# GARY PHILLIPS DONALD J. SCELLATO



## APPLE MACINTOSH ENCYCLOPEDIA



The Apple Macintosh Personal Computer

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### PREFACE

The Apple Macintosh Encyclopedia provides easily accessible, brief and understandable information on the topics that you are most likely to have questions about. We have carefully digested the manuals, books, magazine articles, and other information sources for the Macintosh. These, combined with our own experience in using the Macintosh and other personal computers, have been integrated into an alphabetical sequence of short entries in the style of an encyclopedia. The goal is to provide concise, useful and easy-to-understand information on a particular topic that is quickly accessible when you need it.

Much of the information in the entries is not contained in the manuals provided with the Macintosh and various software products. For example, notice the discussion, under WIDTH, of the "deferred" nature of this command when used with a device name, the discussion of the colon (:) in Multiplan for ranges, or Saving, Problems With. These topics are omitted or inadequately covered in the standard manuals.

The Macintosh is the first truly visual computer. In keeping with the highly visual nature of using the Macintosh, we have provided over 100 illustrations. Each shows exactly what you will see on the screen when exploring topics discussed in the text. The Macintosh Encyclopedia opens with a visual guide to icons, and remains highly visual in orientation throughout the text.

In addition to the operating software provided with the Macintosh, we have provided detailed coverage of Multiplan, Microsoft BASIC, MacWrite, MacPaint and many other major programs for the Macintosh. Dozens of other programs and hardware accessories for the Macintosh are also described. Entries which describe commercial products are distinguished by an asterisk (\*) following the entry title. There are also category entries which list the available products for that category. For example, the entry under Word Processors lists the various word processing programs available for the Macintosh. See the Appendix on Vendors for further guidance in using the product descriptions and the categorical listings.

The Macintosh Encyclopedia also offers reference data on such topics as books for the Macintosh, magazines and user groups. We invite new user groups, authors or publishers of new Macintosh books, programs or hardware to send us information and review products for inclusion in future editions of the Apple Macintosh Encyclopedia. Any suggestions from our readers will also be greatly appreciated.

The entries are alphabetized by ignoring spaces and special characters. in a few cases we have departed from a strictly alphabetical ordering when many entries have similar titles. Our goal has been to make the entries easy to find and to group closely-related entries together whenever possible. The cross references are ordinarily optional pointers for further information. In a few cases the cross reference is slightly abbreviated or modified from the full entry title to save space or avoid potential confusion.

While we have made every effort to ensure the accuracy of all information in the Apple Macintosh Encyclopedia, the reader should verify on the Macintosh any information to be used in potentially sensitive situations. Neither the authors nor the publisher assume any liability with respect to the use of the material in the Encyclopedia.

We have attempted to provide adequate cross-referencing without redundancy. We trust that you will find the Apple Macintosh Encyclopedia a valuable tool in exploring the marvelous capabilities of your Macintosh.

Gary Phillips Donald J. Scellato Petaluma, California

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Gary Phillips and Jacquelyn Smith wish to dedicate this book to their child, who was present throughout the production of the manuscript and will be born about the same time as the book.

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#### **MACINTOSH DESKTOP ICONS**







**File Document** 

MacPaint Document

Document

MacWrite Document



Pts sas

MS-Basic Language









**Application** 



MAIN STREET FILER Application Program



Mac Terminal Application



MacWrite



MacDrive Hard Disk Drive



**MacPaint** 

MacFORTH Language



MacBasic Program

MacBasic Language



Microsoft Chart Document

System File

**Disk Copy** 

Microsoft Word



Mac Terminal Document



Sad Macintosh



Trash



MacDraw Document



MacDraw









Microsoft Chart



# A

**A** ASCII 65, HEX 41. **a** ASCII 97, HEX 61. Also the hexadecimal symbol for decimal 10. The following all represent the same number:

A base 16 = 10 10 base 10 = 10 12 base 8 = 10 1010 base 2 = 10

A The symbol used in MacPaint to signify text entry. The letter appears in the MacPaint drawing tool palette on the left-hand side of the MacPaint screen. When the pointer arrow is positioned on this icon and the mouse button is pressed once, a text cursor which resembles a pair of parentheses )( may be moved about the screen by moving the mouse. This is called the I-beam. A font may be selected from the pull-down Font menu at the top of the screen by dragging the mouse pointer down the menu until the desired font is highlighted. Then the mouse button is released. Font size and style may be selected in a similar fashion. Once the proper font, font size and font style have been selected, the cursor may be placed at the desired point on the screen by moving the I-beam and pressing the mouse button. A straight vertical line appears in the I-beam's place and the user may start entering text. See Icon, Mouse, I-Beam, Pull-down Menu, Fonts, Change Font Size, Menu, MacPaint, Pointer, Arrow.

**A** The abbreviation used in Microsoft BASIC to SAVE a file in ASCII format. See ASCII.

**Abort** The process of ending a program which has encountered an error condition in an orderly manner, and returning control to an operator or operating system. For the Macintosh, this is accomplished by pressing Command-C together or by pressing the reset button on the lower left-hand side of the Macintosh's left side.

**About the Finder Option** The Apple menu on the Desktop display of a boot disk has an option called "About the Finder". When this option is displayed, a drawing entitled "The Macintosh Finder" is displayed on the screen. This display also shows the version of the Finder on the disk, the year it was implemented and names the authors of the Finder.

**ABS** A Microsoft BASIC function which returns the positive (absolute) value of the expression  $\infty$  without regard of negative signs. The format is:

 $\langle variable \rangle = ABS(\infty)$ 

co may be any numeric expression. For example:

2 • A

PRINT ABS(-100) 100

The positive (absolute) value of -100 is 100.

This function may be used in a mathematical expression or algebraic equation where an absolute number is required. The example listed below is a brief Microsoft BASIC program that illustrates the ABS function:

10 REM TEST OF ABS FUNCTION 20 PRINT "INPUT A POSITIVE OR NEGATIVE NUMBER AND ITS ABSOLUTE" 30 INPUT "VALUE WILL BE DISPLAYED FOR YOU..."; N 35 PRINT: PRINT: PRINT 40 PRINT "THE ABSOLUTE VALUE OF ";N;" IS ";ABS(N) 45 PRINT: PRINT: PRINT 50 INPUT "WOULD YOU LIKE TO TRY AGAIN ?(Y/N) ";R\$ 55 IF R\$ = "Y" GOTO 10 60 PRINT "THANK YOU..." 65 END

This program is set up to accept the input of a number by the user (Line 30), print out the number that was input as an absolute number (Line 40), and allow the user to either try again or to quit (Line 55).



Fig. A1 The MacPaint drawing tool palette. Note the large letter A that is used to select text.

**ABS** A built-in function available in many electronic spreadsheet programs such as Microsoft Multiplan. When used, this function returns the absolute value of the numbers or of the formula included in the parentheses following the function. The cell containing the function could include the formula shown below:

#### =ABS(AVERAGE(4,12,8))

and would return the value 8. It could also contain the formula:

=ABS(-99)

and would return the value 99. See Spreadsheet, Multiplan, AVERAGE.

**Absolute Reference** Used in spreadsheet programs such as Microsoft MultiPlan when a formula is copied from one column or row to another, and references to other cells now refer to new cells in the same position relative to the moved cell (relative reference). Example 1 below shows a formula copied from cell R12C2 to cells R13C2 and R14C2 using the Fill Down option on the Multiplan Edit menu from the menu bar at the top of the screen.

Since the Absolute Reference command was not used, all references are relative. The formula refers to cell R13C2 by the relative reference R[-9] to use the inflation factor inserted by the user. This relative reference was carried down to the next two cells under cell R12C2 when the Fill Down option was used although the user intended to refer always to cell R13C2.

	1	2
1		
2		
3	INFLATION RATE(%)::::::>	22
4		:
5	UNINFLATED COSTS	:
6	FUEL	2000
7	UTILITIES	700
8	REPAIRS	900
9	TOTAL	=SUM(R[-3]C:R[-1]C)
10		
11	INFLATED COSTS	
12	FUEL	=R[-6]C*(1+(R3C2/100))
13	UTILITIES	=R[-6]C*(1+(R3C2/100))
14	REPAIRS	:=R[-6]C*(1+(R3C2/100))
15	TOTAL	=SUM(R[-3]C:R[-1]C)

Fig. A2 Example 1. Using relative references.

To avoid relative reference use the Absolute Reference command by pressing the Command key along with the T key as soon as the R[-9] reference was entered. This would have changed the formula to read R13C2 instead of R[-9] when moved. This is shown in Example 2 below.

Thus, an Absolute Reference refers to a specific cell in a spreadsheet while a Relative Reference refers to a cell in the same relative position in a different column or row. See Cell, Spreadsheet, Fill Down Option, Microsoft Multiplan, Relative Reference.

**Absolute Value** The value of the number without reference to positive or negative sign. The value of a number or the result of a formula provided by using the ABS function in Microsoft BASIC or Microsoft Multiplan.

In mathematical notation this is denoted by enclosure in vertical bars (). Thus, if a number is positive or zero x = x. If x is negative: x = -x. See ABS.

#### 4 • Accented Characters

	1	2
1		
2		
3	INFLATION RATE(%):::::>	22
4		
5	UNINFLATED COSTS	
6	FUEL	2000
7	UTILITIES	700
8	REPAIRS	900
9	TOTAL	=SUM(R[-3]C:R[-1]C)
10		
11	INFLATED COSTS	
12	FUEL	=R[-6]C*(R[-9]C/100)
13	UTILITIES	=R[-6]C*(R[-9]C/100)
14	REPAIRS	=R[-6]C*(R[-9]C/100)
15	TOTAL	=SUM(R[-3]C:R[-1]C)

Fig. A3 Example 2. The same spreadsheet section where formulas were copied using the absolute reference.

Accented Characters Characters that are given a specific inflection in a language such as French or Spanish. The accent is portrayed by a symbol that generally appears above the letter to be stressed or pronounced in a particular fashion. Accented characters are displayed by the Macintosh by pressing the Option key along with another key. The Option key with the (`) key in the upper left-hand corner of the Macintosh keyboard prints a grave accent (`). The Option key with the e key produces an acute accent symbol (´). The Option Key along with the i key produces a circumflex (^). The Option Key and the u key produce an umlaut

("). The Option Key and the n key produce a tilde ( $^{-}$ ). This use of the Option Key makes the Macintosh useful for foreign languages such as French, German, and Spanish. See Option Key.

Accessories Items that supplement a basic computer system. The basic Macintosh system consists of the Macintosh computer, the keyboard and the mouse. Accessories could consist of an ImageWriter printer, a second disk drive, a modem, a numeric keypad, the security accessory kit and a carrying case. For specific products, see Carrying Cases, Covers, Hardware, Maccessories Cleaning Kit, Maccessories Disk Case, Maccessories Printer Stand, Maccessories Starter Pak, Maccessories Swivel, MAGICphone, Microdisk Minder, Power Supplies, Security Kits, Video-Digitizer.

**Accumulator** A register into which the results of arithmetic operations are stored. More than one accumulator can be present in a central processor. The D0-D7 registers of the Macintosh's MC68000 often function as accumulators. The Macintosh's MC68000 has no accumulators. Instead, it uses general purpose registers.

ACM Association for Computing Machinery 11 W. 42nd St. 3rd Floor New York, NY 10036 212-869-7440

The major international society for computer technology. With its numerous publications and special interest groups that discuss many topics, ACM will be

of interest to many Macintosh users. For more information write to ACM or find the Journal of the ACM at your library.

**Acoustic Coupler** A mechanical instrument for connecting the telephone handset to a computer, through a modem. The data is converted to tones, usually audible, for transmission over the phone lines.

Activate Event The activity or event that results from a window changing state between inactive and active. The activity is generated by the Window Manager program, part of the Macintosh Operating System, when the user places the pointer on a button or any place in a window and clicks the mouse button. See Button, Window, Window Manager, Operating System.

Activating a Window If more than one window is being displayed at once on the Macintosh screen, one window may be activated by moving the arrow pointer into the desired window and clicking the mouse button. This process is used when Finder windows for more than one disk are being displayed on the screen at the same time, more than one Multiplan window is being displayed, or when the List window and the output menu are being displayed together in Microsoft BASIC. See Mouse Pointer, Clicking, Mouse Button, Window.

Active Cell An active cell in a spreadsheet such as Microsoft Multiplan is the cell that is currently being used to enter a value, a label or a formula. This cell could also have been activated to paste data from the Clipboard or Scrapbook, to cut data to the Clipboard or Scrapbook, or to copy data to the Clipboard or Scrapbook. A cell is made active in Multiplan by placing the plus sign pointer on the cell and clicking the mouse button. See Clipboard, Scrapbook, Cell, Mouse Button.

Active Selection The menu selection or icon currently in use. See Icon, Dimmed Commands, Menu.

Active Window When a number of windows are being displayed on the Macintosh screen, the topmost window is the active window. This window may be rendered inactive by closing it or by placing the mouse pointer on another window and clicking the mouse button. MacBASIC and other programming languages allow more than one window to be active at a time. Windows are rendered active, in this context, by clicking them and inactive by closing them.

**A/D** "A to D." Analog to Digital. Conversion from a sensor's analog voltages and currents to the digital representation used by computer systems. Computers can then process data directly from the external world.

Add Characters In Between Existing Characters In Microsoft BASIC, position the pointer in the Command window at the location where a character is to be inserted and press the mouse button. A vertical line cursor will appear at the location. The character to be inserted can then be typed from the keyboard. Pressing the Return key will cause the computer to accept the line along with the newly added characters. See EDIT.

**Add-On** A system or circuitry attached to a computer to increase memory or performance. For the Macintosh these ordinarily attach to the ports at the back of the computer (mouse, serial RS-422, etc.).

**Address** Position of a word in memory, expressed by a number. In the Macintosh, addresses range from 0 to 128K, and will go up to 512K on the upgraded Macintosh when 256K chips are available.

#### 🖸 File Edit Control

GLOBE.BAS	
List	
280 FOR I=0 TO 760:INPUT #1,E%(I):NEXT	
290 CLS	
300 X=269:Y=49	
3 10 PUT (X,Y),A%,PSET	
320 PUT (X,Y),B%,PSET	
330 PUT (X,Y),C%,PSET	
340 PUT (X,Y),D%,PSET	
350 PUT (X,Y),E%,PSET	
360 IF MOUSE(0)=-1 THEN PUT(X,Y),E%,XOR: X=MOUSE(1)-51:Y=MOUSE(2)-51	
370 A\$=INKEY\$:IF A\$="" THEN 310 ELSE END	
380 OPEN "MGLOBE.DAT" FOR OUTPUT AS #1	
390 CX=CY:CZ=SX:SY=SZ:I=J:R=A:B=C:A1=B2:C1=C2	
Command	-
300 X=269:Y=49	T

Fig. A4 Selecting a program line for editing from the List window.

#### ∉ File Edit Control

GLOBE.BAS						
List						
280 FOR I=0 TO 760:INPUT #1,E%(I):NEXT						
190 CLS						
000 X=269:Y=49						
510 PUT (X,Y),A%,PSET						
320 PUT (X,Y),B%,PSET						
30 PUT (X,Y),CC,PSET						
340 PUT (X,Y),D%,PSET						
350 PUT (X,Y),E%,PSET						
360 IF MOUSE(0)=-1 THEN PUT(X,Y),E%,XOR: X=MOUSE(1)-51:Y=MOUSE(2)-5	1					
370 A\$=INKEY\$:IF A\$="" THEN 310 ELSE END						
380 OPEN "MGLOBE.DAT" FOR OUTPUT AS #1						
390 CX=CY:CZ=SX:SY=SZ:I=J:R=A:B=C:A1=B2:C1=C2						
	-					
Command Command						
300 X=269:Y=409						
	E					

Fig. A5 Inserting a character between two other characters.

6

#### Address of Variable in Memory See VARPTR.

Adjusting References This term is used in Microsoft Multiplan to describe the process of changing the cells referred to in a formula on a spreadsheet, to agree with the column or row to which a formula is moved or copied by the user. If a formula called for the sum of the cells in column 3 rows 12 through 19 (R12:19C3) in Multiplan, and this formula was copied into column 5, the references in the formula would be adjusted to read the sum of the cells in column 5 rows 12 through 19 (R12:19C5) automatically by the program. The same automatic adjustments are made by other electronic spreadsheet programs such as Lotus 1-2-3 when a formula is moved along with the row or column that contains the column, or when a formula is copied from one location to another on the spreadsheet.

Advance One Line on the Printer To space up (advance) one line on the printer without carriage return enter Microsoft BASIC statement:

LPRINT CHR\$(27);CHR\$(102)

Or use the line feed (LF) button of the printer.

Just LPRINT gives a line feed, both space up one line (line feed) and return to left margin (carriage return).

Advance to Top of Page How to Form Feed Printer. Enter Microsoft BASIC statement:

#### LPRINT CHR\$(27);CHR\$(12)

Or use the top of form or form feed (FF) manual control button on the printer.

You may then need to adjust the paper in the printer so it actually is at the top of a page as defined by the perforations.

In a program, you may want to provide instructions to the operator and a pause to allow for adjustment of the paper.

**AgDisk**<sup>•</sup> AgDisk agricultural programs are directed toward farm management and available on separate disks. They consist of Profit Projector, Financial Management, Machinery Management, Swine Management and a collection of Multiplan templates for use in farm management. Although these programs are directed toward the farmer, the Financial Management disk could have some use outside of agriculture. Harris Technical Systems.

Alarm Clock One of the options available from the Macintosh desk accessories accessed by using the Apple menu (signified by an apple symbol in the upper left corner of the Macintosh screen display) on the menu bar when an application program is in use. It is activated by dragging down the Apple menu until Alarm Clock is highlighted, then releasing the mouse button. The Alarm Clock is displayed in the upper right-hand corner of the screen. This display may be moved anywhere on the screen by placing the arrow pointer inside the display, pressing the mouse button, dragging the display to the desired location on the screen and releasing the mouse button. The alarm may be set by placing the arrow pointer on the small alarm clock symbol to the right of the time displayed on the screen and pressing the mouse button. This will cause the display to be expanded to show the date or another time on a line below the time display, and three symbols below the second line. These symbols are a large clock, a calendar and an alarm clock. Any of these items may be reset by placing the arrow pointer on the appropriate icon and pressing the mouse button.

#### 8 • Alert

The next step is to place the crosshair that replaces the pointer over the hours, minutes or seconds on the time display on the second line and then press the mouse button. This will highlight the time segment under the pointer and cause an up arrow and a down arrow to be displayed to the right of the time display. The highlighted time may be adjusted upward or downward by placing the crosshair over the appropriate arrow and clicking the mouse button. Once the desired setting is made to the time, the crosshair is moved to the icon on the second line that resembles a lock (but is called the bell icon) then press the mouse button. See Arrow, Crosshair, Icon.



Fig. A6 Alarm Clock opened for setting. The pointer is on the set box.

Alert A warning message displayed in a special window, called an alert box, on the Macintosh. When a problem arises with a command given to the computer, a program or the computer itself, an alert message is displayed on the screen and is usually accompanied by a beep from the Macintosh speaker. One or more options are displayed as command buttons within the box to allow the user to avoid the problem he is being warned about.

