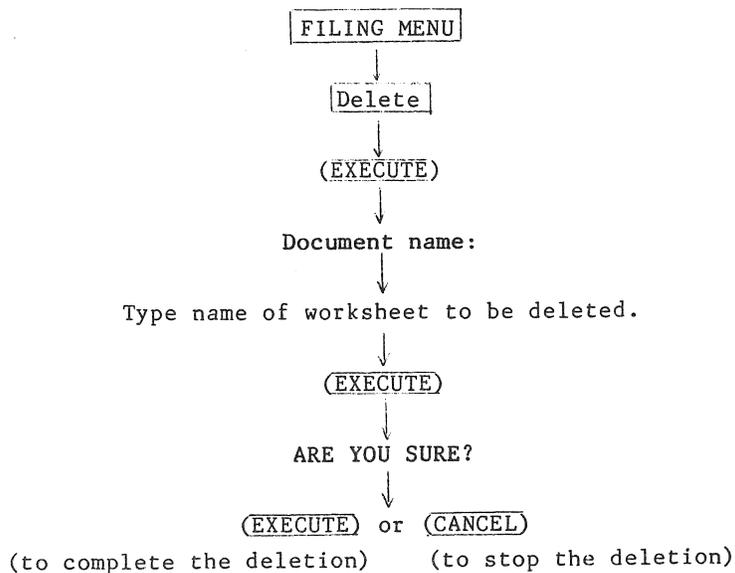
Deleting a Worksheet

You can remove a worksheet permanently from an archive or system disk using delete.

From the Archive Disk

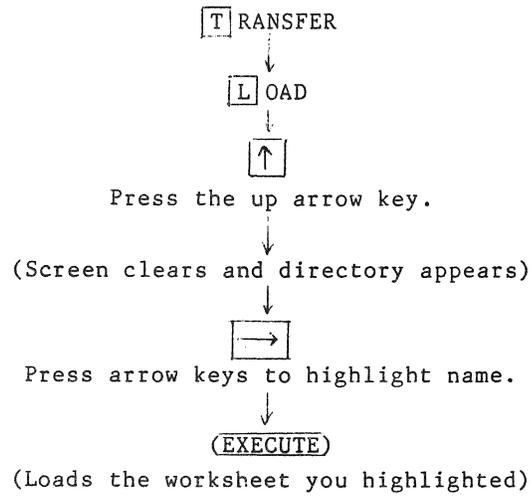


From the System Disk



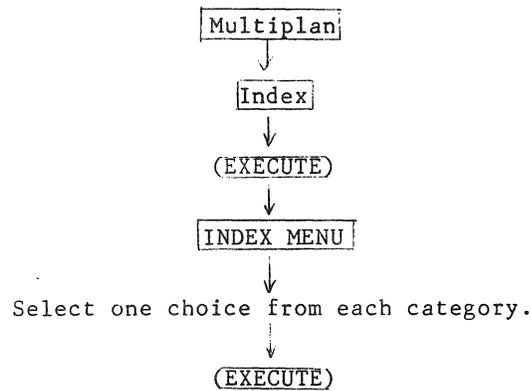
File Directory

All saved worksheets are listed in a directory. Display the directory with the TRANSFER LOAD command and an arrow key.



Index

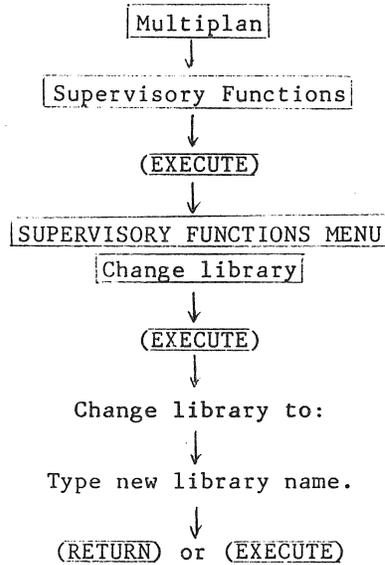
A list of documents or sublibraries on an archive disk or on the system disk. Indexes are made of all the worksheets of a particular format type: Multiplan (Normal), Symbolic, or other (VisiCalc).



Library

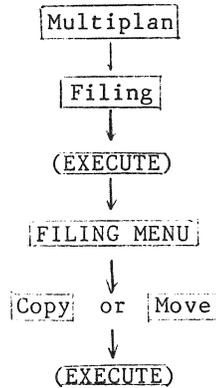
A library is a collection of worksheets. Libraries and their subdivisions, sublibraries, are used to organize your worksheets. A library name always begins with a /, as in /usr/training.

Changing the Library



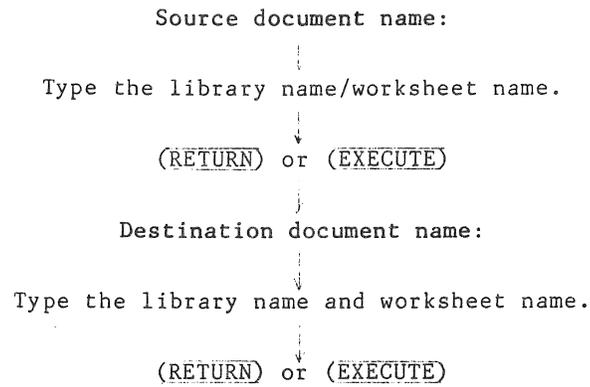
Copying or Moving Worksheets Between Libraries

First change the library to the one where worksheet will go.

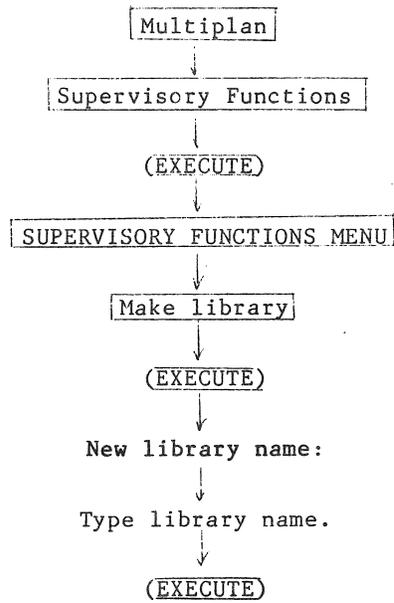


(Procedure continued on next page.)

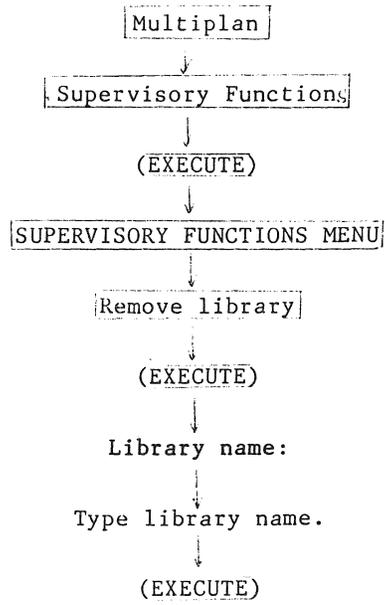
(Copying or Moving Worksheets Between Libraries continued)



Creating a Library or Sublibrary

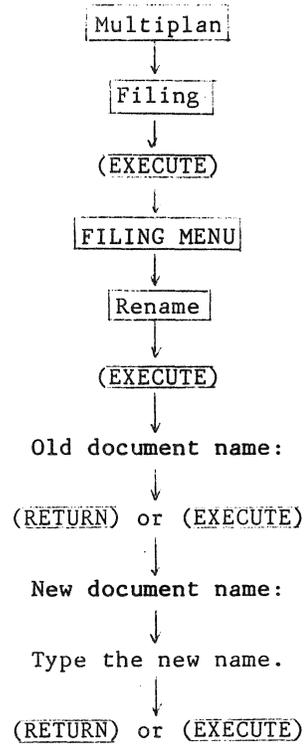


Removing a Library



Renaming a Worksheet

This can be done within the menu functions or using the TRANSFER RENAME command, covered in the command section.



Commands

You must use commands to create, change, or revise a worksheet, to store and print results, or control the cell pointer. The commands are always shown on the command line of the Multiplan screen. Some commands have subcommands which you see when you activate a command. In the following pages all the commands are listed in alphabetical order with the subcommands shown below. There is a description and some examples of how to use each one.

ALPHA

Replaces the contents of the active cell with a character string. If the active cell already contains a string, that string is the proposed response of the command, so that it can be edited. Double quotes should not be used in this command.

Example:

- To put the title totals into the active cell, enter:
ALPHA: totals

BLANK

Replaces the contents of all specified cells with blanks. Names are not affected; if a cell was referred to by a name before use of this command, that name will still apply.

When a formula refers to a blank cell, that cell's numeric value is taken to be zero, and its string value is a string of zero characters.

Examples:

- To blank the cell in row 4 column 3, enter BLANK cells: R4C3.

- To blank all cells in the area named totals, enter:

BLANK cells: totals.

- To blank an irregular area, specify a union (list) of references: BLANK cells: R1:6C1,R7:8.

COPY

There are three ways to duplicate the contents of a cell into another cell. To duplicate one cell across several to its right, choose RIGHT. If you want to duplicate one cell across several below it, choose DOWN. To copy any cell or cells to any others, choose FROM.

COPY DOWN

Copies one cell into one or more cells below it. Both cells contents and cell format are copied. The proposed response for "number of cells" is the number used in the last COPY DOWN or COPY RIGHT command.

As many new copies are made as you specify; the total number of identical cells will be the number given plus one (the original). The command can also copy a group of cells.

Examples:

- To fill the 10 cells below the active cell with the same value as the active cell, enter:

COPY DOWN number of cells: 10 starting at:
(active cell)

- To duplicate the first 5 columns of the top row 4 times, enter:

COPY DOWN number of cells: 4 starting at:
R1C1:5

The row of 5 cells will be duplicated in rows 2, 3, 4, and 5.

COPY FROM

Copies the contents of a cell or group of cells to another location on the worksheet. The "from" cells are not altered. Both cell contents and cell format are copied.

When you indicate only one "from" cell, the contents of that cell is duplicated in each "to" cell. When there is a group of "from" cells, the entire group is copied. When only one "to" cell is given, it marks the upper left corner of the receiving group. When you are copying one area to another, the areas must be exactly the same shape, with the same number of rows and columns.

Examples:

- To copy the cell at R1C1 to the cell at R5C3, enter:

COPY FROM cells: R1C1 to cells: R5C3

- To duplicate cell R1C1 in every cell of column 8, enter:

COPY FROM cells: R1C1 to cells: C8

- To make a copy of a square patch of cells in the upper left corner four rows farther down:

COPY FROM cells: R1:4C1:4 to cells: R8C1

Then R8C1 is a copy of R1C1, R8C2 is a copy of R1C2, and so on to R11C4, which is a copy of R4C4.

COPY RIGHT

Copies the contents of one cell into one or more cells to its right. It is used to make a row of identical values. Both cell contents and cell format are copied. The proposed response for "number of cells" is the number used in the last COPY DOWN or COPY RIGHT command.

As many new copies are made as you specify; the total number of identical cells will be that number plus one (the original).

This command can also copy a group of cells.

Examples:

- To duplicate the active cell in the 8 cells to its right, enter:

COPY RIGHT number of cells: 8 starting at: (active cell)

- To duplicate the 5-row column of cells R1:5C1, enter:

COPY RIGHT number of cells: 1 starting at: R1:5C1

DELETE

There are two ways to remove cells from a worksheet and close up the space: by rows or columns. All reference are adjusted after the deletion.

If a name's entire area is deleted, the name exists, but refers to an illegal (#REF) area. If a formula refers to an area that is completely deleted, the formula becomes illegal (Contains #REF). If the area is only partially deleted, the reference is adjusted, as for names. Shared expressions (obtained via copies) are updated for the upper-left cell that use them. Both relative and absolute references are updated.

DELETE ROW

Removes all or part of a row or rows. The most common use is to delete complete rows (accepting the proposed responses of columns 1 and 63). Rows below those deleted move up and new rows of blank cells are added at the bottom of the sheet.

The command can also delete parts of rows. The removal takes place between the specified columns; other columns are not affected.

Multiplan adjusts all references affected by the deletion. Suppose you delete rows 4 and 5. Any cells that previously referred to row 6 will be altered to refer to row 4 instead, because that's where the cells that were in row 6 have now gone.

Examples:

- To delete the active row simply press EXECUTE:

DELETE ROWS # of rows: 1 starting at: (active row)
between col's: 1 and 63

- To delete a rectangular area in rows 4 and 5 between columns 2 and 8:

```
DELETE ROWS # of rows: 2 starting at: 4
              between col's: 2      and 8
```

DELETE COLUMN

Removes all or part of a column or columns. The most common use is to delete complete columns (excepting the proposed responses of rows 1 and 255). Columns to the right of the deleted columns move left, and new columns of blank cells are added at the right edge of the sheet.

The command can also be used to delete parts of columns. The deletion takes place between the specified rows; other rows are not affected.

Multiplan adjusts all references affected by the deletion. Suppose you delete columns 3 and 4. Any cells that previously referred to column 5 will be altered to refer to column 3 instead, because that's where the cells that were in column 5 have now gone.

Example:

To delete the active column, press RETURN:

```
DELETE COLUMNS # of columns: 1
starting at: (active column)      between
rows: 3      and 8
```

EDIT

EDIT displays the contents of the active cell for editing. Place the cells pointer on the cell to be changed and press e. The cell's contents are placed on the command line for you to modify. The edit cursor is placed at the end of the current contents. If the cell contains a string, it is presented in double quotes. After you have edited the cell's contents, press (EXECUTE) to put the contents back in the cell; or press (CANCEL) to cancel any changes.

The first five function keys on your keyboard -- the two field edit keys, the two character edit keys, and the Delete key -- are devoted to editing. You may also use Back Space to delete characters one at a time, moving to the left.

FORMAT

Presents a choice of four kinds of cell adjustments. To set a specific format for a cell or group of cells, choose CELLS. To set the width of a column or columns, choose WIDTH. To set the default format -- the format that applies wherever a specific format hasn't been set -- choose DEFAULT. To place commas in large numbers, and to display formulas rather than their results on the worksheet, choose OPTIONS.

FORMAT CELLS

Sets a specific format and alignment for one or more cells. Unless a specific format is set, the cells will be displayed according to the current default format (set with FORMAT DEFAULT). If no default format has been set, Multiplan assumes the Gen (general) format code.

The alignment codes are:

Def	Default	Removes any specific alignment and aligns this cell according to the default alignment.
Ctr	Center	The cell display is centered in the column, regardless of type.
Gen	General	Strings are aligned left, numbers right, errors centered.
Left	Left	The cell display is left-justified in the column regardless of type.
Right	Right	The cell display is right-justified in the column regardless of type.
-	No Change	Leaves alignment code as it was. This choice is included so that you can change the format codes of a collection of cells in an area without disturbing specific cell alignments.

The format codes are:

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 (if the cell to the right is blank and has the Cont format also). Numbers are displayed as for Gen format.
*	Bar graph	When the cell contains a number, it is rounded to a whole number and that many asterisks are displayed.
-	No change	Leave format code as it was. Used when the alignment needs to be changed in a collection of cells.
%	Percent	Displays the number times 100 followed by a percent sign.

Examples:

- To center the display of the active cell, choose alignment code Ctr:

```
FORMAT CELLS: (active cell)
alignment code: Def (Ctr)Gen Left Right -
format code: (Def) Cont Exp Fix Gen Int $ * % -
# decimals: 0
```

- To display the cells in column 2, rows 3 through 6 as money, enter:

```
FORMAT CELLS: R3:6C2
alignment code: (Def) Ctr Gen Left Right -
format code: Def Cont Exp Fix Gen Int ($) * % -
```

FORMAT WIDTH

Specifies the width (3 to 32 characters) for one or more columns. To return the width of selected columns to current default width, choose Def. To set a specific width, enter the number of character positions the column is to occupy. The initial width of all columns, and the default until FORMAT DEFAULT WIDTH is used to change it, is 10 characters.

If a cell contains a string longer than the column is wide, Multiplan cuts off the display at the edge of the column. This can be prevented by setting a wider column with FORMAT WIDTH, or by using FORMAT CELLS to set the Cont format code (which allows a string to continue into adjacent columns).

If a cell contains a number that can't be displayed in the column width, Multiplan displays a row of asterisks instead. This can be fixed by widening the column, or sometimes by using a different format code.

Examples:

- To change the width of the active column, simply enter the new width.
- To change the width of columns 4 through 8 to be four characters, enter:

```
FORMAT: WIDTH in chars or D(efault): 4
column: 4 through 8
```

FORMAT DEFAULT

Presents a choice of two kinds of defaults to be changed. Choose CELLS to set the format and alignment codes to be used wherever no specific format has been set. To set the width of all columns for which no specific width has been set, choose WIDTH.

The FORMAT DEFAULT CELLS sets the display format and alignment for all cells for which no specific format has been set, or for which the Def format has been set explicitly. The initial default format code is Gen; the initial default alignment code is Gen. The alignment and format code explanations are listed under FORMAT CELLS.

Example:

- To set the default format code for money amounts (\$), enter:

```
FORMAT DEFAULT CELLS
alignment:      Ctr (Gen) Left Right
format code:    Cont Exp Fix Gen Int ($) *%
# of decimals: 0
```

The format default width sets the display width of any column for which a specific width has not been set, or for which the default width has been set explicitly. The initial default width is 10 characters.

Example:

- To set the default width to 12, enter:

```
FORMAT DEFAULT width in chars: 12
```

FORMAT OPTIONS

Presents a choice of two options: commas and formulas. The comma option displays numbers with commas separating every third digit before the decimal point. This affects only fixed, integer, percent, and dollar formats.

With the formulas option, the formulas themselves will be shown, not the numerical values of the formulas. All field widths will automatically be doubled when the option is turned on to accommodate the formulas.

Example:

- To select an option choose Yes and press (EXECUTE).

FORMAT OPTIONS commas: (Yes) No
formulas: Yes (No)

GOTO

GOTO presents a choice of ways to move the cell pointer over the sheet. To display a specific row and column, choose Row-Col. To display a named area, choose NAME. To move to a specific window, choose WINDOW.

GOTO ROW-COL

Moves the cell pointer (and changes the active window, if necessary) over the worksheet so that a certain row-column intersection is highlighted and active. The cell pointer is placed on the specified cell. If the cell requested is already visible on the screen, the screen is not moved on the sheet. Otherwise the screen is shifted so that it shows the part of the sheet containing the specified cell.

Examples:

- To move to a different row while keeping the present columns on the screen, enter only a row number:

GOTO row: 25 column: (active column)

- To make row 37, column 9 visible toward the center of the screen, enter:

GOTO row: 37 column: 9

GOTO NAME

Moves the cell pointer (and the active window, if necessary) over the worksheet so that a named area is visible. The cell pointer is placed on the cell in the upper left corner of the named area. If that cell is already visible on the screen, the screen is not moved on the sheet. Otherwise the screen is shifted to make the area visible. The arrow keys may be used to step through the name table.

Example:

- To make the upper left corner of the area named sum_of_costs visible, enter:

GOTO NAME: sum_of_costs

GOTO WINDOW

Moves the cell pointer to the upper left corner of the designated window. The specified cell is the one highlighted in the upper left corner of the newly activated window.

Example:

- To make the upper left corner of window 2, row 4, column 5 active, enter:

GOTO WINDOW window number: 2 row: 4 column: 5

HELP

Gives information on specific commands and other functions of Multiplan. There are three ways to use HELP.

You may press the ? key at any time during your work. The help text that appears will apply to the command you were using when you pressed ?. When you Resume, by typing r, your work will be exactly as you left it.

View the information on special topics at this time by selecting one of the topics listed at the bottom of the screen. Type the first letter of the desired topic.

You may familiarize yourself with all the available information by paging through the help text right now. Select Next (type n), Previous (type p), or Start (type s) page.

INSERT

INSERT presents a choice of ways to insert new cells into the sheet. To insert new rows choose Row. To insert new columns choose Column.