**Alert Box** A special window that displays a warning message for the Macintosh user. These messages warn of disks that are too full to allow the storage of a letter, picture or program. They also warn the user that something is about to be lost if he proceeds to the next step in a process, such as saving or deleting a file. The alert box is generated by the Dialog Manager in the User Interface Toolbox. See User Interface Toolbox, Dialog Manager.



Fig. A7 A typical alert box.

**Algorithm** A solution to a problem with step-by-step specifications ending in a finite time. A problem is stated, an algorithm developed for its solution, the solution steps flowcharted and the program developed from the flowchart.

**Align Left Option** This command is available from the pull-down Style menu on the menu bar at the top of the MacPaint display, and executed by clicking the mouse button while the pointer rests on the Style menu, dragging the pointer down until the Align Left command is highlighted and releasing the mouse button.

This command is used in conjunction with text entry in MacPaint. An alternate method of giving this command is to press the Command key and the L key together. The use of this command causes letters to be printed on screen from left to right starting at the cursor position. See Pull-down Menu, MacPaint, Command Key, Mouse Button, Dragging.

Align Middle Option This command is available in MacPaint and is used by placing the pointer on the pull-down Style menu and clicking the mouse button. When this menu is displayed, move the pointer down until the Align Middle command is highlighted, then release the mouse button. This command can also be invoked by pressing the Command key and the M key at the same time. The use of this command causes letters to be printed to the left of the text cursor location and also causes the cursor to move one- half of a space to the right of its location when the letter is printed. See Style Menu, Pull-down Menu, Command Key, Mouse Button.

Align Right Option This MacPaint command is invoked by locating the cursor on the pull-down Style menu on the menu bar and clicking the mouse button to cause the menu to be displayed. The pointer must then be dragged down the menu until the Align Right command is highlighted. The mouse button is then released. The Command key may be pressed at the same time as the R key to invoke this command. The use of this command causes letters to be printed from right to left, starting at the location of the text cursor. The text cursor remains stationary. See MacPaint, Command Key, I-beam.

**Alignment** Controlled in MacWrite by using the left- alignment box icon, the center-alignment box icon, the right- alignment box icon, or the full-justification box icon under the ruler at the top of the MacWrite screen display. Alignment for text is selected by placing the pointer arrow on the appropriate box and pressing the mouse button. See MacWrite, Left Alignment, Center Alignment, Ruler, Full Justification, Icon.

All Cells Option Available in Microsoft Multiplan from the pull-down Select menu on the menu bar of the Multiplan screen display. It is used to format all cells on the work sheet in the same fashion. It can also be used to retain cell formats while erasing cell contents. See Multiplan, Select Menu, Menu Bar, Spreadsheet.

**Allocation of Space** Assigning particular areas of memory (internal, disk, etc.) to particular files, programs, or functions. Allocation is sometimes done by a programmer, or sometimes automatically by a program such as the Memory Manager which is built into the Macintosh ROM. Disk space allocation is handled by the Finder.

Alpha Test Site vs. Beta Test Site New software requires testing prior to its release in the marketplace. While some testing can be done by the programmers that develop the software, final testing should be done in a user environment similar to the ultimate market environment for the software. Testing of new software is ordinarily divided into two phases.

Alpha testing involves a very few test sites. In some cases, only those inside the software development company and other cases including a few companies outside. Individuals or companies participating in alpha testing understand that this software is highly incomplete and very likely to contain bugs. Usually companies are paid or promised some future value for participating in such tests.

#### 10 • Alphanumeric

In beta testing, the product is considered to be essentially complete. Companies that participate in beta testing ordinarily plan to use the product when it is finished, and begin to use it early by participating in the beta test. They expect the software to work correctly in the vast majority of cases. When bugs are encountered, the beta test site accepts a responsibility to report the bug accurately and promptly to the software development company. In return they expect the bugs will be fixed promptly so that the company can continue to operate on the software. In most cases, beta testing goes reasonably smoothly. A few bugs are detected and corrected and the product goes on its way to the market. In some cases, numerous or serious bugs are detected, and the product may need to undergo a major revision or, in the worst possible cases, go back through alpha testing before the next round of beta test sites may experience significant inconvenience, such as the inability to continue to use files if a file format is changed. Alpha test sites and beta test sites are used for hardware as well as software.

Alphanumeric A set composed of all alphabetic and numeric characters.

Alterable Memory Storage media, such as a disk, which can be written onto or changed.

**Ampersand** The Ampersand (&) is used in Microsoft Multiplan for the Macintosh to concatenate (join together) two text values so they appear as a single value. See Multiplan, Concatenation of Data or Programs.

**Analog** Having a continuous range of voltage or current values. Contrasted with digital.

**Analog Board** This is a printed circuit board inside the computer case that contains the Macintosh's power supply, a power regulator, vertical scanning circuits for the video display, horizontal scanning circuits for the video display, other video control devices and the computer's internal speaker. See Power Supply.

**Analyser/Analyzer** Any device that checks or regulates a component, board or system and presents the data for review.

**Anchor Pad**<sup>•</sup> A security device designed to protect the Macintosh system. A pad is fastened to a table top, a desk or similar permanent station. The Macintosh is placed on the pad and bolted into place. The base pad is fitted with a swivel allowing for a 360 degree rotation. A lock down pad is included for the keyboard. The computer and keyboard may be removed from the pads by using a key to unlock the framework that holds the units in place. Anchor Pad International, Inc.

**AND** A term for a logical procedure defined by the rule: If A and B are 1, then (A AND B) is 1, otherwise (A AND B) is 0. The AND of 10110111 and 10000100 is 1000100. For logical situations such as the conditional test in an IF statement, substitute TRUE for 1 and FALSE for 0.

ANSI American National Standards Institute.

**Apostrophe** (') or single quotation. In Microsoft BASIC, a synonym for REM as a way of including remarks or explanatory comments in a program. The colon (:) allows multiple Microsoft BASIC statments on one line. The apostrophe can be used without a colon to indicate that the rest of the line is a remark. Examples:

20 REM Just a comment 30 ' Just a Comment 40 LET X = 1: REM Just a comment 50 LET X = 1: ' Just a comment 60 LET X = 1' Just a comment

The computer takes no action when it encounters a REM statement. It moves to the next line in the program it is running.

Append To add to the end of a character string or list.

**AppleBus**<sup>•</sup> An external device that allows a Macintosh to be connected to other computers to form a network so information may be passed from one computer to another. One of the computers on the AppleBus system acts as a master that controls the passing of information among computers. Only one computer may transmit at a time. Different computers in the system may act as the master at any given time. Large scale data storage devices such as hard disk systems may act as servers for the entire system and may be linked to all of the devices connected via the AppleBus. Apple Computer, Inc. See Hard Disk, Network.

**AppleLine\*** A hardware device that enables a Macintosh to emulate an IBM 3278-2 computer terminal and gives the Macintosh the ability to exchange information with IBM mainframe systems. The device is connected to the Macintosh serial interface circuits via one of the RS-232/RS-422 serial ports on the back panel of the Macintosh. The device will be released late in 1984. See Hardware, Emulation, Serial Port, Back Panel. Apple Computer, Inc.

**Apple Macintosh Book, The**\* By Cary Lu. One of the standard works on the Macintosh. This book is a pleasant discussion of the Macintosh and how to use it. It is a richly illustrated work that explains the Macintosh in a conversational style. Microsoft Press.

**Apple Menu** One of the menus available from the menu bar at the top of the screen display of all of the applications released for the Macintosh to date. This is a pull-down menu displayed by placing the mouse pointer on the Apple symbol in the upper left-hand corner of the screen and pressing the mouse button.

The Apple menu offers several options to the user that are called "desk accessories." It also offers a brief description of the application being used. The options available from this menu are About the Finder . . ., Calculator, Alarm Clock, Key Caps, Note Pad, Scrapbook, Control Panel and Puzzle. For more information on each of these items, see their respective entries. Selection is made by moving the pointer down the menu until the desired item is highlighted, then releasing the mouse button. See About the Finder..., Calculator, Alarm Clock, Key Caps, Note Pad, Scrapbook, Control Panel, Puzzle.

**Apple Modem 300\*** A 300-baud modem designed to work with the Macintosh, with cables designed to connect the modem to the Macintosh. This modem is packaged with a Demopack from Compuserve and a Premium Pak from the Source. The accessory kit contains manuals for using and installing the modem and the necessary cables. It has a self-diagnostic feature, built-in autodial (touch tone or pulse) and auto answer. Apple Computer, Inc. In UK: Apple Computer (UK) Ltd.

**Apple Modem 1200**<sup>•</sup> A 1200-baud modem for use with the Macintosh. It features built-in autodial, auto answer and diagnostics. Its accessory kit contains the necessary manuals to use and install the modem, as well as the proper cables to install the modem. Apple Computer, Inc. IN UK: Apple Computer (UK) Ltd.



Fig. A8 The Apple menu from the menu bar.

**Application Software** Computer programs (software) are divided into two major categories. Application software consists of programs that actually perform some useful function directly related to what he wants done. Examples are word processing programs that produce letters, reports, etc., database programs that allow the user to manage his inventory, appointments and various other items of data, accounting programs, educational programs and even games, etc. System programs (system software) perform functions necessary to the use of the computer yet not directly relevant to solving a particular applications problem. An example of this would be the disk operating system used by the computer, various utilities such as sort, copy or programs which facilitate the use of the program and may be used by application software, but do not directly produce useful results (keeping track of your bank balance, allowing you to play a game, produce a letter, etc.).

**Applications Disk** An applications disk is a disk that contains the System file, the Finder and at least one application. If the application uses print functions, the ImageWriter file must also be present. An application is a program such as Mac-Write, MacPaint, Microsoft Multiplan and Microsoft Word.

**Architecture** The special selection, design and inter-connection of the principal components of a system. In a microprocessing unit this could be the number and function of registers, the instruction addressing modes and the bus structure and timing.

Arctangent See ATN.

**Argument** Data passed from one process or program to another. Similar to a football pass, except that one or more bytes of data replaces the football, and the receiver is a program. The sender may be a program or a person typing the data onto a command line to be passed to a program. The most common example would be a Microsoft BASIC program passing variables to a subroutine.

**Arithmetic Logic Unit (ALU)** The element which performs the basic data manipulations in the central processor like add, subtract, complement, negate, rotate, AND and OR.

Arithmetic Statement An instruction specifing an arithmetic operation.

Arrays See DIM, OPTION BASE.

**Arrow** The Macintosh is able to translate the motion and location of the mouse on a real Desktop to a related location on the screen. An arrow is used to represent the mouse location. Menus, applications, commands and other activities are selected by moving the mouse around the physical Desktop until the arrow pointer is on top of the activity being selected. The mouse button is then pressed to activate the menu, command or application. See the illustration below. See Menu, Mouse Button, Desktop.

**ASC** A Microsoft BASIC function which returns the ASCII code for the first character of the string x. The format is:

 $\langle variable \rangle = ASC(\alpha )$ 

x\$> may be any string expression. For example:

```
10 X$ = "SAMPLE"
20 PRINT ASC(X$)
RUN
83
```

In this example the ASCII code for S, the first character of the string "SAMPLE", is 83. If x\$ is null, the error message "Illegal function call" is returned. For a listing of the ASCII codes see ASCII Codes for Characters.

ASCII American Standard Code for Information Interchange.

ASCII Code to Characters See CHR\$.

#### 🗳 File Edit View Special



Fig. A9 An example of the arrow on the Desktop.

#### **ASCII** Codes for Characters

Value `		Character	Va	lue	Character
Hex	Dec	Key Strokes	Hex	Dec	Key Strokes
00	0	*Ctrl-@	40	64	@
01	1	Ctrl-A	41	65	A
02	2	Ctrl-B	42	66	В
03	3	Ctrl-C	43	67	С
04	4	Ctrl-D	44	68	D
05	5	Ctrl-E	45	69	E
06	6	Ctrl-F	46	70	F
07	7	Ctrl-G	47	71	G
08	8	Ctrl-H	48	72	Н
		Bkspace	49	73	1
09	9	Ctrl-I	4A	74	1
0A	10	Ctrl-J	4B	75	K
OB	11	Ctrl-K	4C	76	L
0C	12	Ctrl-L	4D	77	М

0D	13	Ctrl-M	4E	78	Ν
0E	14	Ctrl-N	4F	79	0
OF	15	Ctrl-O	50	80	Р
10	16	Ctrl-P	51	81	0
11	17	Ctrl-O	52	82	Ŕ
12	18	Ctrl-R	53	83	S
13	19	Ctrl-S	54	84	T
14	20	Ctrl-T	55	85	U
15	20	Ctrl-1	56	86	v
16	21	Ctrl-V	57	87	w/
10	22	Ctrl-W	58	88	X
10	23	Ctrl V	50	80	× ×
10	24	Ctrl V	54	09	7
19	25		50	50	
10	20		50	21	l
IB	2/	ESC	50	92	
10	28	FS	50	93	Ĭ
1D	29	GS	5E	94	
1E	30	RS	51	95	-
1F	31	US	60	96	,
20	32	SpaceBr	61	97	a
21	33	!	62	98	b
22	34	"	63	99	С
23	35	#	64	100	d
24	36	\$	65	101	e
25	37	%	66	102	f
26	38	&	67	103	g
27	39	,	68	104	ĥ
28	40	(	69	105	i
29	41	Ì	6A	106	i
2A	42	*	6B	107	k
2B	43	+	6C	108	Ĩ
20	44	,	6D	109	m
20	45	-	6F	110	n
2E	46		6F	111	0
2E 2F	40		70	112	n
30	48	0	71	113	0
21	40	1	72	114	r
20	50	2	73	115	, ,
22 22	50	2	74	116	t
22	21	3	75	117	
24 25	52		76	118	u v
33	5	5	70	110	V 14/
30	54	0	79	120	~
3/	55	/	70	120	x
38	56	8	79	121	y 7
39	5/	9	70	122	2
3A	58	:	/B 7C	123	1
38	59	;	70	124	١
30	60	<	/U 75	125	1
3D	61	=	/t 75	120	
3E	62	>	/٢	127	DEL (KUDOUT)
3F	63	?			

\*Ctrl means the Command key plus the indicated character.

#### 16 • ASCII Control Characters

**ASCII Control Characters** To set the print size, strike method or number of lines per inch down the page for the ImageWriter printer, the nonstandard type format you want must be turned on by sending control codes to the printer. See Control Characters for Printer.

**ASCII Program** In Microsoft BASIC if you want to SAVE the program in ASCII format, which allows you to MERGE two programs together, put ,A after the close quote of the program name thus:

SAVE "SAMPLE", A

See MERGE.

Instructions for saving a program named "SAMPLE" are as follows: On disk (the default drive) enter:

SAVE "SAMPLE"

On disk (external drive) enter:

SAVE "diskname/SAMPLE"

On disk (from File menu): activate File menu with pointer, scroll pointer to Save and click mouse button. A Dialog box will be displayed asking for file name and disk name. Enter SAMPLE and click the OK button.

To SAVE the program as a protected file in encoded binary form use ,P instead of ,A . Then it cannot be listed, saved, edited (or unprotected). While a clever programmer can get around this, it will at least prevent a quick and casual or accidental modification to your program.

The SAVE instruction does not alter your program in memory. It is important to be aware that if you write a Microsoft BASIC program, it will be lost (erased) unless you SAVE it before you either: turn off the Macintosh; go to the Desktop (System Command); or use the NEW command. See also EDIT.

To run the program at a later time, use the LOAD command to copy it from the disk you saved it on, back into the Macintosh's memory. See LOAD.

**Assembly** Assembler Language. A programming language related very directly to the machine language of the computer. The Macintosh uses an MC68000 processor chip, so the Macintosh Assembler uses instructions based on MC68000 machine language. We can only give a brief introduction to Assembler here, with references for further study.

The MC68000 handles information essentially one byte at a time. Larger units of data such as character string, floating point numbers and records are fictitious entities.

Originally, only assemblers were available for writing programs. The tedious and time-consuming nature of Assembler programming led to the invention of high-level languages such as Microsoft BASIC, FORTRAN, COBOL and Pascal. These languages are high level in the sense that they highly abbreviate the description of the work to be done by the computer. A complex translation process is required to turn the high-level program into a machine language program that the MC68000 can use. This translation process is time consuming and usually results in a machine language program that runs many times slower than a corresponding program written in Assembler.

The compiled program is also many times larger than a corresponding program written in Assembler. Why is this? Because higher-level languages simplify the

programmer's job by using very general program procedures to handle all possible circumstances in which the statements might be used. Since only a small fraction of this generalized code is needed for a particular program, much of the generalized code is not needed in one particular program. Compilers convert the source program to an object program that can be run after debugging.

Interpeted languages (such as Microsoft BASIC) have an additional performance disadvantage. They do the translation of higher-level source code into executable machine code every time the program is executed, rather than only once.

Assembly language programs can run much faster, use less memory and access more special machine-level functions such as direct I/O devices, than Microsoft BASIC or other high-level languages. Assembler is popular with software houses for writing programs that must run very fast (action games or programs to run fast devices such as disk drives, etc.). But because Assembler is harder to code, few individual users write programs in Assembler. Those who do write only selected time-critical or highly specialized routines. More commonly, a program written largely in Microsoft BASIC, for example, may use a short section of code written in Assembler to do one particular time-critical or memory-size critical task. The Assembler code will be called as a subroutine by the Microsoft BASIC program.

In summary, Assembly language is highly techincal and more adapted to the needs of the MC68000 processor than to the needs of the Macintosh user. It is invaluable when speed or memory size is critical, for highly specialized applications and for commerical software development. But for most Macintosh users it will not be practical to use. They will rely on commerical software packages or write programs in a high-level language such as Microsoft BASIC. If an Assembly language program or subroutine is required for your application, paying an experienced Assembly language programmer would be an alternative to learning Assembler. But if you enjoy getting to the nuts and bolts of the computer, Assembly language is the only route to the inside workings of the MC68000. To learn more about Assembler, see the following books:

68000 Assembly Language Programming By Kane, Hawkins, and Leventhall Osborne/McGraw Hill

68000 Microprocessor Handbook By Gerry Kane Osborne/McGraw Hill

Macintosh Assembly Language By Leo J. Scanlan Brady

Programming the MC68000 By Tim King and Brian Knight Addison-Wesley

Assignment Giving a variable a value. In Microsoft BASIC, a simple assignment would be:

LET X=5

This assigns the value 5 to the variable X.

#### Association for Computing Machinery See ACM.

#### 18 • Asynchronous

Asynchronous An event or device which does not have the same timing as the central processing unit.

Athens One of the fonts available to the user of MacPaint and MacWrite. This font is illustrated below. It may be selected by placing the arrow pointer on top of the Font menu on the menu bar at the top of the MacPaint screen display and pressing the mouse button to activate the menu. The pointer is then scrolled down the menu until the Athens font is highlighted. The font is selected by releasing the mouse button. This font is used while MacPaint is in the Text mode selected from the drawing tool palette on the left-hand side of the MacPaint display. See Fonts, Menu Bar, Highlight, Drawing Tool Palette, Icon.

This is an example of the Athans 9 point plain text fant. This is an example of the Athans 10 point plain text fant. This is an example of the Athans 12 point plain text fant. This is an example of the Athans 14 point bold fant. This is an example of the Athans 14 point bold fant. This is an example of the Athans 14 point bold fant. This is an example of the Athans 16 point This is an example of the Athans 16 point bold for the Athans 16 point This is an example of the Athans 10 point bold for the Athans 16 point bold for the Athans

Fig. A10 Example of the Athens font style.