Multiplan adjusts all references affected by the insertion. If a name refers to the expanded area, the definition of the name is adjusted. Suppose that row3_9 is a name defined as R3:9. If a row is added before row 5, the definition of row3_9 will be changed to refer to R3:10, thus covering the same cells as before.

Shared expressions (obtained via COPY) are updated in accordance with their first use.

INSERT ROW

Inserts blank cells in the shape of all or part of a row or rows. The most common use is to insert complete rows (accepting the proposed responses of columns 1 and 63). Rows below the ones added move down, and the bottom rows of the sheet are lost.

The command can also be used to insert parts of rows. Insertion takes place between the specified columns; other columns are not affected.

Multiplan adjusts all references affected by the insertion. Suppose you add a row above row 5. Any cells that previously referred to row 6 will be altered to refer to row 7 instead, because that's where the cells that were in row 6 have gone.

Examples:

- To add a row before the active row, simply press (RETURN):

```
INSERT ROW # of rows:    1      before row:  (active row)
between columns:        1      and: 63
```

- To insert a rectangular area in rows 4 and 5 between columns 1 and 8 (causing the lower parts of columns 1 through 8 to move down to make room):

```
INSERT ROW # of rows:    2      before row:  4
between columns:        1      and 8
```

INSERT COLUMN

Inserts blank cells in the shape of all or part of a column or columns. The most common use is to insert complete new columns (accepting the proposed responses of rows 1 and 255). Columns to the right of the inserted ones move right, and the column or columns farthest right on the sheet are lost.

The command can also be used to insert parts of columns. Insertion takes place between the specified rows; other rows are not affected.

Multiplan adjusts all references affected by the insertion. Suppose you insert a column between columns 3 and 4. Any cells that previously referred to column 4 will be altered to refer to column 5 instead, because that's where the cells that were in column have been moved.

Example:

To add a column just left of the active one, simply press RETURN:

```
INSERT COLUMN # of columns: 1  before col: (active column)
                between rows: 3  and: 8
```

LOCK

LOCK is used to protect specified cell contents and formulas from unintentional change by other commands. The LOCK CELLS command can also unlock cells.

In a protected worksheet the next unprotected cell can be easily located with (NEXT UNLKD). Note that values imported from external sheets may be unlocked only by the XTERNAL COPY command.

LOCK CELLS

Used to protect specific cells from unintentional change. You enter the cell or group of cells to be locked or unlocked. The status field shows the current state (locked or unlocked) of the current cell. Specify the desired state.

Example:

- To lock cell r10c5, enter:

```
LOCK CELLS:  R10C5
Status:      (Locked) Unlocked
```

LOCK FORMULAS

Locks all cells in the sheet that contain text or formulas. This may be a convenient first step in creating a locked sheet. You may, however, wish to leave certain text strings unlocked, or to lock some important numbers.

Example:

- To ensure protection from accidental change enter:

```
LOCK FORMULAS:
Enter Y to confirm
```

MOVE

MOVE presents a choice of ways to move cells around the sheet. If you want to move whole rows, choose Row. If you want to move whole columns, choose Column.

Multiplan adjusts all references affected by the move, including relative references and adjustment of name definitions.

MOVE ROW

Changes the order of rows on the sheet by shifting one or more rows up or down. Multiplan adjusts all references affected by the move, including relative references.

Definitions of names are also adjusted. Suppose a name row1_3 had been defined as R1:3 before the move. Multiplan will adjust it to R1:4, so that it will still account for the same cells as before. The name now encompasses the moved row as well.

Example:

- To move the active row to the top of the sheet (moving all rows now between it and the top down by one to make room) enter:

```
MOVE ROW from row: (active row) to before
row: 1          # of rows: 1
```

MOVE COLUMN

Changes the order of columns on the sheet by shifting one or more columns left or right. Column widths do not move; only the cells do. Multiplan adjusts all references affected by the move, including relative references and name definitions.

Example:

- To move the active column to the left of the sheet (moving all columns now between it and the left edge right by one to make room), enter:

```
MOVE COLUMN: from column: (active column) to before
column:1          # of columns: 1
```

NAME

NAME assigns a name to a cell or area of cells. The name defined may then be used wherever a reference to that cell or area is needed in a command or formula.

If the active cell contains a string, Multiplan proposes that string as the name to be defined. Formulas are easier to read if the names they use correspond to the visible titles.

Names should be from 1 to 31 characters in length, and may contain any combination of letters, numbers, and special characters, except that they should not contain spaces, quotation marks (" "), exclamation points (!), or periods (.). A name should not be a combination of characters that could be confused with a reference. Thus a name should not be:

R, C, RC, or CR
Rn or Cn where n is an integer

To see the names that have been defined, begin the NAME command. Use the arrow keys to display each defined name and its definition in the command fields:

To change the definition of a name after viewing it, use the edit keys to alter the second command field and press (EXECUTE).

A name may be removed by putting the name in the first command field, deleting the second field, and pressing (EXECUTE).

Example:

- To define row 10, columns 3 through 15 as salesline, enter:

NAME: define name: salesline to refer to: R10C3:15

OPTIONS

OPTIONS is used to set and reset the options provided with Multiplan. You can control how often the formulas on your worksheet are recalculated. You can determine whether or not your computer will beep at you. You can also turn on or off the circular reference (iteration) option. OPTIONS is itself a command, not to be confused with the command choices, also called options.

OPTIONS ITERATION

The ITERATION option allows you to use circular references, calculations that double back on themselves, in formulas. Two functions are available to use with ITERATION: DELTA() and ITERCNT(). The functions are used in formulas that determine the completion test, a condition you set that when TRUE tells Multiplan to stop recalculating. DELTA and ITERCNT are discussed in FUNCTIONS.

OPTIONS RECALC

The RECALC option controls how often Multiplan performs formula calculations. If the option is on, Multiplan recalculates all formulas whenever a cell is changed. If the option is off, recalculation is done only when (RECALC) is pressed or during TRANSFER SAVE. With the Recalc option on the computer may not be able to keep up with your typing speed, especially if the worksheet is large.

Pressing the space bar will change the Yes setting to No and vice versa.

The version of Multiplan that you are using and the total bytes available are listed on the message line when you press o (for OPTIONS), then (EXECUTE)

OPTIONS MUTE

With Multiplan you have the choice of using the auditory warning system, the beep, or not. The OPTIONS MUTE command turns it on or off. To turn off the beep, choose Yes; to turn it on, choose No. The cursor moves between responses (Yes and No) with the space bar.

PRINT

PRINT presents a choice of four actions related to printing the active sheet. To begin printing, choose PRINTER. To put printable output in a disk file, choose FILE. To set the margins that will be used on the printed output, choose MARGINS. To fix the part of the worksheet to be printed, or to insert a control line at the top of the output, choose OPTIONS.

PRINT PRINTER

Prints the sheet under the conditions set up by the PRINT FILE, PRINT MARGINS, and PRINT OPTIONS commands.

When output is complete, all print specifications remain unchanged. If printing is directed to a file, and a file of the same name exists, you will be asked for permission to "Overwrite existing file."

The time it takes to print depends on the size of the sheet and the speed of the printer.

Empty columns at the right of the sheet, and empty rows at the bottom, are not printed. Each print line begins with a four character row number. Multiplan prints as many columns across the page as will fit in the print margins. If there are columns left over, it prints a second page, repeating the same row numbers and showing the remaining columns. When all the columns have been displayed, Multiplan starts the next set of row numbers on a new page. Thus, if the area to be printed is wider than the paper, you can assemble the complete width by cutting and pasting later.

PRINT FILE

Directs output to a disk file rather than to the printer. If a file of the same name exists at the time the PRINT PRINTER command is given, Multiplan will ask permission to replace it.

The filename may be changed as often as you like before the PRINT PRINTER command is given; the last filename given takes effect. After PRINT PRINTER, the filename is forgotten; the command must be given again to send a second output to the same or another file. When the command is complete the PRINT command is displayed again.

Example:

- To direct printing to a filename BUDGET.83, enter:

```
PRINT on file: BUDGET.83
```

PRINT MARGINS

Sets up the margins to be used with printed output. The left margin and the width are given as a number of characters. The top margin and the page length are given as a number of lines.

When the command is complete, the PRINT command is displayed again.

Example:

- Letter-size paper (8 1/2" by 11") has a length of 66 lines and a width of 85 characters. To fill it you might want a top margin of 3 lines, a length of 60 lines (leaving a bottom margin of 3), a left margin of 10 characters, and a width of 65 characters (leaving a right margin of 10 characters). Enter:

```
PRINT MARGINS: left: 10 top: 3 Print page length: 66
width: 65 print length: 60
```

PRINT OPTIONS

Sets four optional features before printing.

- Any area, or a union of areas, of a worksheet can be selected for printing by specifying a reference to that area.
- Whatever text you enter in the "setup" field (maximum of twenty characters) will be printed on the first line of the output, as a title for the worksheet.
- If you choose to print formulas, the listing will display the actual formulas that appear in each cell, rather than the calculated values of the formulas, as it normally would.
- If you want to see your worksheet rows and columns numbered, choose Yes.

Example:

- Suppose you want to print only column 1, containing titles; column 14, containing annual cross-totals; and an area called "factors," which holds discount percentages. Enter:

```
PRINT: OPTIONS: area C1,C14, factors setup:
Formulas: Yes (No) row-col numbers Yes (No)
```

QUIT

Ends the Multiplan session without saving the active sheet. Multiplan requests confirmation; if it is given, the Multiplan screen clears and the Multiplan menu screen appears. Press (CANCEL) to return to the global menu. The active sheet is lost unless it has been saved as a file; reply n if you have forgotten to save it.

SORT

You can sort any part of the worksheet a column at a time using this command. Rows of the worksheet will be exchanged until the values in the designated column are in the selected order. Both text and numeric values are allowed. Text values will be ordered before any numerical values. Empty cells are always sorted last. To create multilevel sorts, sort on the last column first, and proceed backward sorting on the other columns. Columns will be sorted between the rows you choose in either ascending or descending order.

Example:

- To sort column 7 in ascending order, enter:

Sort by column: 7 between rows: 1 and : 255 order ()

TRANSFER

TRANSFER offers a choice of six commands, which affect an entire sheet. To load a saved sheet, replacing the active sheet, choose LOAD. To save the active sheet in a disk file, choose SAVE. To clear the active sheet (deleting all its contents), choose CLEAR. To delete the disk copy of the active sheet, choose DELETE. To format your worksheet or change directories, choose OPTIONS. To give the active sheet a new name, choose RENAME.

TRANSFER LOAD

Loads a sheet from a disk file, or displays the worksheet directory. You must spell and punctuate the disk file's name exactly as it was when you saved the sheet with TRANSFER SAVE. When it is loaded it replaces the current sheet; the newly loaded sheet becomes the active sheet. If you have made a copy of the last sheet with TRANSFER SAVE, the copy is not affected.

Choose the command by entering t1 for TRANSFER LOAD and type in the name, or use the arrow keys to step through your file directory. If you want to display only a portion of your directory, for example only the files with the suffix .plan, use the asterisk (*) in the command. Enter:

TRANSFER LOAD filename: *.plan

Press the arrow key and the files with names ending with .plan will be displayed. Use this with prefixes also, such as DIV*. Press (EXECUTE) to load the file you have chosen, or CANCEL to abort the command.

TRANSFER SAVE

Saves the active sheet as a disk file, from which it can later be loaded with TRANSFER LOAD. The proposed name for the disk file is the name last given with TRANSFER RENAME, or the name last loaded with TRANSFER LOAD, or TEMP if the sheet is a clear one.

If the filename is a duplicate of one that that exists on the disk, the message

Overwrite existing file?

appears when (EXECUTE) is pressed, requesting permission to replace the file of the same name now on the disk. Respond with y (for Yes) to give permission, or with n (for No) or any other key to cancel the save and preserve the existing file.

Filenames may be up to 11 characters in length, excluding quotes or spaces. Multiplan will automatically suffix Multiplan filenames with .MP, although this will not be displayed. Files saved in the Symbolic format (using TRANSFER OPTIONS) are suffixed with .SL.

Examples:

- To save the active sheet under the proposed name, simply press (EXECUTE).
- To save it under the name practice, enter:

TRANSFER SAVE filename: practice

TRANSFER CLEAR

Clears the active worksheet from the screen. All cells are removed as with DELETE; all columns are set to 10 characters width, and the default format is set to format code General. All names, and all connections to other sheets made with XTERNAL OPEN, are forgotten. The sheet name is set to TEMP.

If a copy of the active sheet has previously been saved with TRANSFER SAVE, that copy is not affected.

TRANSFER DELETE

Removes a specified worksheet from the disk. The command asks you for confirmation. Once it is deleted it no longer supports any depending sheets.

Example:

- To delete a worksheet named cashflow enter:

```
TRANSFER DELETE filename: cashflow
```

TRANSFER OPTIONS

Allows you to choose one of three save formats. You can also change directories without exiting Multiplan. Use the space bar to choose one of the these formats:

Normal	This is the default format, which keeps Multiplan in its normal language or format. For normal operations it is not necessary to change this format.
Symbolic	Use this format along with TRANSFER SAVE to save your worksheet in the symbolic format.
Other	With this format you can use VisiCalc files in Multiplan.

Your other option, Setup: allows you to draw from another set of Multiplan files. Simply enter the full name of the directory in which those files are located. Then use the arrow keys to step through the new directory.

Example:

- If you have a directory of files saved in the symbolic format under the name Rogers, you may access them as follows.

```
TRANSFER OPTIONS Normal (Symbolic) Other
Setup: /usr/Rogers
```

TRANSFER RENAME

Gives the active sheet a new name. The present name is displayed as the proposed response; a clear sheet has the name TEMP. The renamed sheet is saved and external linkages are adjusted.

The new worksheet name has limited use except in the TRANSFER SAVE and TRANSFER DELETE options; then it appears as the proposed response for the filename to be saved or deleted.

The filename may be up to 11 characters long, and must be composed of letters and/or digits only.

Examples:

- To give the active sheet the name JUNE82, enter:

```
TRANSFER RENAME filename: JUNE82
```

VALUE

VALUE replaces the contents of the active cell with numbers or a formula. If the active cell already contains a number, that number is the proposed response of the command.

Example:

- To enter 10000 into the active cell, enter

```
VALUE: 10000
```

WINDOW

WINDOW divides the screen into up to eight sections, each displaying a given portion of the worksheet. This affords you a better view of a large worksheet.

If you choose to link the windows, the windows scroll together on the opposite axis from the one on which they are split.

The WINDOW command presents a choice of four options.

- To open a new window by splitting the active window horizontally or vertically, or to open a window used strictly for titles with SPLIT (or just press (TAB)).
- To add or remove a decorative border around a window, choose BORDER.
- To change the linkage of two windows, choose LINK.
- To close a window by removing it from screen, choose CLOSE.

WINDOW SPLIT

Presents a choice of three ways to open a window by splitting the active window.

- To split the active window between rows, choose HORIZONTAL.
- To split the active window between columns, choose VERTICAL.
- To split both vertically and horizontally and freeze titles on the screen, choose TITLES.

WINDOW SPLIT HORIZONTAL

Splits the active window horizontally. The display space used by the given row and the rows below it becomes the new window; the space above the given row remains part of the original window.

The new window is given the next unused window number, and is made the active window.

Examples:

- To split the active window at the active row, press (EXECUTE).

- To split it at the display line presently showing row 34, and to make the windows linked, enter:

```
WINDOW: SPLIT HORIZONTAL at row: 34  Linked?  
(Yes) No
```

WINDOW SPLIT VERTICAL

Splits the active window vertically. The display space used for the given column and the columns to its right is used for the new window; the space used for columns to the left of the active column remains part of the original window.

The new window is given the next unused window number, and becomes the active window.

Examples:

- To split the window at the active column, just press (EXECUTE).
- To split the window at the column presently displaying column 3, enter:

```
WINDOW SPLIT VERTICAL at column: 3  Linked?  Yes (No)
```

WINDOW SPLIT TITLES

Splits the active window to form two or four windows. The windows formed are linked, so that they will scroll together. The specified number of rows becomes a window at the top of the display space occupied by the original window. The remaining display space becomes the active window. It is linked for horizontal movement with the window above it, and for vertical movement with the window to its left.

Example:

Suppose that column 1 contains descriptive titles for the rows of the sheet, and columns 2-25 contain data matching those titles. You would like to scan across the data columns horizontally while holding the titles fixed on the screen. If you scroll vertically, both titles and data should move so that the titles will remain aligned with the matching data. Enter:

```
WINDOW SPLIT TITLES: # of rows: 0  
# of columns: 1
```

WINDOW BORDER

Draws a heavy line around a window. WINDOW BORDER changes the border of the specified window. If the window presently has a border, it is removed. If it lacks a border, one is added.

A border takes up one screen position on each side of the window, reducing the area for the display of data by two screen lines and two screen columns.

WINDOW LINK

Linkage between two windows causes them to scroll either horizontally or vertically together. When you split windows you can choose to link them or not. The WINDOW LINK command allows you to change that linkage later.

Two windows may be linked only if they were created sequentially.

Example:

- To link windows 2 and 3 enter:

```
WINDOW LINK window number: 2 with windows number:3
```

```
Linked: (Yes) No
```

WINDOW CLOSE

Closes a window (removes it from the screen). The window's shape, location on the screen, and view of the sheet are forgotten. The other windows stretch out to occupy the screen area used by the closed window. Windows are renumbered. If there is only one window open, the WINDOW CLOSE command is ignored.

XTERNAL

Presents a choice of three actions relating to the use of information from other sheets in the formulas of the active sheet.

- To connect a saved sheet (so that values from its cells can be used in formulas on the active sheet), choose COPY.
- LIST displays the relationships between the active sheet and other sheets; showing which sheets support (provide values for) the active one and which sheets depend on (use values from) the active sheet.
- To set a substitute name for a supporting sheet, choose USE.

XTERNAL COPY

Copies a named area from the selected worksheet into the current sheet. Only the upper left cell of an area being transferred needs to be specified. If the linked option is not selected, only strings and numbers are copied. 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.

Example:

- Suppose you are building a summary sheet that will draw information from another sheet. Specifically, the row to be named total will be needed on the other sheet. Total is crossed by three columns: days, dollars, and people. For the current sheet to use the three cells, total days, total dollars, and total people, all four names must be marked by this command:

```
XTERNAL COPY from sheet: APT.A
```

```
Name: total
```

```
to: r7c1
```

```
linked: (Yes) No
```

```
XTERNAL COPY from sheet: APT.A
```

```
Name: days
```

```
to: r7c2
```

```
linked: (Yes) No
```

```
XTERNAL COPY from sheet: APT.A
```

```
Name: dollars
```

```
to: r7c3
```

```
linked: (Yes) No
```

```
XTERNAL COPY from sheet: APT.A
```

```
Name: people
```

```
to: r7c4
```

```
linked: (Yes) No
```

XTERNAL LIST

Produces a display of the relationships between the active sheet and other sheets. The list of "sheets supporting" shows the names used in the present sheet that call for values from other, saved, sheets. Since the names used need not be the same as the filenames of the supporting sheets, both the names and the filenames are shown.

The list of "sheets depending on" shows the names of other, saved, sheets that call for a value or values from the active sheet.

The screen is cleared of the active worksheet and the list is displayed. Press any key to redraw the screen.

XTERNAL USE

Sets a substitute name for a supporting sheet. The first field should be the name of a worksheet on file. The second field can be an intermediate name. Wherever the intermediate name is encountered, the specified worksheet is used instead. This option is used to switch supporting sheets in a single step.

Example:

- Suppose the active sheet contains references to plan total people (meaning that the intersection of the total area and the people are on same saved sheet). Suppose further that there are two saved sheets, PLAN82 and PLAN83, with appropriate date. To view the figures resulting from the use of information from PLAN82, enter:

XTERNAL USE filename: plan filename: PLAN83

Functions

Functions are formulas built-in to Multiplan. They save you time as you build worksheets. Each function performs a specific operation and has certain requirements for input. Multiplan recognizes functions by the parentheses following a function name.