**ATN** A Microsoft BASIC function which returns the arctangent of x. The format is:

 $\langle variable \rangle = ATN(\infty)$ 

 $\infty$  may be a numeric expression of any numeric type. The evaluation of ATN is always performed in single precision. ATN returns the angle whose tangent is x, b measured in radians in the range -PI/2 to +PI/2, where PI = 3.141593. To convert radians to degrees, multiply by 180/PI.

B ASCII 66, HEX 42. b ASCII 98, HEX 62.

**B** An abbreviation for Bytes or Baud. B is used as an abbreviation for Bytes when referring to memory, or Baud rate when referring to communications. KB = 1000 bytes or baud (technically 1K = 1024 bytes). Also, the hexadecimal symbol for the decimal number 11:

B base 16 = 11 base 10 = 13 base 8 = 1011 base 2.

**Back Panel** The back of the computer case, with a number of sockets for connecting peripheral devices to the computer. The back panel of the Macintosh has sockets for connecting the mouse, a printer, a modem, a second disk drive, an external speaker and a power cord. It also has a small compartment for the battery that runs the computer's clock.

**Background Program** A low-priority program which is run when the processor has no higher priority tasks.

**Backing Up a Disk** Used to describe the process of making a copy of an entire disk. This practice is very important if you wish to have a second copy of a disk that contains a program important to you or if you wish to have a second copy of data important to a program you are using. Generally, commercial programs cannot be backed up by the user. Instead, the manufacturer generally supplies a backup copy to the user at a nominal cost. Sometimes, this copy is ordered when the user sends in the registration card for the program he purchased. Otherwise, the backup copy can be ordered separately as long as proof of purchase is provided. Consult the documentation for commercial programs when you purchase them. Public domain programs and programs that you write may be copied. See Copy a Disk, Public Domain.

**Backing Up a Document** A phrase used to describe the process of copying a document. This process should be used whenever you have a data file or program you wish to avoid losing. See Copy a Document.

**Backslash** MacBASIC assigns extended precision real characteristics to any variable name followed by a backslash (). These are decimal numbers accurate to 18+ decimal places.

**Backspace Key** One of the special purpose keys on the Macintosh keyboard, which moves the insertion point for a character on the screen backward one space, and erases the character to the left of the cursor position. This key may also be used to

#### 20 • Backup Copy

remove unintended returns from the text being entered. The Backspace key may be used to remove whole words, phrases, sentences or large sections of text by first highlighting the material to be deleted, then pressing the Backspace key. The Backspace key is used in MacWrite, the Text Mode of MacPaint, and while programming with Microsoft BASIC or MacBASIC. See Keyboard, Cursor, Return Key, Text Mode, MacPaint, Microsoft BASIC, MacBASIC.

**Backup Copy** A backup copy of any disk or document is a second or even third copy of the document or program. Copies should be made regularly of files and programs important to you, so that you have something to work with if the original is damaged in any way. Disks may be damaged by exposing them to magnets, spilling liquids on them, exposing them to flames or high heat or similar exposure. Files may be lost if you accidentally move them into the Trash Can and then Empty Trash. Backups ensure that you have something to use if you accidentally lose a file, lose a program, or damage a disk.

**Backup Diskettes** Diskettes are relatively fragile. They can be rendered unreadable by minor physical damage such as spillage of liquid or dirt on the magnetic surface, or even by fingerprints. It is, therefore, wise to always maintain an extra or backup copy of any important data contained on diskettes. Backing-up diskettes on a file-by-file basis has the added advantage that fragmented files can be regrouped into a single area on the new diskette. This allows the file to be processed more rapidly by many programs. See also File Management (Disk Maintenance).

**Backup Disks and the Write-protect Tab** A disk is write-protected (or locked) if the write-protect square is open. This is detected by a small spring-loaded switch or a light beam inside the drive and is sensed by Macintosh disk driver programs. You will get an error message (Locked Disk) anytime you attempt to change, delete or copy a file onto the write-protected disk or attempt to format a write-protected disk.

You are allowed to use files, load them or copy them from the write-protected disk. The purpose of these limitations is to prevent accidental loss of the only copy of programs or data. In most cases the procedure is to copy the write-protected disk onto a disk with a closed square, put away the write-protected disk as a permanent copy, then modify the unlocked disk. In some cases you will close the square of the locked disk (after thinking it over) and proceed to change the disk.

It is a good practice to lock any important disk you are copying or backing up. Then, if you accidentally ask for the backup in the wrong direction (from the old disk to your important disk), you will get a second chance to make the backup, rather than losing your data.

**Bad Sector** A sector on the disk which will not read/write data correctly. Usually due to a minor physical flaw in the disk. One or two bad sectors will not seriously affect the disk's use, Macintosh will mark them as bad and avoid using them. More then a few bad sectors indicates the disk should be used as a frisbee rather than to hold your valuable data.

**Bar Graph Option** Microsoft Multiplan and other electronic spreadsheet programs are capable of displaying numbers as crude bar charts, using such symbols as asterisks (\*) or slashes (/) to represent the numbers being graphed in this fashion. The Bar Graph command in Multiplan is invoked for the cell or range of cells highlighted by the cursor by positioning the pointer on the Format menu on the program's menu bar, clicking the mouse button, scrolling the highlight down to the Bar Graph option and releasing the mouse button. Presentation-quality graphics are generally available from such business graphics programs as Multiplan Chart and as

an option on Lotus 1-2-3. See Highlight, Menu Bar, Format Menu, Mouse Button, Business Graphics.

**BASIC** Beginner's All purpose Symbolic Instruction Code. A popular computer language invented at Dartmouth for educational purposes. While similiar to the FORTRAN programming language it is easy to use and learn, and is now on almost all microcomputer systems. Some BASICs have just the bare essentials of regular Microsoft BASIC (a form of Dartmouth original BASIC). Super BASICs may have features from other languages. Compatibility problems between various BASIC's do exist. MacBASIC has its own unique features, notably the use of alphabetic labels instead of line numbers and new statements to allow structured programming somewhat in the manner of more modern languages such as Pascal.

**BASIC Compiler** All programs that run directly on the Macintosh are machine language programs, in the actual numeric instruction code of the Macintosh's MC68000 microcomputer chip. Most were orginally written by a programmer as text files known as source programs. The source program contains relatively readable statements in a language such as FORTRAN, COBOL or Microsoft BASIC. These were then translated by a compiler program, producing an object program.

The object program contains the machine language instructions for the Macintosh's MC68000 which correspond to the instructions of the original source program. Microsoft BASIC programs work in this way with a Microsoft BASIC Compiler.

Regular Microsoft BASIC works in a slightly different way. It is a program (in machine language) which uses your Microsoft BASIC program as a guide to what it should do. It is therefore an interpreter, processing each line of your source program and interpreting what should be done. Since it must reinterpret your source program each time you run it, interpreted Microsoft BASIC can be as much as 100 times slower than compiled Microsoft BASIC.

When you write a Microsoft BASIC program, you have produced a source program in text form. The Microsoft BASIC interpreter, itself a machine language program, uses your source program as data, a source of instructions or commands to control its execution.

To speed up a Microsoft BASIC source program by compiling it into a faster machine language program, you will need a Microsoft BASIC Compiler, a program not supplied with the Macintosh, but available from other software houses. Run your Microsoft BASIC Compiler, giving it as input the source program that you wrote, and it will translate your source program into an executable machine language program.

The resulting program is no longer a Microsoft BASIC program, it is a machine language program based on (or is a translation of) your Microsoft BASIC source program.

**BASIC, Delete Program Lines in Microsoft BASIC.** Program lines may be deleted in Microsoft BASIC on the Macintosh by first listing the program using the List option from the pull-down Command menu or by typing LIST in the Command window. This will cause a List window to be displayed on the screen. Scroll through the program listing until the line or lines you wish to delete are displayed in the window. Then type the line number of the line to be deleted in the Command window and press Return. This will cause the line to be deleted. To delete more than one line, you would type:

#### DELETE [linenumber] [linenumber]

This would cause the lines from the first line number to the second line number to be deleted.

#### 22 • Basic Disk

**Basic Disk\*** A disk containing a number of games, including Shooting Stars, Black Jack, and Tic-Tac-Toe. The disk requires Microsoft BASIC. rds labs.

**BASIC, Display Program Lines in Microsoft BASIC** To display the program lines of a program currently in the Macintosh's memory, you would ensure that the program is stopped by pressing the Command key and the C key together, or by selecting Stop from the pull-down Command menu on the menu bar. Then type LIST in the Command box on the lower portion of the display screen or select the List option from the Command menu. This would cause a List window to be displayed on the screen. To display program lines from start up to line 100 enter:

LIST -100

To display program lines from line 100 to end enter:

LIST 100-

To display program lines from line 100 to line 200 enter:

LIST 100-200

To display program line 100 only enter:

**LIST 100** 

**BASIC, Display Files on Disk in Microsoft BASIC** The files on a disk may be displayed by using the FILES command in Microsoft BASIC, which causes the names of the files on the disk to be printed on the computer screen. If you enter FILES in the Command window by itself, the file names of the files in the internal disk drive will be displayed. For example:

FILES ''MACPAINT.BAK''

This command causes the names of all files on the disk MACPAINT.BAK to be displayed.

**BASIC, Largest Line Number in Microsoft BASIC** The largest possible line number for a Microsoft BASIC program is 65529.

**BASIC, LOAD Instructions for Microsoft BASIC** Used to LOAD a program that was saved on disk back into the Macintosh's memory to modify or run it. For a program named "SAMPLE" on the internal disk drive or the last disk drive used, enter:

LOAD ''SAMPLE''

If SAMPLE is on the disk in the external disk drive, enter:

LOAD ''diskname:SAMPLE''

All LOAD instructions erase any program lines in memory up to the line number of the last line of the program being loaded. Therefore, always clear the computer's memory by typing NEW in the Command window followed by pressing the Return key before loading a second program into memory. If you want to combine a saved program with the one you are writing, see MERGE.

#### BASIC, Reserved Words in Microsoft BASIC • 23

These instructions assume that the program you wish to load is in the internal disk drive on the same disk as the disk that contains Microsoft BASIC. If this is not the case, you will need to use the Finder to load the program from the disk on a single drive system. This process requires you to eject the disk with Microsoft BASIC and insert the disk containing the program you wish to load. Once this disk has been loaded, you must double- click the disk icon for the disk you just inserted. This will display the directory for that disk. You may be required to swap the disk that contains Microsoft BASIC with the disk containing the program you wish to load a couple of times, but the Macintosh will prompt you as needed. Once the directory has been displayed, place the pointer on the icon of the program you wish to load and double-click the mouse button. This will cause the program to be loaded and RUN. To stop the program and to list it, you would use the Stop option from the Command menu on the menu bar. Then you could use the List option or could enter the word LIST in the Command menu and press Return.

**BASIC, Multiple Statements On One Line in Microsoft BASIC** You can put a colon (:) at the end of one statement and continue entering another statement on the same line, without giving a new line number. The line number at the left refers to all statements on the line. An apostrophe (') allows a comment or remark to be added after a statement with or without a separating colon. Examples:

40 LET X = 1:REM Comment 50 LET X = 1:LET Y = 2 60 LET X = 1' Comment

**BASIC**, New Programs in Microsoft BASIC You can clear the computer's memory of old program lines prior to beginning to write a new program or prior to loading a new program by typing the word NEW in the Command window then pressing the Return key. You can accomplish the same thing by using the Edit menu from the menu bar and selecting New. This completely erases all lines now in Microsoft BASIC's memory, so if it is something you want to keep and have not already got on disk, SAVE it first. If you do not erase the program in memory before starting on another, you will usually wind up with an unuseable combination of mixed lines from your old and new programs.

**BASIC, Reserved Words in Microsoft BASIC** Reserved words have particular meanings in Microsoft BASIC and are used for commands, statements, function and operator names. These words cannot be used as variable names and variable names cannot be a reserved word followed by a type declaration character (\$, %, !, #).

When reserved words are used, they are to be delimited (separated with space or spaces around them) so that they are easily recognized by Microsoft BASIC. If you accidentally use one of the reserved words, you may see an error message or have strange results when you execute the program. See also Debugging.

Following are the reserved words in Microsoft BASIC:

ABS	ALL	AND
APPEND	AS	ASC
ATN	AUTO	BACKPAT
BASE	BEEP	CALL
CDBL	CHAIN	CHR\$
CINT	CIRCLE	CLEAR
CLOSE	CLS	COMMON
CONT	COS	CSNG
CVD	CVI	CVS
DATA	DATE\$	DEF

#### 24 • Reserved Words in Microsoft BASIC

DEFDBL DEFSTR EDIT EOF ERASEARC ERL EXP FILLARC FILLRECT FOR FRAMERECT GET GOTO **HIDEPEN INITCURSOR** INPUT# INT INVERTRECT LEFT\$ LINE LLIST LOF LPRINT MID\$ MKS\$ MOVE NFW NOT OPEN OUTPUT PAINTRECT PENMODE PENSIZE POS PSET RANDOMIZE RENUM RETURN RSET SETCURSOR SHOWPEN SPC( STOP STRING\$ TAB( TEXTFONT THEN TO USING VARPTR WHILE XOR

DEFINT DELETE ELSE EOV ERASEOVAL ERR FIELD FILLOVAL FIX FRAMEARC FRE GETPEN HEX\$ INKEY\$ INPUT\$ **INVERTARC** KILL LEN LINETO LOAD LOG LSET MKD\$ MOD MOVETO NEXT OCT\$ OPTION PAINTARC PEEK PENNORMAL POINT PRESET PTAB READ RESTORE **RIGHT\$** RUN SGN SIN SOR STR\$ SWAP TAN TEXTMODE TIME TROFF USR WAIT WIDTH

IF

DEFSNG DIM END ERASE ERASEERECT ERROR FILES FILLROUNDRECT FN FRAMEOVAL FRAMEROUNDRECT GOSUB HIDECURSOR IMP INPUT INSTR **INVERTOVAL** INVERTROUNDRECT LET LIST LOC LPOS MERGE MKI\$ MOUSE NAME OBSCURECURSOR ON OR PAINTOVAL PAINTROUNDRECT PENPAT POKE PRINT PUT REM RESUME RND SAVE SHOWCURSOR SPACE\$ STEP STRING SYSTEM TEXTFACE TEXTSIZE TIMER TRON VAL WEND WRITE

#### BASIC, Rules for Variable Names in Microsoft BASIC Variable names:

(a) must start with a letter

(b) can have up to forty characters

(c) cannot be a reserved word (such as IF, ON, THEN, GOTO, etc.) or a reserved word followed by a variable type declaration character (\$, %, ?, !, #).

(d) end with a type declaration character. The default value for the type of

variable is numeric, so any variable name not ending in a \$, !, or # is automatically treated as a numeric integer variable.

DEFINT for integer numbers, DEFSNG for single-precision numbers, DEFDBL for double-precision numbers, DEFSTR for string variables.

For example, if you place the statement: DEFSTR ABC at the beginning of your program, all variables starting with ABC (such as ABCDATA, ABCMISC, etc.) will be string variables because they start with a series of characters defined in the DEFSTR to be a string variable prefix.

**BASIC, SAVE Instructions for Microsoft BASIC** If you wanted to SAVE the program currently in the computer's memory, you would enter the command SAVE in the Command window followed by the name of the program. You could accomplish the same thing by using the Save option from the pull-down File menu on the menu bar. A Dialog box that requests the name and the format of the file will be displayed on the screen. This dialog box also allows a particular disk (currently stored in the Finder) to be selected by clicking the drive button.

Filename:	SAVE.TEST	OK	
() ASCII	🖲 Binary	() Protected	Cancel

Fig. B1 The Dialog box that requests the name of the	e file	e to save
--	--------	-----------

To run the program at a later time, use the LOAD command to copy it from the disk you saved it on, back into the Macintosh's memory. See LOAD. If you want to SAVE the program in ASCII format, which allows you to MERGE two programs together, put ,A after the close quote of the program name thus:

SAVE ''SAMPLE'',A

See MERGE.

To SAVE the program as a protected file in encoded binary form use, P instead of ,A. Then it cannot be listed, saved, edited (or unprotected). While a clever programmer could probably get around this, it will at least prevent a quick and casual or accidental modification to your program.

The SAVE instruction does not alter your program in memory. It is important to be aware that if you write a Microsoft BASIC program, it will be lost (erased) unless you SAVE it before you: turn off the Macintosh, go to the Desktop (System command) or use the NEW command.