ABS(Numeric Value)

This function returns the absolute value of the input, or argument, the number placed in parentheses, the input. If the argument is zero or positive, the result is equal to the argument. If the argument is negative, the result has the same numbers and a positive sign.

Input Requirements:

Numeric value must be a single numeric value. It may be a number, a reference to a single cell, or a formula.

Example:

```
"Difference:" & DOLLAR (ABS (first-second)) LOG 10  
(ABS(anyvalue))
```

AND(List)

Returns TRUE if and only if all the values listed in the parentheses are true. Otherwise, FALSE is returned.

Input Requirements:

List may include relative or absolute references to cells or areas of cells. The logical operators are used. (Logical operators are listed in formulas.)

Example:

```
If (AND(r1c1 0, R2C1 0), 20, 0)
```

ATAN(Numeric Value)

Calculates the arctangent (inverse tangent) function of the argument, an angle in radians.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number or a formula.

Example:

ATAN(r3c7)

AVERAGE (Number or Reference)

Returns the average of all cells contained in the given arguments. You may specify up to five arguments, separated by commas.

Examples:

AVERAGE (balance, total, cost)

AVERAGE (scores R10)

COLUMN()

Returns the number of the current column. The parentheses are necessary so that Multiplan does not confuse the function with a name.

Example:

INDEX(list, 5, COLUMN ())

COS(Numeric Value)

Calculates the cosine of the argument, an angle in radians.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

COS(thetarow C)

COUNT(Number or Reference)

Returns the counts of the cells containing numbers or numeric formulas in the area defined by the reference given. Cells are not counted if they contain strings or are blank. You may specify up to five arguments, separated by commas.

Example:

FIXED(COUNT(deposits),0) & "deposits"

DELTA

DELTA returns the maximum change in the values of cells from one iteration to another. It is used with the OPTIONS ITERATION command in the completion test to set a limit on how many times Multiplan will recalculate formulas.

Input Requirements:

No input required. Parentheses tell Multiplan this is a function not a name.

Example:

DELTA () 2

DOLLAR (Numeric Value)

Produces a character string representing its argument as an amount in dollars.

The number is rounded to two decimal places. If it is less than two, a zero appears in the one position. A dollar sign is added to the left. If the number is less than zero, the result is enclosed in parentheses (the standard way of showing a negative balance in bookkeeping). Here are examples of these rules:

DOLLAR(2.715) produces "\$2.72"
DOLLAR(0.15) produces "\$0.15"
DOLLAR(0) produces "\$0.00"
DOLLAR(-1) produces "\$(\$1.00)"

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

"Total:" & DOLLAR (SUM(deposits))

EXP(Numeric Value)

Calculates $e(2.7182818)$ -- the base of the natural logarithms -- to the power of the argument. This is the inverse (antilog) function of LN.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Examples:

"'e' is" & FIXED(EXP(1),14)
"SINH =" & FIXED((EXP(theta)-EXP(theta))/2,8)

FALSE()

Represents the logical value FALSE. Its numeric value is 0. The parentheses keep Multiplan from mistaking FALSE for a name.

Examples:

The cell R -1 C will contain either TRUE or FALSE.

IF (r -1 c = 0, 15, 78)

FIXED(Numeric Value, Digits)

Produces a character string representing its first argument as a fixed-decimal number with the given number of decimal digits. If the number is negative, the first character of the string is a minus sign.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Digits must be an integer between -30 and 30. The reference may be to a single cell, a number, or a formula. If the number is negative, round that number of places to the left of the decimal (For example, FIXED (1234, -2) is 1200).

Example:

```
FIXED((first/second)(100,2)&"percent")
```

IF(Logical Value, Number or Text, Number or Text)

Examines the first argument. If it is TRUE, the second argument is returned. If it's FALSE, the third argument is returned.

Input Requirements:

The first argument must return a logical value. The second and third arguments may refer to a cell and may contain a string or a number, another logical value, or a formula.

Example:

```
IF(r2c4,rlc1,rlc2)
```

INDEX(Area, Row, Column) or (Area, Row or Column)

Returns the value located in the specified area at the intersection of the specified row and column. INDEX can retrieve a value from a table or a vector (a list).

Input Requirements:

The first argument must return an existing area, a table or a list. The second arguments must be specific row and column references, absolute or relative.

Examples:

INDEX (r7:30c2:4,9,3)

INDEX (r9C1:6,5)

INT(Numeric Value)

Truncates the argument to the right of the decimal. The result is always an integer. Thus INT(6) is 6, INT(6.4) is 6, and INT(6.999) is also 6.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

"fraction=" & FIXED(number-INT(number),4)

ISERROR(n)

Returns TRUE if n is an error value, such as #DIV/0. ISERROR can detect errors and return a more appropriate message.

Input Requirements:

n may be a cell reference or a formula.

Example:

If (ISERROR (total/AVERAGE(COST)), "unavailable",
total/(AVERAGE(COST))).

ISNA(n)

Returns TRUE if n is an NA (not available) value. It is useful for avoiding error messages in cells where information may not be available.

Input Requirements:

n is a reference to a cell containing either NA() or a value.

Example:

If (ISNA(total), "unavailable", sum(costs)).

ITERCNT()

Returns #N/A during normal recalculation and the iteration count (starting with 1) during iteration. For use with the OPTIONS ITERATION command.

Input Requirements:

Takes no input. Parentheses tell Multiplan this is a function, not a name.

Example:

IF(ITERCNT() 9,"yes","no")

LEN(String)

Returns the length of a string in characters. This function is useful in combination with the MID function to return a portion of text.

Input Requirements:

String must be contained in quotes, though it may be numbers.

Example:

MID(r10c1,LEN(r10c1)-7,8)

LN(Numeric Value)

Calculates the natural logarithm (log to the base e) of the argument.

Input Requirements:

Numeric value must be a single, positive numeric value. It may be a reference to a single cell, a number, or a formula. A #NUM error occurs if the value is less than or equal to zero.

Example:

```
"log2=" & FIXED(LN(value)/LN(2),8)
```

LOG 10(Numeric Value)

Calculates the logarithm to the base 10 of the argument. You can calculate the inverse function (antilog) by the constant 10 to the power of a log, using the exponentiation function ().

Input Requirements:

Numeric value must be a single, positive numeric value. It may be a reference to a single cell, a number, or a formula. A #NUM error will occur if the number is negative or zero.

Example:

```
REPT("+",INT(LOG 10(ABS(value))))
```

LOOKUP(Argument, Table)

Searches for the argument in the first row or column of the area referenced as table. Returns the contents of a corresponding cell in the second row or column of table.

The search proceeds along a column or row until a cell is found that is numerically equal to or greater than the argument. The cell next to that cell is returned as the result of the function. If all cells are less than the argument, the last one is taken as the result.

This function works only with numeric values. An argument that is a character string will cause a #VALUE error, and a result that is a character string will be returned as zero.

Input Requirements:

Argument must be a single numeric value. It may be a reference to a single cell, a number, or a formula. Table should be a reference to a rectangular area with the width being either two rows or two columns. Areas of other shapes are permissible but the function is harder to interpret.

Example:

You have created a two-column table named Brackets in which the first column contains the largest annual salary in a given tax bracket, and the second column contains the tax rate percentage for that bracket. A cell named Salary contains a salary. Then a cell named tax could contain this formula:

Salary* LOOKUP (Salary, Brackets)

MAX(Number or Reference)

Returns the largest numeric value in the area given by the argument. You may specify up to five arguments (separated by commas).

Example:

"Best of" & FIXED(COUNT(scores),0) & "is" & FIXED
(MAX(scores),2)

MID(String, Start, Count)

Returns some of the center characters of the first argument. The first character to be taken is set by the second argument. The number of characters is set by the third argument.

If start is equal to one, the function begins with the left character. If it is between one and the length of string, the result will begin with the character indexed by start.

If count is zero, or if start is greater than the length of string, no characters are produced; the result is still a string but has zero length. Otherwise, the result has as many characters from string as possible, from one up to count.

If count is negative, a #VALUE error results.

Input Requirements:

String must be a single string. It may be a reference to a single cell, a string constant, or a formula that produces a string.

Start and count must be single numeric values. They may be references to single cells, numbers, or formulas. If either has a fractional part it is truncated to an integer before use.

Example:

MID("HmmOKWOW", 4+3*SIGN(INT(grade/10)-8,3)

MIN(Number or Reference)

Produces the least numeric value in the area given by the argument. The least value is also the smallest value when all values are positive. If there are negative values, then the least value is the most negative one. You may specify up to five arguments separated by commas.

Example:

"Best of" & FIXED(COUNT(times),0) & "is" & FIXED (MIN(times),0)

MOD(Numeric value, numeric value)

Returns the remainder of the division of the first argument by the second argument.

Input Requirements:

Both numeric values must be single numeric values although they may be cell references.

Examples:

mod (r11c2,49c4)

round (mod(r11,c2,r9c4),1)

NA()

Returns the #N/A (not available) value. This special value can be used to avoid other error messages. For example, you can use NA() when zero will possibly be the divisor, thus avoiding a #DIV/0 error message. The parentheses keep Multiplan from mistaking NA for a name.

Example:

```
IF(total = 0, NA( ), R9C2/SUM(r2:6c1))
```

NOT(Logical value)

Not returns the opposite logical value of its argument.

Input Requirements:

The first argument must return a logical value.

Example:

```
NOT(r +1 c)
```

NPV(Rate, Annual Flow)

Returns the present value of a series of annual future receipts, given a discount rate.

Net Present Value is the amount of money that, if you had it now, would make it possible to produce a specified amount in the future, given some interest rate.

Input Requirements:

Rate is an interest rate, expressed as a decimal fraction, less than 1 (0.11 is a rate of 11 percent). It must be a single numeric value -- a reference to a single cell, a formula, or a numeric constant.

Annual flow may be one or more numeric values. It may be a reference 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.

Example:

You require \$1000 next year and \$1500 at the end of the following year. You are offered an interest rate of 12 percent annually. How much do you invest? Enter:

NPV(0.12,0,1000,1500)

OR(List)

Returns TRUE if and only if any of its argument values is TRUE. Otherwise, FALSE is returned.

Input Requirements:

List may include relative or absolute references to cells or areas of cells. The comparison operators are used. (These are listed in Formulas.)

Example:

OR(R1C1 2, R2C1 2)

PI()

Returns the value of pi to 13 decimal places. The parentheses keep Multiplan from mistaking PI for a name.

Example:

PI() * radius^2

REPT(String, Count)

Produces a string consisting of count repetitions of string. If count is zero, no characters are produced; the result is still a string but has zero length. Otherwise, the length of the result will be the length of string multiplied by count. Negative count produces #VALUE.

Input Requirements:

String must be a single string. It may be a reference to a single cell, a constant string, or a formula with a string result. String is usually a single character, but it may have any number of characters.

Count must be a single numeric value. It may be a reference to a single cell, a number, or a formula. If it has a fractional part it is truncated to an integer before use.

Example:

```
REPT("+",INT(LOG10(ABS(value))))
```

ROUND(Numeric Value, Digit)

Produces the first argument, rounded to the number of decimal places specified by the second argument.

The second argument, digit, specifies the rounding as follows. If it is greater than zero, then the result will be rounded so that it has that many decimal places. For example, ROUND (3.1416,3) produces 3.142.

If digit is zero, the result is rounded to an integer. If digit is negative, rounding is carried into the integral part of the number. For example, ROUND (26,-1) produces 30 while ROUND (999,-2) produces 1000.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Digit must be a single numeric value. It may be a reference to a single cell, a number, or a formula. If it has a fractional part, it is truncated to an integer before use.

Example:

```
"Change is" & FIXED(ROUND(100*(new-old)/old,2),2)&"%"
```

ROW()

Returns the number of the current row. The parentheses are necessary to keep Multiplan from confusing the function with a name.

Example:

LOOKUP(ROW(),list)

SIGN(Numeric Value)

Returns a number representing the sign of the argument. If numeric value is positive, the function produces one. If it is zero, the function produces 0. If it is negative, the function produces -1.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

You want to display both the logarithm of a number and its sign:

MID('-+',SIGN(num)+2,1)&FIXED(ABS(LOG10(num)),6)

SIN(Numeric Value)

Calculates the sine of the argument, an angle in radians.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

SIN(thetarow C)

SQRT (Numeric Value)

Returns the positive square root of the argument.

Input Requirements:

The arguments must be nonnegative or a numeric overflow warning (#NUM!) results.

Example:

SQRT(ABS(X))

STDEV (list)

Gives a sample standard deviation of the values in the list. This function, used primarily in statistical analysis, shows how much each number in the input list varies from the average of that list.

Input Requirements:

Each element of the list must be a single numeric value. You may use cell references.

Example:

STDEV(R1:7C1)

SUM(Number or Reference)

Returns the sum of the values of the cells in the area defined by the reference. You may specify up to five arguments, separated by commas.

Input Requirements:

If the referenced area includes blank cells or strings, they are ignored.

Example:

(1+rate)*SUM(deposits January)

TAN(Numeric Value)

Calculates the tangent of the argument, an angle in radians. The result of the function changes rapidly when the angle is near $\pi/2$ or an odd multiple of $\pi/2$. You should not rely on the precision of the result in such cases.

Input Requirements:

Numeric value must be a single numeric value. It may be a reference to a single cell, a number, or a formula.

Example:

TAN(thetarow C)

TRUE()

Represents the logical value TRUE. Its numeric value is 1. The parentheses keep Multiplan from mistaking TRUE for a name.

Example:

IF (r1c1 5,TRUE(),0)

VALUE(String)

Returns the number described by the argument. The argument must be in the form of a number. It may contain leading or trailing spaces, a leading dollar sign, a leading minus sign, or be enclosed in parentheses. It may contain a decimal point. It may be in scientific notation.

For example, the following character strings will all yield the numeric value 10: 10, \$10.00, 1E1. The following strings will yield negative 10: -10, -1E1, (10), (\$10.0000).

Input Requirements:

String must be a single string. It may be a reference to a single cell or a formula with a string result. If the contents of the string don't describe a number -- if they include letters, for instance, or two decimal points -- a #VALUE error will occur.

Example:

Suppose that the cell date contains the string 6/14/83. Then

VALUE(MID(date,4,2))

produces the number 14.

Screen Messages

From time to time, you may see a Multiplan message on the screen as you work. Some messages indicate that an error has occurred, while others ask you for more information, or tell you what to do next. All of the messages in Multiplan are listed here in alphabetical order.

To use the message tables, first locate the message you need in the listing. Then, look below it to verify the situation you were in when the message appeared. Look to the center, next to the situation, under the "Problem" column to see what the actual problem is. The right-hand column contains information on what you should do.

!	Situation	!	Problem	!	Solution	!
---	-----------	---	---------	---	----------	---

Cannot copy into nonblank cell

Using XTERNAL COPY command.	You cannot copy information from one sheet into an already occupied cell on another sheet.	Copy information into an unoccupied cell.
--------------------------------	--	---

Cannot link those windows

Using WINDOW LINK command.	Two windows may not be linked if they were not created sequentially.	Recreate the window to permit the linkage as you need it.
-------------------------------	--	---

Situation	Problem	Solution
-----------	---------	----------

Cannot open file

Using XTERNAL
COPY command.

The file for a supporting sheet cannot be found when Multiplan attempts to make a linkage permanent or to remove it. This is unlikely to occur unless you have switched flexible disk or have a hardware problem.

Make sure that the disk file really exists. For flexible disk drives, make sure the right disk is mounted. For a multi-user system, check if you have both read and write access to the file.

Cannot read file

Loading a file

The file named in a TRANSFER LOAD cannot be found or is not accessible, or the format cannot be read by Multiplan.

Make sure that the disk file really exists. For flexible disk drives, make sure the correct disk is mounted. For a multiuser system, check if you have both read and write access to the file.

Cannot write file

Saving a file with TRANSFER SAVE or PRINT FILE.

The disk is full.

A file of the same name exists and has been write-protected.

The entire hard disk or flexible disk is write-protected.

Look for operating system error messages on the screen. Try the SAVE again with a filename you know to be unique. Try a different disk.

Situation	Problem	Solution
-----------	---------	----------

Circular references unresolved

Entering a formula.	A chain of cells refers to each other and the last refers back to the first. Multiplan has calculated all the cells of the chain once and found itself starting over. It stops calculating, leaving the cells in the circular chain undefined.	Alter the logic of the sheet so there are no circular references, or turn on the iteration (circular reference) option of the OPTIONS command.
---------------------	--	--

Command is too long

Entering data.	The command, formula, or string on the command line is too long to be displayed there.	Shorten the command, formula, or string.
----------------	--	--

Confirm change

Changing a name definition.	You have asked Multiplan to change a name definition on a name whose value is used on another worksheet.	Change the definition on both the active sheet and the supporting or depending sheet.
-----------------------------	--	---

#DIV/0

Entering a formula or a number in a cell used by a formula.	Dividing by zero is an impossible operation.	Use NA() in some cells to avoid this message.
---	--	--

Situation	Problem	Solution
-----------	---------	----------

Enter a filename

Using XTERNAL, TRANSFER, or PRINT.	The active field of the command takes the name of a file to be written.	Enter a filename, or press <u>CANCEL</u> to cancel the command.
------------------------------------	---	---

Enter a filename, or use direction keys to step through directory

Using XTERNAL, TRANSFER, or PRINT.	The active field of the command takes a filename existing on the disk.	Enter the name of the file desired, or to examine the names of all saved sheets, use the arrow keys to step through the list. Press <u>CANCEL</u> to cancel the command.
------------------------------------	--	--

Enter a formula

You have typed =, v, +, (, or E DIT.	Multiplan awaits a formula.	Enter a formula, number, or a string (enclosed in quotes), and press <u>EXECUTE</u> , or press <u>CANCEL</u> to cancel the command.
	Multiplan awaits a correction of text.	

Situation	Problem	Solution
-----------	---------	----------

Enter a number

Using a command that requires numeric input.	The active field of the command takes a single number, a row or column number, or a quantity, such as margin spacing.	Enter a number (a small integer; don't use a decimal point or scientific notation), or press <u>(CANCEL)</u> to cancel the command. Enter a formula, although it must result in a small integer.
--	---	--

Enter a number, or D for DEFAULT

Using <u>FORMAT WIDTH</u>	The width of a column can be set to a specific width in characters, or to the width set by the <u>FORMAT DEFAULT</u> command.	Enter a number from 3 to 32, or the letter D, or press <u>(CANCEL)</u> to cancel the command.
---------------------------	---	---

Enter reference to cell or group of cells

Using <u>NAME</u> command.	The active field of the command requires a name. Names may contain special characters. Quotes aren't needed here because only a name is expected in this field. The system may have proposed a response.	To accept the proposed response, press <u>(TAB)</u> or <u>(RETURN)</u> to move to the next field or press <u>(EXECUTE)</u> . You may edit the response, enter a different name, or press <u>(CANCEL)</u> to cancel the command.
----------------------------	--	---

Situation	Problem	Solution
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Enter text

Using ALPHA command.	The active field takes a response of any characters.	Enter the text you want, or press <u>(TAB)</u> or return to move to another field, or press <u>(CANCEL)</u> to cancel the command.
----------------------	--	--

Enter text (no double quotes)

Using EDIT command.	The active field of the command takes a string of characters. Quotes aren't needed because only a string is expected in this field. The system may have proposed a response.	To accept the proposed response, move to the next field with <u>(TAB)</u> or <u>(RETURN)</u> to the next field, or press <u>(EXECUTE)</u> . You may edit the response, type a different one, or press <u>(CANCEL)</u> to cancel the command.
---------------------	--	--

Enter Y to confirm

Using TRANSFER DELETE, TRANSFER CLEAR, and QUIT commands.	You have asked for a major change in the active sheet. Consider carefully whether this action is correct.	If it is safe for the command to proceed, type a Y. Press any other character and Multiplan will do nothing.
---	---	--

! Situation !	! Problem !	! Solution !
---------------	-------------	--------------

Enter Y to retry access to (Filename)

Loading a file.	The file named cannot be found or is not accessible to Multiplan.	Enter N if the file is not appropriate. Make sure that the disk file really exists. For flexible disk drives, make sure the correct disk is mounted. For a multiuser system, check if you have both read and write access to the file.
-----------------	---	--