**BASIC, Special Characters in Microsoft BASIC** The following characters have special meanings in Macintosh Microsoft BASIC, and cannot be used to have meanings other than what is stated below:

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blank space + plus sign or concatenation symbol / slash or division symbol caret or exponential symbol % percent sign or integer type declaration character \$ dollar sign or string type declaration character & ampersand single quotation mark (apostrophe) or remark delimiter : semicolon ? question mark or PRINT abbreviation " double quotation mark or string delimiter (left parenthesis ) right parenthesis = equal sign or assignment symbol - minus sign backslash or integer division symbol \* asterisk or multiplication symbol # number or pound sign, or double-precision type declaration character ! exclamation point or single-precision type declaration character . comma . period or decimal point : colon – underline < less than > greater than

#### **BASIC, Statements Cross-referenced by Function for Microsoft BASIC:**

Address of variable in memory - VARPTR((variable)) Arctangent - ATN(xx) Arrays - DIM (variable subscripts) and OPTION BASE (n) ASCII codes for characters - ASC((X\$)) ASCII code to characters - CHR\$((n)) Branch - GOTO (line) Call Microsoft BASIC subroutine - GOSUB and RETURN Carriage position - printer - LPOS((n)) Change a Microsoft BASIC line - EDIT (line) Change memory byte with Microsoft BASIC - POKE (n,m) Character read from keyboard - INKEY\$ Clear the screen - CLS Color of a point - find - POINT (x,y)Communications buffer space -LOC((filenum)) and LOF((filenum)) Convert decimal to hexadecimal string - HEX\$(<n>) Convert decimal to octal string - OCT\$((n)) Convert number to string - MKI $(\infty)$ , MKS $(\infty)$ , MKD $(\infty)$ Cursor - find current location - POS((n)) Decimal to hexadecimal string conversion - HEX\$((n)) Decimal to Octal string conversion - OCT\$((n)) Disk - list directory of files - FILES (filespec) Double-precision number - convert to -  $CDBL(\infty)$ e - powers of - EXP(\color) Ellipse - draw - CIRCLE((x,v),op End of File - EOF((filenum)) Erase a file from Microsoft BASIC - KILL (filespec)

#### BASIC, Statements Cross-referenced by Function for Microsoft BASIC • 27

Erase current Microsoft BASIC program and variables - NEW Erase current Microsoft BASIC variables (not program) -CLEAR, [<n>[],<m>]] Error - line number where it occured - ERR and ERL Error code number of last error - ERR Execute Microsoft BASIC program - RUN Exponential -  $EXP(\infty)$ File - erase from Microsoft BASIC - KILL (filespec) File - length of - LOF((filenum)) Find character or string in a string - INSTR([<n>, kx\$, v\$>) Generate line numbers automatically -AUTO[(//increment>]] Graphics - PUT (x1,y1)[-(x2,y2)], (array)[, (action)] Immediate response to one-character answers (without using return) - Y or N, etc.- INKEY\$ Integer - convert to by rounding -  $CINT(\infty)$ Keyboard - read characters - INKEY\$ Kevboard - read data from -INPUT[;][{''prompt''>; kvariable>[, variable>] and LINE INPUT#(filenum).(stringvariable) Left justify a string - LSET (stringvariable) = (string exp) Large programs - use of overlays - CHAINMERGE (filespec) Length of file - LOC((filenum)) and LOF((filenum)) Length of string - LEN( $\infty$ \$) Line numbers - generate automatically -AUTO[(//increment>)] Line numbers - renumber -RENUM [[<newnumber>][,[<oldnumber>][,<increment>]]] Line number where error occured - ERL Location of cursor - find - POS((n)) Loop - FOR and NEXT statements and WHILE and WEND statements Machine language program (subroutine) -CALL (variable) ((variable)...)] Memory address of variable - VARPTR(«variable») Memory - amount free - FRE((n)) Memory - change - POKE (n,m) Memory - read byte - PEEK((n)) Natural logorithm - LOG(xx) Number - convert from string -CVI(x\$), CVS(x\$), or CVD(x\$)Number - convert to string - MKI $(\infty)$ , MKS $(\infty)$ , or MKD\$(\color) Numeric value of string - VAL(x\$)Octal string - convert to from decimal - OCT\$((n)) Overlays - CHAINMERGE(filespec) Position of carriage - printer - LPOS((n)) Print Microsoft BASIC program listing on printer -LLIST[dine1>[-[dine2>]]] Print on printer - LPRINT[dist of expressions>] Printer - carriage position - LPOS((n)) Program, Microsoft BASIC - run or execute - RUN and LOAD Random number - RND[(x)] Read character from keyboard - INKEY\$, INPUT[:][{"prompt":kvariable

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Read data from file -GET[#]{filenum GET[#] def GET[#] def GET[#] def (READ reads from DATA statements and INPUT# and LINE INPUT#) Repeat a character (n) times -STRING\$((n.m)) and STRING\$((n.x\$)) Repeat program lines - FOR (variable) =  $\infty$  TO (v) [STEP (z)] Screen, clear - CLS Screen, graphics - PUT(x1,y1)[-(x2,y2)], (array) [,(action)] and COLORFL Screen - width - WIDTH (size) 40 or 80 Search string for character or shorter string -INSTR([m], x\$, y\$)Sign - SGN(xx) Single-precision numbers - convert - CSNG(xx) Spaces in PRINT or LPRINT - SPC((n)) Speaker - BEEP Square Root - SOR(xx) Stop Microsoft BASIC program - END String - convert from number -  $MKI\$(\infty)$ ,  $MKS\$(\infty)$ , and MKD\$(xx) String - convert to number - CVI(x\$), CVS(x\$), or CVD((x\$)) String - left justify - LSET (stringvariable) = (stringexp) String - length of - LEN(x\$>) String - numeric value of - VAL(x\$)String - right justify - LSET (stringvariable) = (stringexp) Subroutine - GOSUB (line) Subroutine - machine language -CALL (variable) ((variable)...)] Trace off - TROFF Trace on - TRON

BASIC,	Statements	for	Microsoft	BASIC	Table	of	formats	with	descriptions	and
types:										

Statement	Туре	Description
ABS(co)	F	Absolute value of «
ASC(x\$)	F	Gives ASCII code of 1st character of <a>(x\$)</a>
$ATN(\infty)$	F	Returns the arctangent of \infty
AUTO[ <num> [,<increm>]]</increm></num>	C	Automatically numbers lines
BEEP	S-1/O	Speaker emits beep sound
CALL (numvar) [(variable list)]	S	Machine language program called
CDBL(co)	F	converted to a double-precision number
CHAIN[MERGE] (filespec)	5	Calls and passes variables to another program
CHR\$( <n>)</n>	F	Gives character with ASCII code (n)
CINT(xx)	F	Converts «» to integer
CIRCLE((x,y)),(p)	S-I/O	Draws circle with center (x, y) and radius (p)
CLEAR[,[ <n>,<m>]]</m></n>	C	Program variables cleared, optionally sets memory area
CLOSE[#]	S-I/O	Closes a file
CLS	S-I/O	Clears the screen
COMMON dist of variables	S	Variables passed to a chained program
CONT	С	Continues program execution
# BASIC, Statements for Microsoft BASIC • 29

COS(colored{c	F F F	Computes cosine of angle (∞) (in radians) Converts ∞ to a single-precision number Converts (x\$) to integer, single-, or double- precision number
DATA dist of expressions	S-I/O	Data table is created to be read by READ statement
DATE\$,DATE\$=(exp) DEF FN(name)	S S	Gives or sets the system date Defines numeric or string function
DEF (type)	S	Defines default variable types - ‹type› is SNG, DBL, INT, STR
DELETE(dine1>) [-dine2>]	С	Deletes specified lines in a program
DIM dist of subscripted variables>	5	Sets up maximum subscript values for arrays and makes available space for them
EDIT dinenum>	C	Displays a program line for editing
END	5	Terminates the program, closes all files, and returns you to command level
EOF(‹filenum›)	S-I/O	End of file condition on (filenum) is indicated
ERASEcarraynames	S	Removes arrays from a program
EKL	5	occurred
ERR	S	Gives the error code number of the last error
	S	Simulates error number (n)
EXP(OD)	F S L/O	Fields are defined in a random file buffer
awidth AS as	5-1/0	rielus are denneu în a fandom me ounei
FILES[(filespec)]	С	Files in the disk directory that match a file specification are listed
FIX(∞)	F	Makes (🕸) an integer by truncation
FOR (variable) =	S	Used with NEXT statement to repeat program lines a specified number of times
[STEP @)		
FRE((n))	F	Gives the amount of unused space in memory
GET[#]‹filenum› [,‹number›]	S-1/O	Record is read from a random file
GET(α1,γ1›)- (α2,γ2›),	S-I/O	Reads graphic information from the screen
(arrayname)		
GOSUB dinenum»	S	Used with the RETURN statement to execute and return from a subroutine
GOTO dinenum»	S	Delivers control to a specified line
HEX\$(‹n›)	F	Gives a string representing the hexadecimal value of <pre>of <pre>of</pre></pre>
IF«expression» THEN«clause»{ELSE «clause»}	S	If expression is true, statements(s) in THEN clause are performed. Otherwise, performs the ELSE clause or goes to the next line
INKEY\$	S	Reads character from keyboard
INPUT[;] [\$NCHprompt\$NCH›;] ovariable list	S-1/O	Reads data input from the keyboard
INPUT#(filenum), (variable list)	S-1/O	Reads data from file (filenum)
INPUT\$( <n> [,[#]<filenum>])</filenum></n>	F	Reads (1) characters from (filenum)
INSTR([m,] (x\$),(y\$)	F	Returns the position of the first occurrence of (v\$) in (x\$) starting at position (n)
INT(xx)	F	Gives greatest integer that is less than or equal to $\infty$

# 30 • BASIC, Statements for Microsoft BASIC

KILL (filespec) LCOPY	C S	Erases a disk file Sends the exact image of the Macintosh screen to the printer
LEFTS( <x\$>,<n>)</n></x\$>	F	Gives the leftmost (n) character of (x\$)
LEN(x\$)	F	Returns the number of characters in «\$»
(LET)(variable)= (exp)	S	Assigns the value (exp) to (variable)
LINE[(\(\alpha1,y1\))]- (\(\alpha2,y2\)],[ (\(\alpha0,y2\)],B[F]]]	S-I/O	Draws a line(s) or box on the screen and fills the box with color
LINE INPUT[;] [{\$NCHprompt\$NCH>;] (stringvariable)	S-I/O	Reads an entire line from the keyboard, ignoring commas or other delimiters
LINE INPUT#	S-I/O	Reads an entire line from file (filenum) to (stringvariable)
LIST [dine1>] [-[dine2>]]	С	List specified program (line)(s) to screen or other device
LLIST[dine1> [-[dine2>]]]	С	List specified program (line)(s) to the printer
LOAD[(filespec>) [.R]	С	Loads a program from a specified device and optionally runs it
LOC((filenum)) LOF((filenum))	F F	Gives the location of file (filenum) Returns the number of bytes (in multiples of 128) in a sequential or random file, and gives the number of free bytes in communications input buffer
LOG(xx)	F	Returns the logarithm to base e of $\infty$ (natural log)
LPOS((n)) LPRINT[dist of	F S-I/O	Gives the carriage position of the printer Prints data on the printer (LPT1:)
expressions) LPRINT USING (stringvan; dist of expressions)	S-I/O	Prints data on the printer using the format specified in «stringvan
LSET stringvap = stringexp	S-I/O	Left justifies a string in a field
MERGE (filespec)	с	Merges the lines from an ASCII program file into the program currently in memory
MID\$(x\$), <n> [,<m>])</m></n>	F	Returns (m) characters from the string (x\$) starting at position (n)
MKI\$(∞) MKS\$(∞)	F	Converts ∞ in integer, single- ,or double- precision string values
MKD\$(@) MOUSE(@)	F	Returns information on the state of the mouse button or the location of the mouse based on parameter (m)
NAME (oldname) AS	С	Changes the name of a disk file
NEW	с	Deletes the current program in memory and clears all variables
NEXT[‹variable›] OCT\$(‹n›	S F	Ends a FORNEXT loop Gives a string which is the octal value of the decimal argument
ON ERROR GOTO	S	Moves program control to error handling routine when error is encountered
ON (expression) GOSUB (linenum- list)	S	Branches to specific line number or listed line numbers; requires RETURN statement
ON «expression» GOTO(linenumlist)	S	Branches to specific line number or listed line numbers

# BASIC, Statements for Microsoft BASIC • 31

OPEN(filespec) FOR (mode)]AS[#] (filenum)[LEN=	S-1/O	Opens file or other device to allow I/O
(reci) OPEN(mode),[#] (filenum), (filespec)	S-I/O	Another form of OPEN
OPTION BASE (n)	s	Declares minimum values for array subscripts
PEEK((n))	F	Reads the byte from the memory position (m)
POINT(x,y)	F	Returns the color of the specified point on the screen (graphics mode only)
POKE (n,m)	S-1/O	Places a byte in a memory location
POS((n))	F	Gives the current cursor column position
PRESET((x,y)) [,(colon]	S-I/O	Draws a point on the screen in background color
PRINT[dist of	S-I/O	Prints data on the screen
expressions»] PRINT USING «\$»;dist of	S-1/O	Prints data using specified format
expressions» PRINT#dilenum», dist of	S-1/O	Writes the dist of expressions sequentially to a file
expressions		
PRINT#(filenum), [USING cx\$);] (list of expressions)	S-I/O	Writes the dist of expressionsy sequentially to a file using the format specified by <x\$></x\$>
PSFT(x xx)	5-1/0	Draws a point on the screen in the foreground
	51,0	color if the color is not specified
PTAB ( $\infty$ )	F	Moves screen print position to pixel $\infty$
PUT[#]{filenum> [, <number>]</number>	S-1/O	Puts an image in a rectangular area on the screen. The upper left-hand corner of the area is specified by (x,y)
PUT(x1,y1) [-(x2,y2)], (array)[, (action)]	S-1/O	Draws a rectangular image on the screen. The upper left-hand corner or the area is specified by «1,y1»
RANDOMIZE(m)	S	Reseeds the random number generator
READ (variable) [,(variable)]	S-1/O	Reads data from a DATA statement and assigns them to variables
REM (remark)	S	Inserts (remark)s in a program
RENUM [[‹newnum›] [,[‹oldnum›] [ /increment)]]	C	Renumbers program lines
RESET	C	Closes all disk files and clears the system buffer
RESTORE	Š	Allows DATA statements to be reread from a
[dinenum>]	-	specified dinenum
RESUME [0],	S	Continues program execution after an error
RESUME NEXT, or		recovery procedure is executed
RESUME (line)		
RETURN [dine>]	S	Returns from a subroutine
RIGH1\$(a\$,a)	F	Gives the rightmost (n) characters of string (x\$)
	F c	Returns a random number between 0 and 1
KSET (Stringval)	3	for a PLIT statement
RUN dilespecy	С	Executes a program: the R option is used to keep
[.R]	÷	files open
RUN (dine)	С	Executes a program at the dine specified
SAVE[(filespec)	С	Saves a Microsoft BASIC program file on disk;
[,A]]		the A option saves the program in ASCII format

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# 32 • BASIC, Statements for Microsoft BASIC

SAVE[{filespec>	С	Saves a program on disk; the P format saves the program in an encoded binary format
SGN(co)	F	Returns the sign of $\infty$
SIN(\col)	F	Returns the trigonometric sine function of $\infty$
SPACE\$(m)	F	Gives a string constant of (n) spaces
SPC((n))	F	Prints (n) spaces in a PRINT or LPRINT statement
SOR(co)	F	Gives the square root of $\infty$
STOP	S	Stops program execution and returns to command level
STR\$(co)	F	Converts the value of $(\infty)$ to a string value
STRING\$( <n>,<m>) or</m></n>	F	Returns a string of length (n) whose characters all ASCII code (m) or the first character of (x\$)
STRING\$(< <pre>string\$</pre>	_	
SWAP (variable1), (variable2)	S	Exchanges the values of two (variable)s
SYSTEM	С	Exits Microsoft BASIC, closes all files, and returns to Desktop
TAB(‹n›), PRINT TAB(‹n›),or	F	Tabulates to position (‹n›)
LPRINT TAB( <m)< td=""><td></td><td></td></m)<>		
TAN(co)	F	Gives the trigonometric tangent of (xx)
TIME\$ or	S	Retrieves or sets the current time
$TIME$ = \langle v \rangle$		
TIMER	F	Retrieves number of seconds elapsed since midnight
TROFF	C	Turns the tracer for execution of program statements off
TRON	C	Turns on the tracer for executed program statements
VAL( <x\$>)</x\$>	F	Returns the numerical value of the string (x\$)
VARPTR (variable)	F	Returns the address of (variable) in memory
WEND	S	Closes a WHILEWEND loop
WHILE (expression) [(statements)]	5	Starts a loop which continues to execute (statement) as long as the (expression) is true
WIDTH (size)/ (filenum,size)/ (device,size)	S-I/O	Sets screen width – options let you specify width printer or communications file
WRITE[dist of expressions]	S-I/O	Outputs data on the screen
WRITE#(filenum), (list of expressions)	S-I/O	Outputs data to a sequential file

Abbreviations used: x, y, n = a numeric variable v\$ = a string variable x\$ = a string

Type:

C = Command

S = Statement (not Input/Output)

S-I/O = Input/Output Statement

F = Function

**Basket Case**<sup>\*</sup> A hard-sided carrying case, with pockets for the mouse, the numeric keypad, the power cord, the keyboard and the Macintosh. There are two latches on the front for locking the case. It has metal corners and a carrying handle. Justin Case. In UK: P+P micro distributors.

**Batch Processing** A program or series of programs is run to completion or aborted with no interaction between the user and the program possible.

**Battery Backup** Auxilliary power is provided through batteries to the processor so volatile information is stored during a power failure.

**Baud Rate** The number of bits per second that can be passed from one device to another via a cable connection or a telephone connection. A baud rate of 300 bits per second equates to about 30 characters per second.

**Beep** An audible sound produced by the Macintosh's speaker, used to warn the user of potential problems when alert boxes are displayed. Such a sound is generated when the Macintosh has been turned on and no disk has been inserted in the disk drive for loading. See Alert Box.

**BEEP** A Microsoft BASIC Statement which causes the speaker to emit a sound at 800 Hz for 1/4 second. The format is:

# BEEP

**Benchmark Program** A specific program written to calibrate the speed of a computer in a well-defined situation, or type of computation, e.g., scientific number crunching, sorting or compilation.

Beta Test Site See Alpha Test Site vs. Beta Test Site.

**Bidirectional** Data flow may go in either direction on a wire. At each end of the wire there are transceivers to both receive and transmit. Common bidirectional buses are tristate or open collector transistor-transistor logic.

**Bidirectional Printing** Alternately printing in either direction. A line printed left to right is followed by a line printed right to left, avoiding a carriage return delay and greatly increasing output.

**Binary Number** A representation of an integer as a sum of powers of 2, using a sequence of 0s and 1s.

**Bit** A contraction of binary digit. A bit is a 0 or a 1. Bits are used in computer systems to code information, instructions and data. Larger units of bits are: nibbles (4), bytes (8) or words (16, 24, 32, 96 or more).

**Bit Image** A collection of bits stored in the computer's memory, arranged into a matrix that is rectangular in concept. The Macintosh screen is a bit image that is visible to the user.

**Bit Map** An abbreviated means of defining the position of bit images in the computer's memory. Each bit map contains a pointer to a bit image, the row width of that image and the boundaries of the rectangle occupied by the image.

**Bit-mapped Screen** A screen display that associates each pixel on the screen with a memory location in the computer's RAM. Pixels are turned on or off depending upon the state of the memory location associated with each pixel. See RAM, Pixel.

**Blank Line on Printer** An LPRINT statement with no other specifications will print a blank line (that is, feed the paper up one line and return to left margin) so you can space your printout format neatly.

# 34 • Blank Lines, Inserting

**Blank Lines, Inserting** A blank line may be inserted in the midst of MacWrite text by moving the cursor down to the left-hand side of the line to be located below the blank line. The mouse button is then clicked to display the insertion cursor (a straight vertical line). Then the Return key is pressed causing a line to be inserted. See Cursor, Mouse Button, Vertical Bar Cursor.

Blanking On the monitor screen, not displaying a character or leaving a space.

**Blinking Vertical Bar** Used to mark the insertion point for text when a dialog box requests the name of a program or file being saved, to mark the insertion point for text when MacPaint is being used and to show the insertion point for text when MacWrite is being used. See Insertion Point, Dialog Box.

**Block** The memory of the Macintosh is divided into blocks that may vary in size. A block is a contiguous range of memory locations in the same heap zone. See Heap.

**Block** Within a logical record, information is stored in units or blocks. Block is also sometimes used to mean a collection of logical records, as in blocked records or blocking factor. Block size is usually expressed in bytes.

**Block Contents** The contents of a block of memory is the data stored there. In effect, this is the space in the block that is available for storing data, programs, etc., whether or not data is present.

**Block Header** A brief record of data that describes a block of memory and its contents.

**Board (Breadboard)** The fiberglass or pressed-paper sheet used for mounting the integrated circuits. Interconnections may be wire-wrapped, soldered or printed on the board. The term breadboard refers to a prototype circuit and dates from the time when radios were made on mother's breadboard. Also called a "card" when referring to smaller boards that plug into the motherboard.

**Bold** One of the options available from the MacPaint pull- down Style menu located on the menu bar of the MacPaint screen display. This option is used in the Text mode selected from the icon menu on the left-hand side of the MacPaint screen display. Bold is also an option available from the Style menu of MacWrite. It is selected in the same fashion in both applications. The pointer is positioned on the word Style on the menu bar, the mouse button is clicked and the pointer is moved down the pull-down menu until Bold is highlighted. Then, the mouse button is released. This selection will produce boldface type in both programs for whichever font is active. See Menu Bar, Pull-down Menu, Icon, Drawing Tools Palette, MacPaint, MacWrite.