Error in formula

Entering a formula.	Several possible mistakes has been made in the formula you are entering. The highlighted area begins at the point an error was noted.	Check all punctuation, especially parentheses, quotes, and brackets. Check the spelling of function names. Check for a mismatch of data types, as in concatenating a string to a number.
---------------------	---	--

Field has too many words

Editing text or numbers.	The formula or string being edited has more numbers or words than can handled for when tabbing from word to word with the field edit keys.	None needed; the formula or string is valid and may be used. However, the field edit keys can't be used while editing it.
--------------------------	--	---

!	Situation	!	Problem	!	Solution	!
---	-----------	---	---------	---	----------	---

File is not a saved worksheet

Loading a worksheet.	The file you are trying to load or link to was not created with the TRANSFER SAVE command.	Check the spelling of the filename. Make sure the right flexible disk is mounted.
----------------------	--	---

Help file not available

Requesting HELP.	The disk file containing the online reference information can't be found.	For flexible disk drives, make sure the disk with the help file is mounted. You may need to reinstall Multiplan.
------------------	---	--

Illegal option

Typing a letter to request a command or option.	A menu is displayed and a character is typed that does not appear as a starting letter of any of the menu options.	Check the menu to select an option, and type the first letter of the menu item, or press <u>CANCEL</u> to cancel the command.
---	--	---

Situation	Problem	Solution
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Illegal parameter

Entering a reference.	One field of the command last entered had a numeric response that made no sense. For instance, if the "number of cells" field of COPY DOWN was given the response 299, this message would appear when (RETURN) was pressed. There are only 255 rows, so 299 copies could never be made.	The command had no effect, so reenter it correctly. Pay attention to numeric responses.
-----------------------	---	---

Illegal width of column

Setting a column width.	The column width you requested was impossible.	Reenter the command. Make sure to specify the width as a number between 3 and 32.
-------------------------	--	---

Insufficient memory

Saving a worksheet or entering new data.	Multiplan has run out of storage space; there is no space left for new cell contents.	Save the sheet at once. You may have to break the application into additional sheets to fit in all the information.
--	---	---

Locked cell may not be changed

Trying to change an entry or a formula in a locked cell.	No change is permitted in a locked cell.	Use the LOCK command to unlock the cell.
--	--	--

Situation	Problem	Solution
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#N/A

Entering a formula or recalculating.	The information you have requested is unavailable.	Sometimes used to replace other error messages. Check your references.
--------------------------------------	--	--

#NAME

Entering a formula containing a name.	Formula contains an undefined name.	Check the list of names to make sure you have defined locations correctly.
---------------------------------------	-------------------------------------	--

Name not defined

Referring to a name.	The active command field requires a name that has been defined previously with the NAME command. The name you've entered has not been defined.	Check the spelling of the name. You may abort the command, then use the NAME command to review the names that exist.
----------------------	--	--

Name too long

Entering a name.	Names may not exceed 31 characters. The name you have entered exceeds this length.	Use a shorter name.
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#NULL

Entering a reference.	Empty intersection, for example, R1 and R2.	Check your references.
-----------------------	---	------------------------

!	Situation	!	Problem	!	Solution	!
---	-----------	---	---------	---	----------	---

Overwrite existing file?

Using TRANSFER SAVE or PRINT FILE command.	The disk file to be created (either a saved worksheet or a file of printer lines from the PRINT FILE command) has the same name as an existing file. If Multiplan continues, it will replace the existing file with the new one.	To confirm the existing file is is not needed, reply Y to overwrite it with the new file. Reply N and reenter the command to give a different, unique, filename.
--	---	---

Press any key to redraw screen

Using XTERNAL LIST or HELP.	The XTERNAL LIST command or the HELP command has put an information display in place of the usual windows on the sheet.	Press any key to return to the normal display.
--------------------------------	--	--

#REF

Referencing a cell in a formula.	Improper relative reference; the reference does not make sense to Multiplan.	Check your references.
--	--	---------------------------

Situation	Problem	Solution
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Select command option or type command letter

You've just entered Multiplan or completed a command.	The application is awaiting your choice from a list of alternatives.	Select one of the items shown by moving the edit cursor to it with the space bar and <u>(BACK SPACE)</u> (as necessary), then pressing <u>(TAB)</u> or <u>(RETURN)</u> . Or just type the initial letter of the item you want.
---	--	--

Select option

You've selected a command that has options.	Multiplan is waiting for your choice among a short list of options.	Selection in this case is similar to command selection. Move the edit cursor to the desired option using <u>(SPACE BAR)</u> and <u>(BACK SPACE)</u> , then press <u>(TAB)</u> or <u>(RETURN)</u> . Or type the initial letter of the option.
---	---	--

Sheet linkage error

Using XTERNAL command.	A linkage cannot be removed. An infrequent situation as long as you use Multiplan for all sheet deletion and renaming.	It is likely that linkages may not have been correctly made. Remake linkages.
------------------------	--	---

Situation	Problem	Solution
-----------	---------	----------

Symbolic save file has incorrect format

Trying to load a symbolic file.	There is an error in your symbolic file making it unavailable to Multiplan.	Resave the symbolic file in the version of Multiplan you are using.
---------------------------------	---	---

System file error

Working in Multiplan.	While attempting to read or write a file, Multiplan was told by the operating system of a serious error. Perhaps there is a hardware error with the disk device, or the disk (or your portion of it) is full.	Look for error messages from the operating system on the screen. For flexible disk drives, make sure you have the correct disk mounted. To save a sheet, try again under a different name or on a different flexible disk.
-----------------------	---	--

Too many depending sheets

Using XTERNAL COPY command.	A sheet may supply data to at most eight other sheets at once. The XTERNAL COPY command has been asked to connect to a ninth. It is possible that more than four levels of hierarchy have been created (that is, A supports B, which supports C, which supports D, which supports E).	Redesign the logic of the sheets to require that no sheet supply data to more than eight supporting sheets.
-----------------------------	---	---

Situation	Problem	Solution
-----------	---------	----------

Too many windows

Using WINDOW command to create new window.	There is a limit of eight windows, and the WINDOW SPLIT has been used in an attempt to open a ninth.	Review the existing windows; use WINDOW CLOSE to delete some of them.
--	--	---

#VALUE

Making a reference in a formula.	String used as a value or vice versa. When performed, the formula results in an error.	Check your references.
----------------------------------	--	------------------------

Window will not fit

Adding a new window.	The window you are trying to border or split is too small.	Close an adjacent window to get more room on the screen, or rethink your screen layout.
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Appendix Multiplan[™] and VisiCalc[™]

If you have previously used VisiCalc, another financial modeling tool, you are probably curious about the differences between Multiplan and VisiCalc.

In this appendix, you'll find a summary of the primary differences between Fortune System's Multiplan and VisiCalc, including Multiplan counterparts to VisiCalc functions and commands. Next, you can read a summary of how to use Multiplan. Finally, several of these topics are presented in more detail for the interested reader.

Multiplan meets many of the needs that are not satisfied by other spreadsheet products, and significantly expands the scope of applications that can be handled by a business microcomputer. Following are the features Multiplan has added.

- Automatically links models using the XTERNAL function.
- Sorts any set of rows based on any column.
- Writes formulas in Englishlike format by using the NAME command to define any cell or group of cells.
- Locks portions of the worksheet to protect it from accidental changes.
- Creates applications that give results in words, not just numbers.
- Creates data-driven applications using the INDEX command.
- Formats information exactly to report requirements via flexible display format options and text string handling ability.
- Multiple windows display various portions of the worksheet at the same time. Borders distinguish the window areas.

THE MULTIPLAN SCREEN

Multiplan divides the screen into a display area, command lines, a message line, and a status line. Parts of the worksheet are shown in the display area. Unlike VisiCalc, which allows you to create just two windows, Multiplan allows you to create as many as eight different windows within the display area. You have control over the size and placement of each window. You can also have windows with or without borders, and you can freeze title columns and rows. All of these functions are controlled by the WINDOW command.

A point of nomenclature: in this manual, one position on the worksheet is called a cell. The active cell is the highlighted one into which you can make entries. The highlight itself is called the cell pointer, rather than the cursor. Multiplan indicates where you're about to type on the command lines with a solid highlight called the edit cursor rather than the "blinking block," a VisiCalc name.

The message line contains Multiplan's comments on the progress of any command. You're never in doubt about what it expects you to type next. The status line at the bottom of the screen always displays the coordinates of the active cell, its actual contents, and the amount of storage that remains on the sheet. The command lines are used for the entry of commands.

MOVING THE CELL POINTER

Eleven keys move the cell pointer within the active window: the four arrow keys, the page keys, (CHANGE WINDOW), (END), and (HOME). The Home key sends the cell pointer to the upper left cell of the window. The End key moves the cell pointer to the last active cell on the worksheet located at the intersection of the highest-numbered row and column. The direction keys move it one cell in each direction. You may also move the cell pointer to a specific cell with the GOTO command, which lets you move to a particular row and column or to a particular cell by name. The semicolon key and (CHANGE WINDOW) move the cell pointer to the next window in sequence.

CORRECTING ERRORS, ABORTING COMMANDS

Multiplan provides a separate key -- the Cancel key -- whose only function is to cancel any command you have begun. The Backspace key erases the last character typed.

ENTERING TITLES AND STRINGS

A cell may contain a title, a string of characters labeling a row or column on the worksheet. To enter a title, choose the ALPHA command, type the title, and press (EXECUTE) or any direction key. In VisiCalc, you press " to enter a text string.

Multiplan also allows a string of characters to be used in a formula. You can build a title from a formula, using the & symbol to catenate strings to the formatted results of calculations. Enter the formula in double quotes.

ENTERING NUMBERS

A cell may contain a number. To enter one, just start typing it. Put the finished number in the active cell by pressing (EXECUTE) or any direction key. Numbers may be in decimal form or in scientific notation.