**Books** To find books on a particular topic, scan the Vendor/Product List noting the underlined entries.

**Boolean Logic** Named after George Boole, who defined an algebra of logical operations such as And, Or and Not, on the two values true and false.

Boot To use a bootstrap. Generally used to describe starting up a computer.

**Bootstrap** A program used for starting the computer, which usually clears memory, sets up I/O devices and loads the operating system from ROM, disk or cassette.

**Border** Borders of varying width are used to surround each of the shapes generated by the icons on the tool palette (icon menu) on the left-hand side of the MacPaint screen display. Borders are selected from the line and border width menu in the lower left corner of the MacPaint display. See Icon, Drawing Tools, MacPaint.

**Bottom Margin** The height of the bottom margin in MacWrite is set by opening the Footer window in the program and pressing Return for as many lines (up to six) as may be required for the bottom margin of each page. The Footer may then be hidden by using the Hide Footer option from the Format menu on the menu bar. See Footer, Hide Footer Option, Return Key, MacWrite.

**Bound** Processor-bound or I/O-bound indicating which component of a system is the bottleneck preventing faster performance.

**Boundaries** In Microsoft Multiplan, the edges of highlighted areas on the screen are called boundaries. Boundaries are set by placing the plus sign (+) (used as a pointer) on the first cell to be formatted, included in a formula or value copy process or moved. The mouse button is clicked and the pointer is dragged to the end of the range of cells to be included within the boundaries. This process will highlight the range of cells to be included, which may consist of a single cell, a pair of cells arranged horizontally or vertically, a column or row of cells, or a series of adjacent rows or cells that make up a square or rectangle. See Multiplan, Cell, Highlight, Mouse Button, Pointer, Clicking, Dragging.

**BPI** Bits Per Inch. Used to specify the density of data recorded on tape or disk.

**Braces** Braces () are used in Multiplan to denote the position of cells referred to in a formula for cells on the Clipboard for handling via the Clipboard. See Cell, Multiplan, Clipboard.

**Branch** A programming instruction which causes transfer of control to another program sequence. In Microsoft BASIC, for example, the GOTO statement. See GOTO.

**Breakpoint** A point at which the processor will stop a program sequence and display the current machine status, implemented through hardware, software or a combination of both.

**Brush Mirrors** An option available from the pull-down Goodies menu in MacPaint, which is located across the top of the MacPaint screen display. When Brush Mirrors is selected, a square is displayed in a window on the screen. Horizontal, vertical and diagonal lines are displayed inside of the square. One or all of these lines may be selected for producing a mirror image of any line drawn with the brush tool from the tool palette of MacPaint by placing the pointer on each of the axes to be selected and pressing the mouse button. After the desired brush mirrors have been selected, the OK button is activated in the window by placing the pointer on the button and pressing the mouse button. This will cause the window to be closed and make the brush mirror available for use. Brush mirrors produce images similar to the image shown below. They cause the mirror image of any line drawn to be produced on the opposite side of the axis or axes selected by the Brush Mirrors option. See Paintbrush, Button, Window, MacPaint, Drawing Tools, Pointer, Mouse Button.



Fig. B2 Drawing done with brush mirrors from MacPaint.



Fig. B3 The Brush Shape menu from MacPaint.

**Brush Shape** Brush shapes and thicknesses for use with the Brush icon on the tool palette of MacPaint may be selected by using the Brush Shapes option available from the pull-down Goodies menu on the menu bar of MacPaint. When selected, a window containing a variety of brush shapes and thicknesses is displayed on the screen. The current brush shape is inside of the square displayed within the window. A new brush may be selected by moving the pointer to the desired brush and clicking the mouse button. Once the mouse button has been pressed, the window will close automatically and you will be able to use the selected brush when you select the Brush icon from the tool palette.

**Buffer** In software, any memory structure provided for the temporary storage of data. In hardware, a device which restores logic-drive signal levels in order to drive a bus or a large number of inputs.

**Buffering** The delaying and temporary storage of data in a data communications path.

**Bug** Errors in a Program. A programmer must ensure that a program will correctly process all of the types of data it is intended for. Samples of the data are prepared (test data) and the program is executed using this data (a test run). The program's outputs (reports, screen displays, files, etc.) are then verified to be as specified. An error in the processing logic of a program is called a "bug," hence the term "debug" and "bug-free."

Bulk Storage Large capacity data storage, generally long term.

**Burn-in** A phase of component testing where basic flaws or early failures are screened out by running the circuit for a specified length of time generally at elevated temperatures in some sort of oven.

**Bus** A path for signals having a common function. Every Standard MPU creates three buses: the data bus, the address bus and the control bus.

**Business Graphics** Applications programs that allow the user to display data as bar graphs, line graphs, scattergrams, pie charts or combinations of these various graphs. An example of such an application is Microsoft Graph. See Graphics.

**Business Software** Applications that are commonly used by businesses. The applications covered by this generic description are generally accounting, personnel, forecasting or inventory applications. See Business Simulation, Dow Jones Market Manager, Dow Jones Spreadsheet Link, Habadex, Mac Manager, Mac Project, Management Edge, Negotiation Edge, Sales Edge, SEACAS, Telofacts 2, Template Disk No. 1 for Multiplan, Trade\*Plus.

**Button** A small square or rectangle within a window that allows the user to take a course of action. Alert boxes contain buttons that suggest the most prudent action when a problem has been encountered. Dialog boxes may offer one or more options for proceeding, or may only communicate a message. Those dialog boxes that require a response are called "modal." Those that require no response are called "modeless." Action is initiated in a dialog box by placing the pointer on the desired button and clicking the mouse button. See Dialog Box, Alert Box, Pointer, Modal Dialog Box, Modeless Dialog Box.



Fig. B4 A Dialog box with an "OK" button.

**By Date Option** When you double-click the disk icon of the disk in the Macintosh's disk drive, the directory of that disk will be displayed on the Macintosh screen as a window. The directory is normally displayed in the icon format. If you wished to view this directory in date order with the date of the latest file modified showing first on the list, select the View menu from the menu bar at the top of the display on the Macintosh screen. Then move the pointer down this menu until by Date highlighted. Then release the mouse button and this directory appears on the screen in date order. This type of directory is displayed below:

# 🔹 File Edit Views Special

by	Icòn
by	Name
⁄by	Date
by	Size
bū	Kind

		MacDrive	
Size	Name	Kind	Last Modified
OK	Empty Folder	folder	Mon, Oct 1, 1984
10K	pbg.budget	document	Mon, Oct 1, 1984
10K	pbg.addtobudget	MS-BASIC document	Sun, Sep 30, 1984
10K	pbg.changebudget	MS-BASIC document	Sun, Sep 30, 1984
10K	pbg.menu	MS-BASIC document	Sun, Sep 30, 1984
10K	pbg.listthebudget	MS-BASIC document	Sun, Sep 30, 1984
10K	pbg.newbudget	MS-BASIC document	Sun, Sep 30, 1984

Fig. B5 The By Date directory from the View menu.

**By Icon Option** An option available from the View menu on the menu bar at the top of the Macintosh screen display. When selected, the directory of the disk in the Macintosh's disk drive is displayed with each file name appearing as an icon. This directory is illustrated below:



Fig. B6 The By Icon directory from the Macintosh Desktop display.

**By Kind Option** An option available from the View menu on the menu bar of a Macintosh screen display. When selected, the names of the files in the directory of the disk are displayed in order of file type. This directory display is illustrated below.

**By Name Option** An option available from the View menu on the menu bar of a Macintosh screen display. When selected, the names of the files in the disk directory are displayed in alpabetical order by name. This directory is illustrated below.

**By Size Option** An option available from the View menu on the menu bar of the Macintosh screen display. When this option is selected, the disk directory is displayed in order of size with the largest file at the top of the list. This type of directory is illustrated below.

**Byte** A group of eight bits, universally used to represent a character. Microcomputer instructions generally require one, two or three bytes. One byte has two nibbles (4 bits).

Ś.	File Edit	View Spi	ecial
		by Icon	
		by Name	rive
Size	Name	by vate	Last Modi
51K	Stuff	∠hu Kind s	Sat, Aug
40K	SFAC Lette	rs totter	Fri, Aug
30K	Application	s folder	Sat, Aug
317K	MacPaint D	oc folder	Fri, Aug
102K	<b>CIS Folder</b>	folder	Fri, Aug
10K	Da¥inci Ext	eriors folder	Sat, Jun :
92K	June DOM	folder	Mon, Jul
10K	MS-Basic P	rog folder	Fri, Aug
419K	Da¥inci Lan	dsca folder	Sat, Aug
71K	Text Files	folder	Sat, Aug
\$			

Fig. B7 The By Kind directory as selected from the View menu.

	File Edit	View	Spe	ecial	
		by Ic	DN		1
		√by Na	me,		
Size	Name	by Da	te		
10K	GLOBE.BAS	by Siz	d d	GIC document	K
10K	HexDump	UY KI	ppnca	tion	
10K	home	٢	1acPai	int document	
20K	ICONPIC	N	1acPai	int document	
20K	Imagewrite	r 9	ysten	n document	100
92K	June DOM	f	older		
10K	Life	a	pplica	tion	
61K	MacPaint	a	pplica	tion	
317K	MacPaint D	oc f	older		V
					D

Fig. B8 The By Name directory from the Macintosh Desktop as selected from the View menu.

	File Edit	View Spe	ecial	
		by Icon by Name	lacDrive 📰	
<u>Size</u>	Name	by Date bu Size T		Last Modified
71K	Text Files	by Kind	a la crita e la	Sat, Aug 18, 1984
61K	MacPaint	applica	tion	Wed, May 2, 1984
61K	MacWrite	applica	tion	Wed, May 2, 1984
51K	Finder	System	n document	Wed, May 2, 1984
51K	MS-BASIC	applica	tion	Fri, Jan 1, 1904
51K	Stuff	folder		Sat, Aug 18, 1984
40K	SFAC Letters	s folder		Fri, Aug 10, 1984
30K	Applications	folder		Sat, Aug 18, 1984
5				

Fig. B9 The By Size directory from the View menu on the Macintosh Desktop.

# C

C ASCII 67, HEX 43.c ASCII 99, HEX 63. Also the hexadecimal notation for the decimal number 12:

C base 16 = 12 12 base 10 = 12 14 base 8 = 12 1100 base 2 = 12

**C Programming Language** C is a high-level programming language developed at Bell Laboratories, associated with the UNIX Operating System. This is a compiled language and is sometimes substituted for Assembly language because it operates at a very high speed. C-compilers are available for the Macintosh and Unipress, Inc. is working on a C Development Environment.

**C** for the Macintosh<sup>•</sup> A C-Compiler for the Macintosh. The current version is intended for the student; however, a full professional package will be available shortly from the manufacturer. Hippopotamus Software.

**CAD** Computer-Aided Design. A software/hardware system providing tools for the designer. MacPaint and MacDraw can be used as limited CAD packages.

**CAI** Computer-Assisted Instruction. Any program that instructs or trains the student, particularly where instant feedback and customized rate and progression through topics is offered.

**Calculate Menu** The Calculate menu is one of the pull-down menus that is available in Microsoft Multiplan. This menu contains seven options: Calculate Now, Automatic Calculation, Manual Calculation, Iterate, Don't Iterate, Set Completion Test and Select Completion Test. Calculate Now is used to calculate the cells in a worksheet when the Manual Calculation mode is in effect. Automatic Calculation is the default calculation mode. It must be selected to return to automatic calculation when the Manual Calculation option is in force. Manual Calculation is used to set the worksheet to the manual mode of calculation to save time while large amounts of data are being entered into a worksheet or while a worksheet is being created. No calculations take place while this option is in force unless the Calculate Now option is selected. The Iterate option is used to calculate certain formulas in a worksheet until a certain condition is met. The condition for completing iteration is called a completion test. A completion test is set up by using the Set Completion test command option. Such a test is selected by using the Select Completion Test command option. The Don't Iterate command option is used to prevent Multiplan from attempting iteration even though a formula that requires iteration is encountered.

**Calculate Now Option** Calculate Now is a command option that may be selected from the Calculate menu in Multiplan. This command is used to cause all of the cells

in a worksheet to be calculated at time when Automatic Calculation has been turned off and Manual Calculation has been turned on. See Calculate Menu.

**Calculator** One of the desk accessories available from the Apple menu in the upper left-hand corner of the Macintosh display screen. The Calculator is selected by scrolling down this menu with the mouse button depressed until the word "Calculator" is highlighted. The mouse button is then released and the Calculator is displayed on the screen. (See illustration shown below.) Many of the features of a normal 10-key desktop calculator are available on this Calculator. It may be used with the mouse by pointing at the keys to be used in the calculation you are making. It may also be used from the keyboard, by pressing any number or arithmetic symbol. The results of a calculation are displayed in the window at the top of the Calculator and may be transferred to the Clipboard by using the Cut option from the Edit menu on the menu bar at the top of the screen. These calculations may then be transferred to a MacWrite document or another application document by using the Paste option from the Clipboard. The Calculator is closed by placing the pointer on the Calculator's close box and clicking the mouse button. See Apple Menu, Clicking, Close Box.



Fig. C1 The Calculator from the Macintosh Desktop accessories.

**Calendar, The\*** A time-management program that allows the user to schedule his activities and appointments, make notes about appointments, display an on-screen calendar of planned activities, update schedules and appointments, and print out daily, monthly and yearly schedules. Hayden Software, Inc.

**CALL** A Microsoft BASIC statement which allows a machine language subroutine or an internal Macintosh subroutine to be accessed through a Microsoft BASIC program. The format is:

# 44 • Call

CALL (numvan[(variable)], variable)]...)]

(numvar) refers to the name of a numeric variable, the value of which indicates the starting memory address of the subroutine being called.

(variable) is the name of a variable to be passed as an argument to the machine language subroutine.

**Call** Program execution is temporarily transferred to a subroutine or subprogram. When completed, execution resumes at the instruction following the call.

Call Microsoft BASIC Subroutine. See GOSUB and RETURN.

**Call by Reference** The actual storage locations of the parameters are passed to the subroutine by the call, rather than passing a copy of the values.

**Call by Value** A subroutine or procedure call in which the actual values of the parameters are passed to the subroutine.

**Cancel** Some alert boxes and some dialog boxes offer the user a Cancel button as well as an OK button. The Cancel button allows the user to cancel the operation just started. In the case of an alert box, this option prevents a potential loss of data. In the case of a dialog box, it offers a chance to back out of a process started. An example of an alert box and a dialog box with a cancel button are shown below. See Alert Box, Dialog Box, Button.



Fig. C2 An alert box that uses a Cancel button.

Save the document as:	MAC DRAW
Floorplan	Eject
Save Cancel	

Fig. C3 A dialog box that uses a Cancel button.

**Cancel Button** A Cancel button is presented in most dialog boxes that are used in Macintosh applications. This button is a hollow rectangle with the word "Cancel" inside. It allows the user to back out of the last activity or command that he selected. This button is activated by placing the mouse pointer inside the button and then clicking the mouse button.

**Cancel the Current Operation** When Command-C is pressed while a Microsoft BASIC program is being run, the program operation is interrupted and will also cause the line being edited in the Command window to be left as it was before editing began. It also discards the contents of the Command window if you are writing a program line and wish to discard it. Pressing the Command key and the period (.) key will cancel the operation of a file command or a print command at the point where these two keys are pressed. These are both useful shortcuts when you are involved in the operations described and wish to interrupt or stop the operation. See Command Key, Command-C, Command-., Command Window.

**Candy Apple IEEE 488\*** A user interface used to connect the Macintosh to testing and measurement equipment. It is Apple Bus compatible and uses the INTEL 8291A and 8292 integrated circuits. It has its own power supply and is the same color as the Macintosh. Tecmar, Inc.

**Caps Lock** Located on the left-hand side of the Macintosh keyboard, this key may be locked down to produce all capital letters. To release the key, press it down one time and release it.

Carriage position See LPOS.

**Carriage Return** A term carried over from the days when computer keyboards resembled teletype keyboards. The carriage return key on this keyboard acted the same as the carriage return lever on a manual typewriter and the carriage return key on the electric typewriter. It advanced the paper one line and returned the print element to the left-hand margin. The Return key serves a similar purpose with word processors. In programming, the Return key indicates to the computer that it should accept the data entered prior to the Return key being pressed. Press Return to end the current line, give the line to the requesting program and put the cursor at the start of the next line. See Keyboard, Return Key, Word Processor.

Carrier A frequency used to "carry" information, modulated to denote 0 or 1.

**Carrying Case, ATS Cases**<sup>+</sup> A hard-shell case intended as a shipping case to transport the Macintosh via surface or air transportation. The exterior is laminated plastic and plywood, and the interior is foam-lined. It has pockets for the keyboard, the mouse, disks and the power cord. ATS Cases, Inc. In UK: P+P micro distributors.

**Carrying Cases** See Basket Case, Carrying Case, MacBag, MacFreighter, MacPak, Mac Sac, MacSak, MacTote, Scottie MacCase, Totem Pak.

**CDBL** A Microsoft BASIC function which converts any numeric expression  $\infty$  to a double-precision number. The format is:

 $\langle variable \rangle = CDBL(\infty)$ 

See Numeric Precisions in Microsoft BASIC Conversions.

# 46 • Cell

**Cell** A repeated unit in a RAM chip storing one unit of information and returning it in response to a particular address signal. In electronic spreadsheets, a cell is the point of conjunction of a column and a row. Cells are designated by their row and cell number. For example, in Multiplan, the cell R12C3 is in row 12, column 3.

**Center Alignment** Used with word processors to describe the alignment of text lines so the text is equally distributed on either side of the center line of the page. Used for titles and in some poetry, center alignment is accomplished in MacWrite by selecting the center alignment box under the ruler at the top of the MacWrite screen display and placing the pointer on the box illustrated below and clicking the mouse button. The blinking vertical bar cursor is then displayed in the center of the screen on the line being entered. As text is entered, it remains in the center of the display. If you wish to center a title in MacWrite, you would insert a new ruler immediately after you have finished typing the title line by using the Insert Ruler option from the Format menu on the menu bar at the top of the screen display. Once the second ruler is in position, you may change the alignment of the text to be entered below the ruler by selecting another alignment option in the same manner. A similar option available in MacPaint is called Align Middle. See Word Processor, MacWrite, Mouse Button, Vertical Bar Cursor, Ruler, Align Middle Option, MacPaint.

ć	File	Edit	Search	Format	Font	Style			
					Untitle	ed 📃			
1,	I	. 12 .		3	4 .		15		 170
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T							k		
	i sera								
									₹ 2
-						2	-		 5

Fig. C4 The pointer marks the Center Alignment box on the MacWrite Ruler.

**CHAIN** A Microsoft BASIC statement which transfers control to another program and passes variables from the current program to that program. The format is:

#### CHAIN [MERGE] (filespec>[,[dine>][,ALL][,DELETE (range>]]

(filespec) This follows the rules for naming files. For additional information refer to Naming Files Microsoft BASIC.

(line) This is a line number or an expression that evaluates to a line number in the chained-to program which will begin running at this line number, or, if no line number is specified, execution will begin at the first line. For example:

#### CHAIN "PROGX",500

Should PROGX be renumbered using the RENUM command, (line) will not be affected. In this example the old line number 500 would be changed to point to the new "renumbered" line number.