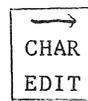
ENTERING FORMULAS

A formula is composed of strings, numbers, cell references, functions, symbols (+, -, *, /, ^), and function names (SUM, MIN, etcetera). Unlike VisiCalc, but like most computer programming languages, Multiplan evaluates formulas according to the priority of operations: functions and exponentiation sign () first, then multiplication (*), and division (/), and finally addition (+) and subtraction (-). Operations of the same priority are performed left to right. You should use parentheses to make the order of calculation explicit.

To enter a formula, type +, =, the letter v, or (. You can reference another cell by pointing to that cell with the direction keys. All the editing keys are available to you while entering a formula. The field edit left, field edit right, char edit left, and char edit right keys are especially useful. Their functions are



next field



next character



prior field



prior character

REFERENCES

Numbers for both rows and columns are used to refer to cells. VisiCalc uses letters to designate columns. Numbers may seem a little foreign at first, but become more natural once you get used to them. For example, it is easier to recall a number, such as column 63 than to remember a combination of letters, such as column BK.

In a formula you can refer to the value of a cell or cells in any of several ways. You can give an absolute reference to a row and column (R3C5) or to a range along a row or column (R3:6C9, R5, C1:8). You can give a reference relative to the cell holding the formula R -1 C for "one row up, this column." Most important, you can give a name to any cell or group of cells. For instance, the name salesline might refer to R9C2:9 (row 9, columns 2 through 9). Then the formula SUM(salesline) produces the sum of all numbers in those cells.

All three types of references can be combined by intersection or union to make other references.

FUNCTIONS

Multiplan supports most of the named functions familiar to you from VisiCalc, as well as others. Table 1 shows a comparison of the VisiCalc functions to their Multiplan counterparts. Multiplan function names do not begin with @.

Table 1
Multiplan Functions and Their VisiCalc Counterparts

Multiplan	VisiCalc
SUM(list)	@SUM(list)
MIN(list)	@MIN(list)
MAX(list)	@MAX(list)
COUNT(list)	@COUNT(list)
AVERAGE(list)	@AVERAGE(list)
NPV(dr,area)	@NPV(dr,range)
LOOKUP(v,area)	@LOOKUP(v,range)
INDEX(vector,n)	@CHOOSE
NA	@NA
no counterpart	@ERROR
PI()	@PI(v)
ABS(v)	@ABS(v)
INT(v)	@INT(v)
EXP(v)	@EXP(v)

LN(v)	@LN(v)
LOG10(v)	@LOG(v)
SQRT(v)	@SQRT(v)
SIN(v)	@SIN(v)
COS(v)	@COS(v)
TAN(v)	@TAN(v)
ATAN(v)	@ATAN(v)
no counterpart; use ATAN (v/(1-v) 0.5)	@ASIN(v)
no counterpart; use ATAN (1-v) 0.5/v	@ACOS(v)
IF(f,a,b)	@IF(log,value,v1,v2)
ISNA(v)	@ISNA(v)
ISERROR(v)	@ISERROR(v)
TRUE()	@TRUE
FALSE()	@FALSE
NOT(f)	@NOT(log.value)
AND(list)	@AND(list)
OR(list)	@OR(list)
LOGICAL OPERATORS (, , =, =, = ,)	LOGICAL OPERATORS (, , =, =, = ,)

Multiplan provides several functions that do not exist in VisiCalc. These are listed in Table 2. Most of them relate to the use of strings and the construction of titles with formulas.

Table 2
Multiplan's Additional Functions

ROUND(n,v)	Value of <u>y</u> rounded to <u>n</u> decimal places.
FIXED(n,v)	Character string form of <u>y</u> formatted with <u>n</u> decimal places.
DOLLAR(v)	Character string form of <u>v</u> formatted as a dollar amount; negative <u>v</u> shown in parentheses.
VALUE(s)	Numeric value of string <u>s</u> ; <u>s</u> may represent a number in any format including dollar amounts.
REPT(n,s)	Character string made of <u>n</u> repetitions of string <u>s</u> .
MID(s,m,n)	The <u>n</u> characters of string value <u>s</u> starting at <u>m</u> .
STDEV(list)	Sample standard deviations of the values. Gives unbiased estimate.

ROW()	Current row number.
COLUMN()	Current column number.
LEN(n)	The length of the text in characters.
MOD(n, m)	The remainder of the integer division n/m.
SIGN(n)	Returns -1 if n < 0, 0 if n = 0, 1 if n > 0.

COMMANDS

You choose a Multiplan command by typing a single letter. As soon as you have chosen a command, Multiplan displays the complete command on the command line. Some commands have several parts; those commands have multiword names. Table 3 shows the Multiplan commands and their VisiCalc counterparts. Remember that you type only the first letter of the command when choosing it.

Table 3
Multiplan Commands and Their VisiCalc Counterparts

Multiplan	VisiCalc
BLANK	/B
TRANSFER CLEAR	/C
DELETE COLUMNS, DELETE ROWS	/D
FORMAT CELLS	/F
FORMAT CELLS	/FD
FORMAT WIDTH	/GC
FORMAT DEFAULT	/GF
No counterpart; see text	/GO
OPTION	/GR
INSERT COLUMNS, INSERT ROWS	/I
MOVE COLUMNS, MOVE ROWS	/M
PPRINT /P	
COPY FROM, COPY DOWN, COPY RIGHT	/R
TRANSFER (see Table 4)	/S
WINDOW SPLIT TITLES	/T
No counterpart	/V
WINDOW SPLIT, etcetera	/W
REPT function	/-

QUIT	ISQ
SORT	no counterpart
LOCK	no counterpart
XTERNAL COPY	no counterpart
XTERNAL LIST	no counterpart
XTERNAL USE	no counterpart
EDIT	no counterpart
FORMAT OPTIONS	no counterpart
HELP	no counterpart

Note: You type only the initial letter of each Multiplan command and its options.

The BLANK command not only empties a cell, it releases the occupied storage space. A blanked cell reverts to the current default format.

It's worth noting that Multiplan's INSERT, DELETE, and MOVE commands can operate on more than one row or column at a time; you can move several rows. INSERT and DELETE allow you to handle any rectangular area; you aren't restricted to handling entire rows or columns. Multiplan adjusts all references (absolute or relative) and name definitions to account for the changes. You can add space for a title after completing the sheet without disturbing the integrity of the sheet.

The Multiplan FORMAT command can set the format of one cell, of an area of cells, or of a list of areas of cells. The /GO or order of calculation command isn't needed in Multiplan because Multiplan continues to recalculate cells until all have reached the correct values, or until Multiplan finds an endless chain of references. You don't have to be concerned with the order of calculation in Multiplan either. The automatic recalculation can be turned off at any time by using OPTIONS recalc.

PRINTING

Multiplan has a full set of printing operations, issued with the PRINT command. You can print the whole worksheet or any rectangular area of the worksheet. An area can be specified by name or specific references. Multiplan can send the printed representation of the worksheet to a file on disk. You can then use that file with operating system commands and other programs. For example, you could incorporate a worksheet listing within another document.

COPYING CELLS

Multiplan's COPY command performs the operations that, in VisiCalc, are done with /R. COPY DOWN and COPY RIGHT provide especially easy ways to duplicate one cell down a column or across a row. The general COPY FROM operation will duplicate a single cell into an area of any shape, or duplicate an area of any shape into another area of the same shape. Multiplan adjusts references automatically. If you build your formulas with relative references and name references, they are position-independent.

WORKSHEET TRANSFERS

The TRANSFER command handles operations on the whole worksheet. Table 4 compares the parts of TRANSFER to the variations of the /S command. There are several differences. The /SW (write to cassette) command is omitted because cassette operations are not supported in the Fortune system. /SI (initialize diskette) is omitted because Multiplan uses the Fortune operating system for file operations and so relies on it to handle disk formats. The /SL (load and merge entries) operation is replaced by tl (TRANSFER LOAD).

Table 4

VisiCalc Commands for Saving and Loading Sheets from Disk and Their Multiplan Counterparts

Multiplan	VisiCalc
TRANSFER SAVE	/SS
No counterpart; see text	/SW
No counterpart; see text	/SL
TRANSFER LOAD	/SR
TRANSFER DELETE	/SD
No counterpart; see text	/SI

MULTIPLAN NAMES

With Multiplan, you name cells. Using the NAME command, you define a name as referring to a single cell, to an area of cells of any shape, or even to a list of unconnected areas of cells. Once you've done so, you can use that name as an input to a function or, in many cases, as a response to a command. A name can be a single word or a

series of letters connected with underscores or periods. In fact, a name can be any continuous sequence of characters at all.

This naming ability can make a big difference in the clarity of your sheets. Consider this formula:

$$R1C2 * (R2C2 * (1 - R3C2))$$

That's the Multiplan equivalent of $B1*(B2*(1-B3))$. But what an improvement if you write it this way:

$$\text{Quantity} * (\text{Price} * (1 - 1\% \text{ discount}))$$

As we noted earlier, you can place a constant factor anywhere on the sheet, name the cell it's in, and use the name in formulas thereafter. You can name an area and use that name as an argument to SUM, MIN, MAX, COUNT, or AVERAGE.

You can accumulate a number of names on a complicated sheet, using the NAME command, then step through all your name definitions, using the cursor keys to move back and forth in the list.

MULTIPLAN REFERENCES

The primary benefit of a worksheet program lies in Multiplan's ability to use the value of one cell in calculating the value of another. Multiplan has considerably extended this idea of cell-to-cell reference. Aside from the ability to reference cells by name, it supports relative references and a simple notation for referencing areas. The reference RC -1 refers to the cell in "this row, one column to the left." Suppose the first row of the sheet contains sales by month and the second row contains costs by month. You can type this formula once:

$$R -2 C -R -1 C$$

and reproduce it across the third row to create a row of net-by-month cells.

LINKING SHEETS

A strong point of Multiplan is its ability to use values on one sheet in the formulas of another sheet. A sheet that provides values is called a supporting sheet, and the sheet that uses values is called a dependent sheet. The linkage between sheets is made with the XTERNAL command.

Use sheet linkages to construct a hierarchy of worksheets. You might have one detailed sheet for fixed costs and another for production costs. Those might feed their totals into a sheet summarizing costs, which in turn can feed total costs into an overall balance sheet. You update the figures on a detail sheet and save it. When you next load a summary sheet dependent on it, the new totals are retrieved automatically.