ALL specifies that every variable in the current program is to be passed to the chained-to program. If the ALL option is omitted, you must include a COMMON statement in the chaining program to pass variables to the chained-to program. See COMMON. For example:

## CHAIN "PROGX", 500, ALL

MERGE brings a section of code, as an overlay, into the Microsoft BASIC program. The MERGE operation is performed with the chaining and chained-to program. The chained-to program must be an ASCII file if it is to be merged. For example:

## CHAIN MERGE "OVERLAY",500

After using an overlay, delete it so a new overlay may be brought in. To do this, use the Delete option, which behaves like the DELETE command where the line numbers specified as the first and last line of the «range» must exist, or an "Illegal function call" error occurs. For example:

## CHAIN MERGE "OVERLAY", 500, DELETE 500-1000

Here lines 500 through 1000 of the chaining program will be deleted before loading in the overlay chained-to program. The numbers in (range) are affected by the RENUM command.

Remember: 1. The CHAIN statement with MERGE option preserves the current OPTION BASE setting.

2. When the MERGE option is omitted, the OPTION BASE setting is not preserved in the chained-to program. Without MERGE, CHAIN does not preserve variable types or user-defined functions for use by the chained-to program. Any DEFINT, DEFSNG, DEFDBL, DEFSTR or DEF FN statements containing shared variables must be restated in the chained program.

3. When the MERGE option is being used, user-defined functions should be included and defined before the CHAIN MERGE statement is used in the program.

**Chaining** A method of allowing the execution of programs larger than the main memory of a computer, by loading and executing modules of the same program sequentially.

**Change** One of the options in the dialog box presented by MacWrite when the pull-down Search menu is selected from the menu bar at the top of the screen. This dialog box is illustrated below. When the Change command is selected from this menu, the dialog box is displayed on the screen. The Change button would be used as one of the available options, after the word to be changed and its replacement have been entered in the two rectangles on the top two lines of the dialog box. This option is used to change only a single occurrence of the old word or phrase. The Find

# 48 • Change a Microsoft BASIC Line

Next option would be used to find and change the next occurrence. See Change All, Dialog Box, Menu Bar.





Fig. C5 The dialog box that is used when the Change option is selected from the Search menu.

# Change a Microsoft BASIC Line See EDIT.

**Change All** A button available in the dialog box presented by MacWrite when the Change command is selected from the pull-down Search menu from the menu bar at the top of the screen. This dialog box first asks for the word in the text that must be changed, then asks for the text that must replace the old text. The dialog box then presents four options in the form of buttons placed in a row along the bottom of the dialog box: Find Next, Change Then Find, Change and Change All. The selection of this option causes all incidents of the old word that occur in the text to be changed to the new word. Phrases may also be changed in the same fashion. The Change All option is called a "Global Search and Replace" in many word processors for computers other than the Macintosh. See Button, Dialog Box, Change, Search Menu, Menu Bar, Global Search And Replace.

**Change Contents of a File** Edit means to change the contents of program or data file. Several different editors are used with the Macintosh. MacWrite may be used to edit documents and letters. A public domain text editor called RudE by Loftus E. Becker, Jr. is available from noncommercial sources. This may be used to edit text files or programs. The Edit menu on the menu bar of Microsoft BASIC allows the user to cut, copy and paste material to the Clipboard from or to a program listing.

Editing may also be accomplished by listing a program, placing the pointer on the line to be edited, and clicking the mouse button. This transfers the line from the List window to the Command window of Microsoft BASIC and allows text to be added by

placing the pointer at the insertion point and clicking the mouse button to obtain a vertical bar cursor. The insertion may then be made. Material may be deleted from a program line by placing the pointer to the right of the material to be deleted and clicking the mouse button. This places a vertical bar cursor in this position and allows the Backspace key to delete the material to the left of the cursor. Blocks of material may be deleted by placing the cursor at the leftmost point from which the deletion must take place, clicking the mouse button, and dragging the pointer to the rightmost point of the block of material to be deleted and pressing the Backspace key.

Editors are classified as line-oriented if they work on one line at a time and deal with text by line number.

Full screen editors allow you to change any data currently displayed on the screen and treat paragraphs or even entire documents as a unit, allowing reformatting, change of margins with justification, block moves, etc. Most word processing programs are full screen editors.

The Microsoft BASIC editing functions lie between these two categories. They allow you to change any Microsoft BASIC line on the screen, but still treat the data as a collection of lines. You must press enter while the cursor is on a line you have changed or the changes are not effective. See MacWrite, Editor, Public Domain, List Window, Command Window, Pointer, Mouse Button, Insertion Point, Program Line, Dragging, Backspace Key.

**Change Date in System** The date in the Macintosh Alarm Clock can be changed by using the Apple menu to access the Control Panel. Once the Control Panel is displayed, place the crosshair inside the date box and click the mouse button. Then place the crosshair on the month and click the mouse button again. Two arrows are displayed on the side of the date box. To move the date forward, place the crosshair on the up arrow and click the mouse button until the proper date is displayed. The number that designates the day of the month is changed in the same fashion. See Apple Menu, Control Panel.



Fig. C6 The Control Panel with the Set Date section under the pointer.

**Change Font Size** Font size may be changed easily in MacPaint, MacWrite and other applications that use Font menus, Font Size menus and Style menus. The Font

# 50 • Change Memory Byte with Microsoft BASIC

Size menu is used in MacPaint to select a font size when text is being entered. The Style menu is used in MacWrite to select font size. The current font size will be retained in both applications unless it is changed by the user. If the vertical bar cursor has been activated by clicking the mouse button while the I-beam is in use as a pointer, a new font size may be selected for future entry while the current font size is retained for earlier entries.

# Change Memory Byte with Microsoft BASIC See POKE.

**Change Name of a File** File names can be changed on Macintosh disks by placing the pointer on the file name under the icon for the file and clicking the mouse button, displaying a vertical bar cursor. The new name can be typed in at the cursor. When the new name has been entered, press Return. See Icon, Vertical Bar Cursor.



Fig. C7 The Desktop with the vertical bar cursor next to a file name that has been highlighted for changing.

Change Time in System See Set the Time.

**Character File** Contains character data, letters, numbers or special characters. These files may have any file extension. Most data and programs that you write will be in text files. See Data File.

**Character Generator** A circuit which forms the letters or numbers on a screen or printer. Characters may also be generated by software as well as hardware. The Macintosh relies heavily on software-generated character sets.

**Character Insert** In Microsoft BASIC characters may be inserted in BASIC program lines by listing the program using the List command on the command line or by selecting List from the Command menu at the top of the screen display. Either method will cause the program in memory to be displayed in a list box on the screen. The line to be edited is then selected by typing LIST in the Command window followed by the line number to be edited or by placing the pointer on the line to be edited and clicking the mouse button. Once the line is displayed in the Command window, place the pointer at the point in the line where you wish to insert a character and click the mouse button again. This will cause a vertical line cursor to be displayed at the insertion point and new characters can then be typed in. Once all of the new characters have been inserted, press the Return key. See Command Menu, Command Window, LIST, Clicking, Pointer, Vertical Bar Cursor, Insertion Point.

**Character Keys** Keys used to enter letters, numbers, symbols and punctuation marks. They also include the Tab key, the Return key and the space bar. See Tab Key, Return Key, Space Bar.

Character Read from Keyboard See INKEY\$, INPUT.

**Character Set** The collection of characters available for display or processing on a particular computer or peripheral.

**Character String** A one-dimensional array or sequence of characters, encoded as bytes. Character strings have a length field or are terminated by the zero byte. See Arrays, Byte, Zero Byte.

**Characters Per Inch** The type size and style used by dot- matrix and daisy-wheel printers determines the number of characters printed per inch on the paper. The Apple ImageWriter printer uses the following type sizes selected by passing control characters to the printer from a basic program, a printer driver, a word processor, an electronic spreadsheet or from any other application that has been set up to use the ImageWriter.

CHARACTERS PER INCH	STYLE	CONTROL CHARACTERS
9	Extended	ESCAPE n
10	Pica	ESCAPE N
12	Elite	ESCAPE E
13.4	Semicondensed	ESCAPE e
15	Condensed	ESCAPE q
17	Ultracondensed	ESCAPE Q

The ESCAPE character and the letter following the ESCAPE character are usually passed in the program as an ASCII character. For example, the ASCII characters for ESCAPE N are CHR\$(27) CHR\$(78). See ImageWriter, Control Characters, Printer Driver, ASCII, Escape.

**Checksum** A field of one or more bytes appended to a block of n words containing a truncated binary sum or some other function value based on the contents of that block. The sum is used to verify the integrity of data.

# 52 • Chicago

**Chicago** A text font available in MacWrite and MacPaint which may be selected by placing the pointer on the Font menu marker at the top of the display screen, moving the pointer down the list until Chicago is highlighted and releasing the mouse button. The Chicago font is illustrated below. See MacWrite, MacPaint, Fonts.

# This is an example of the Chicago I point plain text fant. This is an example of the Chicago I 2 point plain text font. This is an example of the Chicago I 2 point plain text font. This is an example of the Chicago I 4 point plain t This is an example of Chicago I 4 point plain t This is an example of Chicago I 4 point bold This is a chicago I 8 point 00000 This is a chicago I 9 point 00000 This is a chicago I 9 point 00000 This is a chicago I 9 point 000000 This is a chicago I 9 point 000000

Fig. C8 An example of the Chicago font in various font sizes.

**Chip** A rectangular silicon die cut from a wafer. For example, the Macintosh's MC68000 processor is on a single chip.

**CHR\$** A Microsoft BASIC function which converts an ASCII code to its character equivalent. The format is:

stringvariable = CHR\$((n))

For example, CHR\$(83) would return the one-character string "S." For a listing of ASCII codes refer to ASCII Character Codes.

**CineMAC**<sup>•</sup> A video port for the Macintosh. It must be installed by a dealer. This hardware upgrade is an additional video output port and may be used to connect the Macintosh to an external monitor. Micrographic Images Corporation.

**CINT** A Microsoft BASIC statement which converts  $\infty$  to an integer (whole number) by rounding the fractional portion of that integer. The format is:

 $\langle variable \rangle = CINT(\infty)$ 

 $\infty$  must be in the range of -32768 to +32767 or an "Overflow" error occurs. For additional information refer to FIX and INT.

**CIRCLE** A Microsoft BASIC statement which draws an ellipse on the screen with center (x, y) and radius (b). The format is:

CIRCLE(((,</pre

 $\alpha, \gamma$  are the coordinates of the center of the ellipse in either absolute or relative form.

or is the radius (major axis) of the ellipse in points.

color is a number which specifies the color of the ellipse. The default color is black. If a value of 50 is used, white is produced. All other values produce black on a black and white screen Macintosh.

(starb, end) are the angles in radians and may range from - 2\*PI to + 2\*PI, where PI = 3.141593.

(aspect) is a numeric expression. If (aspect) is less than one, then (r) is the x-radius. That is, the radius is measured in points in the horizontal direction. If (aspect) is greater than one, then (r) is the y-radius. The default for aspect is 1.0, which produces a circle. Other aspect numbers produce ellipses.

**CLEAR** A Microsoft BASIC command which erases all memory used for data by setting all numeric variables to zero and all string variables to null. This is done without erasing the program currently in memory. The format of is:

CLEAR [,[<n>][,<m>]]

(n) is used if you need to reserve space in storage for machine language programs. It sets the maximum number of bytes for the Microsoft BASIC work area in the computer (where your program and data are stored), along with the interpreter work area.

(m) could be used if a number of nested GOSUB statements or FOR...NEXT loops are used in your program, or if you use PAINT to do complex scenes. (m) sets aside stack space for Microsoft BASIC. The default is 512 bytes or one-eighth of the available memory (whichever is smaller).

After a CLEAR, arrays are undefined, numeric variables have a value of zero, string variables have a null value and any information set with any DEF FN, DEF USG, DEFINT, DEFDBL, DEFSNG and DEFSTR statement is lost.

Executing a CLEAR command turns off any sound running and resets to Music Foreground. Also, PEN and STRING are reset to Off.

The ERASE statement can be used to free some memory without erasing all the data in the program. It erases only specified arrays from the work area.

**Clear** A command option available from the Edit menu of Microsoft Multiplan for the Macintosh. This clears all variable values entered in a spreadsheet application. In effect, this command clears out all entries added to an application by the user and allows a spreadsheet to be reused without reloading a blank version of the same application. See Variable, Multiplan.

#### Clear the Screen See CLS.

**Clicking** A term used to describe the pressing of the button on the top of the Macintosh mouse. When the mouse pointer is placed on a menu at the top of the screen display, clicking the mouse button causes the menu to pull down so that it may be used to make a selection. When the pointer is placed on an icon on a disk directory or on a file name and the button is clicked, it is highlighted. Clicking is used to accomplish some action with the mouse. See Mouse Button, Pull-Down Menu, Icon, Disk Directory.

**Click Art\*** This is a disk of high-quality drawings, pictures, political figures, etc., which are ready to clip out and use in Macintosh documents or print-outs. These are excellent graphics works, highlighted by the outstanding rendition of Michaelanglo's David. T/Maker Graphics. IN UK: Softsel.

#### 54 • Clipboard

Clipboard A portion of the Macintosh's Random Access Memory set aside to store data being transferred from one file or application to another. Any time you transfer a picture from MacPaint to MacWrite or a spreadsheet from Microsoft Multiplan to Microsoft Chart, this is accomplished by cutting or copying the material to be transferred. This process moves this data to the Clipboard. The file that provided the data must then be closed and the file into which the data is moved must be opened if you only have the internal disk drive and if data is being transferred to a file in another application program. The file and the application program must be closed and the disk containing the application from which data is being transferred must be ejected. The disk containing the application to which data is being transferred must then be loaded and the file that will use the data must be opened. Once this activity is finished, you are ready to transfer data from the Clipboard to the application, which is done by placing the cursor at the insertion point for the data and using the Paste option from the Edit menu. The new data will then be inserted. The Clipboard may only hold one set of data at a time. When new data is placed in the Clipboard, the old data is erased. See Insertion Point, Cut Option, Copy Option, Paste Option.



Fig. C9 An example of material on the Clipboard.

**CLIP 1\*** A disk of clipboard art for the Macintosh. It includes over 100 images. The package includes a disk and a complete manual. Frazier, Peper, & Associates. In UK: P+P micro distributors.

**Clock Frequency** The oscillation rate (clock rate) of a clock, is usually expressed in megahertz. The Macintosh has a basic clock rate of 7.8 MHz. For reference, compare this to the IBM PC, with a clock rate of 4.77 Mhz. The Macintosh executes instructions approximately twice as fast as the IBM PC, and since it is a 32-bit processor, the Macintosh is also doing more work with each instruction executed.

**CLOSE** A Microsoft BASIC statement which concludes I/O to a device or file. The format is:

#### CLOSE [[#]filenum[,[#]filenum...]]

The association between a particular file or device and its (filenum) stops when CLOSE is executed, and subsequent I/O operations specifying that file number will be invalid. The file or device may be opened again using the same or a different file number, or the file number may be reused to open any device or file.

A CLOSE to a file or device opened for sequential output causes the final buffer to be written to the file or device.

A CLOSE with no file numbers specified causes all devices and files that have been opened to be closed.

Executing an END, NEW, RESET, SYSTEM or RUN without the R option causes all open files and devices to be automatically closed. STOP does not close any files or devices.

CLOSE is used in conjunction with the OPEN statement. Refer to OPEN.

Open files may be closed by selecting the Close or Close All optiona 32-bit processor, the Macintosh is also doing more work with each instruction executed.

**CLOSE** A Microsoft BASIC command from the File menu at the top of the screen display. This will cause the icons to close and the files to close with the icons.

**Close** Disassociation of a file from a particular program, including flushing unwritten buffers and updating the directory and File Allocation Table if required.

**Close a Document** To close a document in use with an application program, either place the pointer on the close box on the upper left-hand corner of the document's title bar and click the mouse button or select the Close option from the File menu. Either of these methods will close the document. See Close Box, Title Bar, Menu Bar, File Menu.

**Close All** An option available on the File menu at the top of the Macintosh display screen which causes all open files and the file directory display to be closed and returned to the disk icon at the upper right-hand corner of the display screen. See Close, File Menu, Icon, Disk Icon, File.

**Close Box** All file windows and application windows have a small square in the upper left-hand corner of the window on the title bar, called the "close box." When the pointer is moved to the square and the mouse button is clicked, the application or the file is closed. See Window, Title Bar, Mouse Button.



Fig. C10 The pointer marks the close box on the illustrated window.

# 🖸 File Edit View Special

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CLS A Microsoft BASIC statement is used to clear the screen. The format is:

CLS

The CLS statement will also return the cursor to the home position. In the text mode this is the upper left-hand corner of the screen. This means the "last referenced point" for future graphics statements is the point in the center of the screen.

**CMOS** Complementary MOS. Technology characterized by extremely low-power consumption, widely used in portable applications and for battery-assisted memory systems. CMOS requires both p-channel and n-channel transistors, with speed and density characteristics intermediate between NMOS and PMOS. CMOS devices may operate from 3 to 12 V and have ideal noise immunity characteristics. Macintosh uses CMOS for the clock/calendar.

**COBOL** Common Business Oriented Language. A high-level programming language developed for business applications with statements based on English. COBOL is popular on mainframes but not currently available for the Macintosh.

**Code** A synonym for Program Instructions Code. This applies to program instructions, language statements or a symbolic representation for data, in any language, including Microsoft BASIC, machine language and others. See Program.

**Colon (:)** Used for multiple statements on one line in Microsoft BASIC. You can put a colon (:) at the end of one statement and continue entering another statement on the same line, without giving a new line number. The line number at left refers to all statements on the line. An apostrophe (') allows a comment or remark to be added after a statement with or without a separating colon.

The colon is also used in Microsoft Multiplan to designate a range of cells to be acted upon. For instance, if you wished to sum a range of cells between Row 12 and Row 15 in Column 3, you would designate this range in the formula with a colon as shown below:

(@SUM(R12:15C3)

See Microsoft BASIC Multiple Statements on One Line.

**Command Key** Immediately to the left of the space bar on the Macintosh keyboard is the Command key, which works very much like the Control key or the Alternate key on other computers. It provides a number of special functions to the Macintosh user, one of which is to provide shortcuts for functions or options available from the various menus on the menu bar at the top of the screen. When you use one of these shortcuts, it has the same effect as using the mouse to select an option from a pull-down menu. It may also be used in combination with other keys on the keyboard to interrupt or suspend a program running in Microsoft BASIC, or to send a communication character to another computer. The table below lists the various uses of the Command key for the Macintosh applications currently available.

APPLICATION	MENU	COMBINATION	FUNCTION
MPL	Select	Comm A	All Cells
MD/MPL	Edit	Comm A	Select All
MD	Type	Comm B	Bold Type
MP/MW	Style	Comm B	Bold Text
MP/MW/MPL	Edit	Comm B	Clear

# Command Window • 57

MD/MP/MW/MPL	Edit	Comm C	Сору
MB	Control	Comm C	Stop Program
All	File(Dir)	Comm D	Duplicate
MD	Edit	Comm D	Duplicate
MPL	Edit	Comm D	Fill Down
All	File(Dir)	Comm E	Eject Disk
MP/MW	Edit	Comm E	Trace Edges
MPL	Format	Comm F	Align Left
MPL	Format	Comm G	Align Center
MPL	Format	Comm H	Align Right
All	File(Dir)	Comm I	Get Info
MD	Type	Comm I	Italic Type
MP/MW	Style	Comm I	Italic Text
MP/MW	Style	Comm L	Align Text to Left
MP/MW	Style	Comm M	Align Text from
Middle			C C
MD	File	Comm N	New
MPL	Select	Comm N	Define Name
MP/MW	Style	Comm O	Outline Text
MD	File	Comm O	Open
MD	Туре	Comm P	Plain Type
MP/MW	Style	Comm P	Plain Text
MPL	Options	Comm P	Set Page Break
MD	Edit	Comm R	Reshape
MP/MW	Style	Comm R	Align Text to Right
MPL	Edit	Comm R	Fill Right
MD	File	Comm S	Save
MP/MW	Style	Comm S	Shadow Text
MPL	Select	Comm S	Show Active Cell
MB	Control	Comm S	Suspend Program
MPL	Edit	Comm T	Absolute Reference
MD	Туре	Comm U	Underline
MP/MW	Style	Comm U	Underline
MPL	Options	Comm U	Remove Cell
Protection			
MD/MP/MW/MPL	Edit	Comm V	Paste
MD/MP/MW/MPL	EditComm X	Cut	
MD	Edit	Comm Z	Clear
MP/MW/MPL	Edit	Comm Z	Undo
MPL	Calculate	Comm =	Calculate Now
	· · · · · · · · · · · · · · · · · · ·		

MD = MacDraw, HP = MacPaint, MPL = Microsoft Multiplan, MB = Microsoft BASIC, MW = MacWrtie and File(Dir) = File command menu while disk directory is being displayed.

**Command-C** Refers to the process of pressing the Command key and the C key together. This key combination is used in Microsoft BASIC to stop a program. The program may be restarted by selecting Run from the Control menu or by entering RUN in the Command window. This key combination is also used in many applications as a shortcut used to copy highlighted material from the application to the Clipboard or from the Clipboard into an application. See Command Window, Clipboard.

**Command-.** Refers to the process of pressing the Command key and the period (.) key together. This key combination is used to stop an action that is already in progress. For example, it is used to stop printing a document.

**Command Window** The Command window is the window at the bottom of the Microsoft BASIC screen display when the user is editing program lines from a list or is entering program lines. This window only holds two lines of text unless the window is dragged up the screen to a new location and then stretched by placing the

# 58 • Comma (,)

mouse pointer on the size box in the lower right corner of the window and dragging the box down. It will show up to five lines when it is at its largest size. It is used for the entry of commands and program lines in Microsoft BASIC. It is also used to edit program lines selected from a program list. Lines are selected from the list by placing the mouse pointer on the line number to be edited and clicking the mouse button.

**Comma (,)** Each group of spaces across the print line, as defined by the WIDTH statement, is called a "print zone." A comma (,) in an LPRINT list of items means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without a space between. See also WIDTH, Print Lines (Spacing).

**Comma, Double (,,)** To leave a lot of space on the print line between items, put an extra comma (,,) in the print list.

Enter Microsoft BASIC statement: LPRINT A,,B

This would print A in print zone 1, nothing in print zone 2 and put B in print zone 3. See also Print Zones, Print Lines (Spacing), SPACE\$.

**Command** A statement to cause a computer to carry out a specific action. Commands differ from instructions in several ways. A command is usually a complete specification of an action, while instructions must usually be combined in dozens or hundreds to make a useful program. Commands are immediate if they can be acted upon by typing them directly on screen and pressing the Return key. They are deferred if they must be included in a program line for the computer to act upon them. Commands are acted on by the operating system of the computer, while instructions must be processed by a particular program, such as the Microsoft BASIC interpreter, a FORTRAN or Pascal compiler, etc.

**Command Processor** A program which accepts a command (usually from a keyboard) and causes it to be carried out. Some command processors contain the programming required for all commands they process. Others do not carry out commands directly. Instead, they examine the command, determine what other program (if any) can carry it out, locate the required program and start it running. Still another type of command processor carries out some commands directly (internal commands), but locates and runs other programs for some commands (external commands).

**Comment Field** A field within an instruction, which contains explanations or remarks, ignored by the interpreter, the compiler or the assembler.

**Comments** For insertion in Microsoft BASIC Programs, use REM as a way of including remarks or explanatory comments in a program. The apostrophe (') can be used interchangeably with REM, and the apostrophe can be used without a colon to indicate that the rest of the line is a remark. Examples:

20 REM Just a comment 30 ' Just a comment 40 LET X = 1: REM Just a comment 50 LET X = 1: ' Just a comment 60 LET X = 1' Just a comment

The colon (:) allows multiple Microsoft BASIC statements on one line.

**COMMON** A Microsoft BASIC statement used in conjunction with the CHAIN statement to pass variables to a chained program. The format is:

COMMON (variable), (variable)...

variable> This refers to the name of a variable to be passed to the chained-to program. Array variables are specified by placing parentheses () around the variable name.

COMMON statements may appear anywhere in a program, but usually are placed at the beginning. Any number of COMMON statements may appear in a program, but the same variable cannot appear in more than one COMMON statement. If all variables are to be passed, use CHAIN with the ALL option and omit the COMMON statement. See CHAIN. Any arrays that are passed do not need to be dimensioned in the chained-to program. For example:

100 COMMON A, SAMPLE1, C, D(), F\$ 110 CHAIN ''PROGX''

This example chains-to program PROGX on the disk in drive A:, and passes array D along with the variables A, SAMPLE1, C and F\$.

**Communications Programs** These programs allow you to transfer data from your Macintosh to and from other Macintoshes, other computers and commerical services, such as The Source, Compuserve, etc. See Era 2, Mac Terminal, Trade\*Plus.

**Compatible, Upward** The term upward compatible indicates that programs developed for one version of a programming language, operating system, application software package or computer will work without alterations on an expanded, more powerful version of the same language, system or package.

In hardware, upward compatibility refers to the possibility of building up to more powerful models without reprogramming. The Macintosh fits this definition to a large extent, since the new Lisa models can run Macintosh software and provide a substantial increase in processing power. A program released by Apple Computer, Inc., called MacWorks is an example of a measure taken by Apple to ensure that Macintosh software will run on the Lisa.

**Compile Time** The point in the processing of a program when it is being translated from source code to object code by a translator (compiler or assembler).

**Compiler** A translation program which converts high-level instructions into binary instructions for direct processor execution. Any high-level language, such as Microsoft BASIC or COBOL, requires a compiler or an interpreter.

An interpreter translates each statement of the program each time the statement is executed, whereas a compiler translates the complete program once, producing object code that can be executed repeatedly. Any change in the program requires recompilation. The code produced by compilers may be longer and/or slower than that generated from assembly language source code.

Compiler Programs See Programs, Source and Object.

**Complementing** The action of changing each 1 to a 0, and each 0 to a 1.

**Complete Guide to Your Macintosh, The**\* By Joseph Caggiano and Roy Robinson. This book explains the Macintosh, its features and the peripherals that may be used

## 60 • Computer

with it. Advanced applications and troubleshooting are presented in depth. It includes sections on BASIC and Pascal programming. Sybex.

**Computer** A general purpose computing system incorporating at least a central processing unit, memory and I/O facilities. This describes a single board computer. Most computers also include a power supply and cabinet or case.

Computer Accessories See Supplies, Accessories.

Computer Memory See Memory.

**Computer System** A complete system including the MPU, keyboard, CRT and other peripherals such as printers, disks, tapes, etc., and often includes programs.

**Concatenation of Data or Programs** It is often desirable to produce a large data file or program by combining several existing files. This process is called "concatenation." In this process, two or more small files are combined to produce one large file without mixing the information together. All of the information from one file constitutes the first part of the resulting large file. The final part or parts of the large file contain additional files in one big chunk.

**Console** The terminal with the most control in a system. For a microcomputer, the keyboard or the front panel and the monitor is the console.

**Constant** An explicit value in a program instruction or statement rather than a symbolic value. The value is fixed throughout a program.

**CONT** A Microsoft BASIC statement which causes program execution to resume after a Ctrl-Break has been pressed, a STOP or END statement has been executed in the program or an error has occurred. The format is:

#### CONT

Execution of the program will continue at the point where the break occurred. If the break occurred following a prompt from an INPUT statement, execution will continue with the reprinting of the prompt.

CONT is useful in conjunction with STOP for debugging purposes. When execution is stopped, you can examine or change the values of variables using direct mode statements. You may then use CONT to resume execution, or use a direct mode GOTO, which resumes execution at a particular line number. CONT is invalid if the program has been edited during the break.

Control Characters Characters having specific system- dependent meanings.

**Control Characters for Printer** To set the ImageWriter printer's print size, strike method or number of lines per inch down the page, the nonstandard type format you want must be turned on by sending control codes to the printer. This is a description of one nonstandard format: normal size, emphasized, double-strike, six lines per inch.

To return to the default normal ten-character per inch print size and six lines per inch down the page (such as this sentence), the nonstandard type size currently in effect must be reversed. To do this use the ASCII codes in the following table:

Type Format	Turn On	Turn Off	
Boldface	27 33	27 34	
Condensed Print	27 113		
Elite	27 69		
Elite Proportional	27 80		
Extended	27 110		
Headline	14	15	
Pica	27 78		
Pica Proportional	27 112		
Ultracondensed	27 81		
8 Lines/Inch	27 66		
6 Lines/Inch*	27 65		

\*Standard twelve dots per line (72/12 = 6 Lines/Inch). Set when printer is initialized or powered on.

The following Microsoft BASIC program will help clarify how the ImageWriter printer can be set up for various types of printing. Alternatively, you may choose to key in the program and use it as a utility for controlling the printer.

100 ' THIS PROGRAM WAS WRITTEN TO SET 101 ' THE IMAGEWRITER FROM THE MAC 102 PRINT:PRINT:PRINT 120 PRINT ''THIS IS A PROGRAM TO ALLOW'' 121 PRINT "YOU TO SET UP VARIOUS" 130 PRINT ''PARAMETERS OF YOUR IMAGEWRITER'' 131 PRINT '' PRINTER FROM THE MAC'' 140 PRINT ''PRESS THE SPACE BAR TO CONTINUE'' 141 S\$ = INKEY\$ : IF INKEY\$ = CHR\$(32) GOTO 150 150 CLS: PRINT: PRINT: PRINT 160 PRINT TAB ( 5)" 1. PRINT EXTENDED PRINT" 170 PRINT TAB ( 5)" 2. PRINT IN PICA PRINT" 180 PRINT TAB ( 5)" 3. PRINT IN ELITE PRINT" 190 PRINT TAB ( 5)'' 4. PRINT IN PICA PROPORTIONAL'' 200 PRINT TAB ( 5)'' 5. PRINT IN ELITE PROPORTIONAL'' 210 PRINT TAB ( 5)'' 6. PRINT IN SEMICONDENSED'' 220 PRINT TAB ( 5)" 7. PRINT IN ULTRACONDENSED" 230 PRINT TAB ( 5)'' 8. PRINT IN CONDENSED'' 240 PRINT TAB ( 5)'' 9. TURN ON BOLDFACE'' 250 PRINT TAB ( 5)"10. TURN OFF BOLDFACE" 300 PRINT 310 PRINT "ENTER THE NUMBER OF YOUR CHOICE" 320 INPUT "AND PRESS RETURN ......"; C 330 CLS 340 ON C GOTO 400,500,600,700,800,900,1000,1100,1200,1300 350 IF C < 1 OR > 10 GOTO 150 **400 REM SET EXTENDED PRINT** 405 P\$ = CHR\$(4): EC\$ = CHR\$(27): ET\$ = CHR\$(110) 410 LPRINT ECS: ETS 420 PRINT ''YOUR PRINTER HAS BEEN SET FOR EXTENDED TYPE'' 425 GOTO 1600 **500 REM SET PICA PRINT** 505 EC\$ = CHR\$(27): PT\$ = CHR\$(78)510 LPRINT EC\$ ; PT\$

515 PRINT ''YOUR PRINTER HAS BEEN SET FOR PICA PRINT''

600 REM SET ELITE TYPE 605 EC = CHR(27): ET = CHR(69)610 LPRINT EC\$: EP\$ 612 PRINT ''YOUR PRINTER HAS BEEN SET FOR ELITE PRINT'' 615 PRINT: PRINT: GOTO 1600 700 REM SET PICA PROPORTIONAL 705 EC = CHR\$(27) : PP\$ = CHR\$(112) 710 LPRINT EC\$; PP\$ 715 PRINT ''YOUR PRINTER HAS BEEN SET FOR PICA PROPORTIONAL'' 720 PRINT: PRINT: GOTO 1600 800 REM SET FOR ELITE PROPORTIONAL 805 EC\$ = CHR\$(27): EP\$ = CHR\$(80)810 PRINT ''YOUR PRINTER HAS BEEN SET TO ELITE PROPORTIONAL'' 820 PRINT: PRINT: GOTO 1600 900 REM SET UP SEMICONDENSED 905 EC = CHR (27): SC = CHR (101) 910 LPRINT ECS: SCS 915 PRINT ''YOUR PRINTER HAS BEEN SET TO SEMICONDENSED'' 920 PRINT: PRINT: GOTO 1600 **1000 REM SET UP ULTRACONDENSED** 1005 EC = CHR(27): UC = CHR(81)1010 LPRINT EC\$; UC\$ 1020 PRINT ''YOUR PRINTER HAS BEEN SET TO ULTRACONDENSED'' 1025 PRINT: PRINT: GOTO 1600 1100 REM SET UP CONDENSED 1105 EC\$ = CHR\$(27): CC\$ = CHR\$(113)1110 LPRINT EC\$; CC\$ 1115 PRINT ''YOUR PRINTER HAS BEEN SET TO CONDENSED'' 1120 PRINT: PRINT: GOTO 1600 1200 REM SET UP BOLDFACE 1205 EC\$ = CHR\$(27): BF\$ = CHR\$(33)1210 LPRINT EC\$; BF\$ 1215 PRINT ''YOUR PRINTER HAS BEEN SET FOR BOLDFACE'' 1220 PRINT: PRINT: GOTO 1600 1300 REM TURN OFF BOLDFACE 1305 EC = CHR(27): BO = CHR(34)1310 LPRINT EC\$; BO\$ 1315 PRINT ''BOLDFACE IS NOW TURNED OFF'' 1320 PRINT: PRINT: COTO 1600 1600 REM TEST PRINTER OR RETURN TO MENU 1605 INPUT "WOULD YOU LIKE TO MAKE ANOTHER SETTING ?" ; R\$ 1610 CLS : PRINT: PRINT: PRINT 1620 IF R\$ = "Y" GOTO 150 **1700 REM TEST PRINTER** 1705 CLS : PRINT : PRINT : PRINT 1710 INPUT ''ENTER A 'Y' '' 1711 PRINT "IF YOU WOULD LIKE TO TEST THE PRINTER"; T\$ 1720 IF T\$ = ''Y'' GOTO 1800 1725 GOTO 1900 1800 LPRINT ''1111111122222223333333344444444'' 1805 LPRINT ''ABCDEFGHIJKLMNOPQRSTUVWXYZ @#\$%&\*()'' 1810 CLS:PRINT : PRINT: PRINT 1820 INPUT "WOULD YOU LIKE TO MAKE ANOTHER SETTING ?(Y/N) "; U\$ 1830 IF U\$ = ''Y'' GOTO 150 **1900 REM QUIT** 

1910 CLS: PRINT: PRINT: PRINT: PRINT: PRINT 1920 PRINT TAB( 20)''THANK YOU FOR USING THIS PROGRAM...'' 1930 END

**Control Key** The Control key on most computers extends the use of another key on the keyboard to accomplish a specific purpose, such as instructing a printer to print in condensed print, sound the computer's bell tone or whatever is defined by the application currently in use. This process is carried out on the Macintosh by the Command key instead of the Control key. See Command Key.

**Controlled Test Environment** The software in the Macintosh with a program to be tested (which may determine your ability to detect and interpret errors) is the test environment.

Similar features are included in Microsoft BASIC, via TRON, TROFF and the ability to stop the program at any time to examine the contents of variables with PRINT. This TRACE feature is a fundamental way of following the sequence of instructions executed in a program to ensure that the program's logic is correct. The Control menu also contains Trace On and Trace Off as options which may be selected with the mouse in Microsoft BASIC for the Macintosh.

**Control Menu** Microsoft BASIC uses a Control menu to control the operation of programs. This menu contains seven command options: Stop, Continue, Suspend, List, Run, Trace On and Trace Off. Stop is used to halt a program that is currently running in memory. Continue is used to resume the running of a program that was halted by the Stop command. It will also restart a program that was stopped with the Command-C keypress. Suspend stops the running of a program until a key is pressed. This works the same as stopping the program with a Command-S keypress. List opens a List window and lists the program currently in memory. Trace turns on a trace feature for use in debugging a program. It causes each program line to be listed as the program executes the line. Trace Off is used to turn off the trace feature.

Control Panel The Macintosh Control Panel is a special interactive window allowing the user to change the time on the computer's clock, the date, the volume of the sounds generated by the computer's built-in speaker, the number of clicks required by the mouse button to run an application or select a command, the amount of linear movement required by the mouse to move the pointer across the screen, the nature of the background pattern displayed on the Desktop when disk icons are being displayed, the speed that a command blinks when it is being displayed, the rate at which the vertical bar cursor blinks when you are inserting material, the rate at which keys repeat when they are pressed continuously and the amount of time required to press a key to produce repeating characters. The Control Panel features are illustrated below.

**Convert** Change from one form to another.

Convert Decimal to Hexadecimal String See HEX\$.

Convert Decimal to Octal String See OCT\$.

Convert Number to String and String to Number See MKI\$, MKS\$, MKD\$.

**Copy an Application** Certain applications such as MacPaint and MacWrite may be copied from one disk to another or from a disk to a hard disk. These applicatons are most easily copied by opening the disk icon of the disk or hard disk to which the

#### 64 · Copy a Disk

application is to be copied, opening the disk icon or hard disk from which the application is to be copied, and dragging the application icon from one Directory window to the other. This process will cause the application to be copied from one disk to the other. If only the internal disk drive is in use, you will be prompted whenever it is necessary to swap disks. An application may also be copied from one disk to another by dragging the application icon from the Directory window of the disk from which it is to be copied onto the disk icon of the disk to which it is to be copied. See Disk Icon, Directory, Window, Dragging.



Fig. C11 The Macintosh Control Panel.

**Copy a Disk** The entire contents of one disk may be copied to another disk by using the Disk Copy program available from the disk directory of the MacWrite/MacPaint disk. This application allows this entire operation to be accomplished in only four passes on a 128K Macintosh. The program prompts the user to exchange disks when required, if no external disk drive is available to the user and the copy is being made with only the internal disk drive. If the second disk is not a blank disk, an alarm box is displayed on the screen and the user is allowed to cancel or carry on the Copy process. If the user elects to carry on, the contents of the disk will be overwritten by the contents of the disk being copied. If the disk to which the copy is being made is not initialized, the copy program will display a message informing the user that the disk is being initialized. A Cancel button is displayed in the lower left-hand corner of the screen. If the user places the pointer on this button and clicks the mouse button, the process will be cancelled.

While the copy process is in progress, the screen display will show a bunch of meaningless garbage. This does not mean that something has gone wrong. It only means that the memory usally dedicated to video display is being used to hold the material being copied from one disk to the other. When the copy has been successfully made, the following message is displayed at the bottom of the screen: "Disk copied successfully. Copy Another?" This message is accompanied by an OK button and a Quit button. If the user points to the OK button and clicks the mouse button, the program directs that the disk to be copied be inserted in the disk drive. If this disk contains programs or data, the program asks the user if the disk should be erased by displaying a message that says "Erase Write/Paint?" except the words "Write/Paint" will be replaced by the name of the disk inserted into the disk drive. It is a very good
practice to write-protect any disk that is being copied in case it has been inserted into the disk drive in the wrong sequence. See Button, Cancel Button, Disk Copying.

**Copy a Document** Documents, applications or other files stored on a disk may be copied by first opening the disk icon of the disk containing the program to be copied. This is done by placing the pointer on the icon and double-clicking the mouse button, then the copy can be made by placing the pointer on the icon of the document to be copied and clicking the mouse button once. This causes the document's icon to be highlighted. Then move the pointer to the File menu on the menu bar, click the mouse button, and drag the highlight to the Duplicate option on the menu. When the mouse button is released, the document will be copied.

A new icon will appear on the directory and will be given the name Copy of followed by the name of the file that was copied. The user can change the name of the document by placing the pointer on the extreme right side of the name, clicking the mouse button to cause the vertical bar cursor to be displayed, backspacing over the Copy of name and typing in the new file name. Copying can also be accomplished by pressing the Control key followed by the D key when the document's icon has been highlighted as discussed earlier in this entry. See Menu Bar, Icon, Document Icon, Dragging, Double-clicking, Control Key, Highlight.

**Copy Backup Disks** Because disks can be rendered unreadable by physical damage, magnetic contamination, or dirt, it is wise to keep at least two copies of any important information. See Copy a Disk.

**Copy Option** Used to copy information from one place to another. The original file is always left undisturbed. While an application is in use on the Macintosh, a menu bar is visible at the top of the screen. The Edit menu may be selected by moving the pointer to the word Edit. The Copy option may then be selected from this menu. This option allows the highlighted material in an application to be saved to the Clipboard without erasing the material. If the Cut option had been selected, this material would have been erased. Once material has been transferred to the Clipboard, it can then be used in another file or another application by using the Paste option from the Edit menu. See Edit Menu, Cut Option, Paste Option, Menu Bar, Pointer.

**Core** A small magnetic torus (or doughnut) of ferrite used to store a bit of information. Cores can be strung on wires so that memory organizations of 32K 18-bit words can be packed into a space 1/2 by 6 by 6. One advantage of core is that it is nonvolatile. Also, as a holdover from the days when nearly all computer internal memory was core, the word is still sometimes used as a synonym for internal memory: coreimage, in core, etc.

**CoreEdit** A routine available from disk to supplement the text editor called TextEdit in the Macintosh's ROM. This supplement to TextEdit allows the Macintosh to use different type fonts and sizes from those in ROM. See TextEdit, Text Editor, ROM, Fonts.

**COS** A Microsoft BASIC function which returns the trigonometric cosine function of  $\infty$ . The format is:

 $\langle variable \rangle = COS(\infty)$ 

 $\infty$  is the angle whose cosine is to be calculated. The value of  $\infty$  must be in radians. To convert degrees to radians, multiply the degrees by PI/180, where PI = 3.141593. The calculation of COS( $\infty$ ) is performed in single precision.

## 66 • Covers

Covers See MacCover, Macintosh Covers.

**CP/M** Control Program for Microcomputers. A popular single- user operating system for 8080-, Z80- and 8085-based microcomputers created by Digital Research. CP/M can not currently be run on the Macintosh.

CPS Characters Per Second or Cycles Per Second.

**CPU** Central Processing Unit. The computer device in charge of fetching, decoding and executing instructions, containing a control unit, an ALU and other related facilities with registers, clocks or drivers. The Macintosh uses the MC68000 CPU chip as a CPU. It not only does the things described above, but is also capable of storing and retreiving data from all of the Macintosh's memory addresses. The MC68000 chip can process 32 bits of data at a time. It can put 16 bits of data at a time on the address bus for input or output. See Bit, Address Bus, Memory Address.

**CR** Carriage return, 13 decimal or 0D base 16. Command Register or Card Reader.

**Crash** A situation where the system becomes inoperative due to a hardware or software malfunction. A head crash refers to the accidental impact of the read/write head upon the disk surface.

**Create** Refers to making a new file on disk as opposed to modifying an existing file.

**Creating a Document** Each time the Macintosh user opens an application program, such as MacWrite or MacPaint, and decides not to open a document file for an existing document, the application treats any entries made in the application as a new document. When this document is saved, a dialog box requests that the document be named. If an existing document is opened with the application program, and the user wishes to retain the old document with no changes along with the document as changed, the Save as... option must be selected from the File menu on the menu bar. See MacWrite, MacPaint, Menu Bar, File Menu, Dialog Box, Document.

**Creator, The**<sup>•</sup> A database program and report generator for the Macintosh that requires Microsoft Basic. A template is provided by the program to allow the design of a database. Each file may be made up of 32,767 records. Search and sort features are available. TNT Software, Inc.

**Crosshair** A crosshair pointer is used to change the controls on the Control Panel when it has been selected from the Apple menu. The crosshair pointer first appears as soon as the arrow pointer has been moved inside the limits of the Control Panel. The crosshair is used to select the item on the Control Panel to be adjusted. It is also used to make the actual adjustment. The crosshair is also used to set the time on the Alarm Clock when it has been selected from the Apple menu. See Control Panel, Alarm Clock.

Crosstalk Two signals interfering with one another.

**CRT** Cathode Ray Tube. A computer terminal using a CRT that displays characters or pictures. Also called a monitor, screen, terminal, etc.

**CSNG** A Microsoft BASIC function which converts  $\infty$  to a single-precision number. The format is:

 $\langle variable \rangle = CSNG(\infty)$ 

 $\infty$  is the numeric expression which is to be converted to single-precision. See Numeric Precisions in Microsoft BASIC Conversions for details.

**Cursor** Used by a computer to designate the point on the screen where the next action, such as inserting characters or entering a response, will take place. While actions are being taken with the mouse, a pointer shaped like an arrowhead is used to mark insertion points and to select options. Once an insertion point has been selected by moving the pointer to that location and clicking the mouse button, a vertical bar appears. This vertical bar is the cursor for character insertion for the Macintosh. It will blink to attract your attention to its location.

Cursor POS is used in Microsoft BASIC to find the current location of the cursor.

**Cut 'N' Paste\*** A series of disks containing clip art for the Macintosh. Each disk is devoted to a particular subject, such as people or computers, and is accompanied by documentation that explains how each drawing was made. These drawings may be moved from the disk into an application via the Clipboard. Dreams of Phoenix, Inc.

**Cut Option** An option from the top of the Edit menu on the Macintosh screen display. It is selected by placing the pointer on the word Edit and clicking the mouse button. Once this has been done, Cut is selected by scrolling the highlight down this menu until Cut is highlighted. The mouse button is then released and any highlighted material in the application on the screen will be erased from the screen and transferred to the Clipboard for pasting into another application or another file. The Clipboard may only hold one set of data at a time, so make sure that the material has been transferred to the new file prior to saving additional material to the Clipboard with a Cut or a Copy command. See Menu Bar, Edit, Mouse Button, Copy Option, Paste Option, Clipboard.

**CVI, CVS, CVD** Microsoft BASIC functions used to convert string variable types to numeric variables. The formats are:

‹variable› = CVI(‹2-byte string›) ·variable› = CVS(‹4-byte string›) ·variable› = CVD(‹8-byte string›)

When numeric values are read from a random file, they must be converted from strings into numbers. CVI converts a (two-byte string) to an integer, CVS converts a (four-byte string) to a single-precision number and CVD converts an (eight-byte string) to a double-precision number.

The CVI, CVS and CVD functions do not change the bytes of actual data, only the way Microsoft BASIC interprets those bytes.

Related functions are MKI\$, MKS\$ and MKD\$, which convert numeric-type data to string-type data.

**Cyborg**<sup>•</sup> A text adventure game where the player is half man and half machine. His new powers assist him in solving the puzzle of the game. The adventure starts with the player lost in the woods with no food and power. Sentient Software. In UK: Softsel.

# D

**D** ASCII = 68, HEX 44. **d** ASCII = 100, hex = 64. Also, the hexadecimal symbol for the decimal number 13. The following all represent the same number:

D base 16 = 13 13 base 10 = 13 15 base 8 = 13 1101 base 2 = 13

**Daisy Chain** A method for prioritizing interrupts. Units capable of interrupting the system can either pass on a processor, acknowledge signal or block it. The highest priority is given to the unit electrically closest to the processor. Daisy chain is also used to describe the process of hooking up peripherals one to another, such as disk drives, rather than with separate connections from a single controller card.

**Daisy-wheel Printer** An impact printer which has a wheel with radial spokes bearing type to produce letter-quality output. Currently the Macintosh is not set up to use a daisy-wheel printer. Printing with a Macintosh is a graphics dump rather than a text dump as required by a daisy-wheel printer. See Printers.

**Darker More Solid Printing** Double Strike Printing causes the dot-matrix printer to reprint every character with a slight shift down on the page. The dots printed the second time fill in the vertical spaces between original dots creating a darker, more solid character. The ImageWriter does not produce double struck characters. It produces boldface characters in a similar fashion to double-struck characters. The ImageWriter final copy print is comparable to double striking with other printers. See ImageWriter, Bold.

**Data** A synonym for information. In a computer context, it refers to data in some machine-readable format, such as a diskette file, information stored in ROM, cassette tape or another type of machine-readable media, that can be placed directly into the machine and processed without an intervening manual operation such as keying the data.

**DATA** A nonexecutable Microsoft BASIC statement used in conjunction with the READ statement. It stores the numeric and string constants that are accessed by the program's READ statement(s). The format is:

Data «constant», constant»...

«constant» is a numeric or string constant. String constants in Data statements do not need to be surrounded by quotation marks, unless the string contains commas, colons or significant leading or trailing blanks.

Data statements are nonexecutable. They can be placed anywhere in a program. A Data statement may contain as many constants as will fit on a line, and any number

of Data statements may be used in a program. The READ statements access the Data statements in line number order. The information that is in a group of Data statements can be thought of as one continuous list of items, regardless of the number of items on one line.

If the variable type is defined in the READ statement as numeric, the corresponding constant in the Data statement must be numeric as well. If the variable type is defined as string in the READ statement, the corresponding constant in the Data statement must be string. For examples see READ.

Data statements can be "reread" through the use of the RESTORE statement. In such cases, they are reread from their beginning. See RESTORE for details.

**Data Acquisition** The collection of data from external sensors, usually in analog form.

**Database** A systematic organization of data files for central access, retrieval and update.

**Database Programs** See Creator, dBase III, Factfinder, FilePlan, Friday, Habadex, Helix, NPL, Information Management System, Jack 2, Keystroke Data Base, Keystroke Report Base, Lotus Macintosh Product, Main Street Filer, Megafinder, Microsoft File, Omnis 1, Omnis 2, Omnis 3, PFS File, PFS Report, RGS Softmaker II, R:base 2000, Telofacts 2.

**Data Bits** The number of bits required by the Macintosh to make up a character sent or received by a communications program. Data bits are used to encode characters sent between computers. Either seven or eight bits make up each character. See Bits.

**Data Disk** Used to store data. A disk is called a "data disk" when it is used primarily or totally to store data rather than programs. A data disk will usually not contain all of the system files (to save space). Likewise, "program disk" refers to a disk primarily used to store programs used to process data. A system disk is used principally to store system files (fonts, the Finder, etc.) and related utility-type programs. Often a disk will contain both data and the programs needed to process the data.

**Data File** A named collection of information usually stored on magnetic media, which contains data to be processed by a program.

**Data or Program Concatenation** Adding one item on at the end of the others to produce one longer data or program item.

**Datasaver**<sup>•</sup> A back up AC power supply for the Macintosh. It is a 90-watt batterypowered unit providing power from five to fifteen minutes after an AC power failure. It includes transient suppression for voltage spikes, EMI noise filtering, a sealed rechargeable battery, two outlets, an audible alarm and a visible alarm. Cuesta Systems.

**Data Security** In any computing system which keeps track of dollar amounts, quantities, etc., there is the possibility that data will be modified improperly. For example, in a payroll system, an individual with access to the computer system could modify their rate of pay, thereby causing the computer to produce a larger payroll check. Data security consists of measures that prevent tapering with data, tampering with programs and access to secret or private information.

Data Statement A nonexecutable statement in a program, which contains data

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elements separated by commas for use in the program by a READ statement. See DATA.

**Data Types** A specific interpretation applied to binary data, such as integer, real, character, etc.

**Data-transfer Rate** The rate of transfer of data from one place to another, such as from disk to memory or from memory to memory.

**Date, Setting** The current date may be set on the Macintosh computer by placing the pointer at the Apple menu indicator in the left-hand corner of the display screen, clicking the mouse button, dragging the highlight to the Control Panel line and releasing the mouse button. This will cause the Control Panel to be displayed on screen. One option that may be reset on the Control Panel is the date. This is reset by placing the pointer on the month, day, or year portion of the date on the clock and clicking the mouse button. This will cause an up-arrow button and a down-arrow button to be displayed in the clock section of the Control Panel display. The part of the date that is highlighted will be advanced by using the up-arrow and retarded by using the down-arrow. See Control Panel, Alarm Clock, Set Date.

## File Edit View Special



Fig. D1 The Clock Set portion of the Control Panel.

**DATES** A Microsoft BASIC function and statement which is used to set or retrieve the date. The format is:

As a function:

stringvariable> = DATE\$

## Debug or Test a Program • 71

SemA 10-character string of the form mm-dd-yyyy is returned. mm represents two digits for the month, dd represents two digits for the day and yyyy represents a four digit number for the year.

As a statement:

DATE\$ = <x\$

Here x is a string expression which is used to set the current date and may be entered in any one of the following forms:

mm-dd-yy mm/dd/yy mm-dd-yyyy mm/dd/yyyy

The year must be in the range 1980 to 2099. A 0 (zero) is assumed in front of the month or day if only one digit is used. If only one digit is used for the year, a zero is added before the digit entered to make two digits. If only two digits (yy) are given for the year, the year is assumed to be 19yy. For example:

10 DATE\$ = ''7/4/84'' 20 PRINT DATE\$ RUN 07-04-1984

Here we set the date to July 4, 1984. Using the DATE\$ function, a zero was placed in front of the "7" and the "4", and "19" was placed in front of "84" to display 1984. Hyphens were also placed between month, day and year where slashes were entered.

**DaVinci\*** A graphics program for the Macintosh presented in three packages: Buildings, Landscapes and Interiors. Each package consists of hundreds of design selections that may be used with MacPaint. These packages are useful to the professional landscape planner, architect, office manager and interior designer, and just as useful to the home owner and amateur landscape planner. Each component is scaled to provide the best quality in output. All designs and plans generated on DaVinci may be printed on the ImageWriter printer. Hayden Software.

**dBase III**<sup>•</sup> An advanced, full-feature database manager offering the user the ability to handle extremely large files and use the information in the files to perform accounting tasks, inventory control, payroll and a large variety of other businessrelated tasks. It can also be used for other applications such as investment management, real estate management, medical management, insurance analysis and financial analysis. Ashton- Tate.

**DBMS** Database Management System. A program providing a general mechanism for systematic storage and retrieval of data from a database. See Database.

**Deadline**<sup>•</sup> A text adventure game for the Macintosh, the first in a series of murder mysteries. Infocom, Inc.

**Debug or Test a Program** A programmer must ensure that a program will correctly process all of the types of data for which it is intended. Samples of the data are prepared (test data) and the program is executed using this data (a test run). The

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program's outputs (reports, screen displays, files, etc.) are then verified to be as specified. An error in the processing logic of a program is called a "bug," hence the terms "debug" and "bug-free."

**Debugger** An essential program designed to facilitate software debugging. At a minimum, it provides breakpoints, dump facilities, register and memory examine/modify, preferably in symbolic form.

**Decimal Command** The Decimal command is a command option that is available in Microsoft Multiplan's Format pull-down menu on the menu bar at the top of the screen display. This command is used by selecting Decimal from this menu after a cell or range of cells have been highlighted with the pointer. To highlight a cell, place the "plus sign" pointer on the cell you wish to format and click the mouse button. This will cause the cell to be highlighted as black on a white background. Then you would select the Format menu and the Decimal option from this menu. To highlight a range of cells, you place the cursor on the first cell to be highlighted and drag it to the last cell in the range. This can be done in rows, columns and blocks of cells. The Decimal option then causes the numeric output of the cell to be displayed with the number of digits to the right of the decimal point equal to the number of digits set by the Number of Decimals option on the same menu. See Microsoft Multiplan, Cell, Menu Bar, Pull-down Menu, Pointer, Plus Sign Pointer, Format Menu.

R5C2	Dollar		
	Percent		
	2 No Decimal	5	6
2	Decimital Scientific		
2	Bar Granb		
4	bui orapii		
5	Number Of Decimals		
6	i i i i i i i i i i i i i i i i i i i		
7	Alian Left %F		
8	Align Center %6		
9	Align Right %H	:	
10	:		
11	Commas		
12	·····		
3	Column Width		
4			
15		:	

File Edit Select Format Options Calculate

Fig. D2 The Format Menu in Multiplan.

**Decimal Math Package** Microsoft BASIC includes a subroutine called the "Decimal Math Package." This subroutine provides the user with precision of up to fourteen digits. This degree of accuracy eliminates rounding errors in important business and financial calculations. See Subroutine.

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**Decimal Tab** A decimal tab is a tabulation feature of a program that allows numbers to be aligned in columns with the decimal point appearing in the same column. The decimal tab function is a feature of some word processors. MacWrite has this particular feature. Use the arrow pointer to move the tab marker (a small triangle) along the ruler at the top of the screen display until the marker is in the proper position. This marker is moved by placing the the pointer on the triangle, pressing the mouse button and dragging the marker to the right column. At this point the tab setting is made for text. Next, place the pointer on the decimal tab marker icon on the left-hand side of the line immediately under the ruler on the display screen. This marker is a triangle with a dot in the center. This icon must be dragged to the tab marker that designates the column to be used for decimal alignment. Once this tab has been set, numbers in the column will be aligned on the decimal point in the column directly under the tab regardless of the number of digits entered to the right of the decimal point. See MacWrite, Word Processor, Ruler, Icon, Decimal Tab Marker, Dragging. An illustration of the MacWrite screen with decimals aligned on a decimal tab is presented below.



Fig. D3 An example of decimals set with the decimal tab set in MacWrite.

**Decimal Tab Marker** This is a device used by MacWrite to designate the location of a decimal tab on a line. The normal tab marker is a triangle. The decimal tab marker is a triangle with a dot in the middle. To set a decimal tab, drag the decimal tab marker icon to the point on the ruler that is marked with a regular tab marker. See Decimal Tab.

Decimal to Hexadecimal String Conversion See HEX\$.

Decimal to Octal String Conversion See OCT\$.

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**DEF FN** A Microsoft BASIC statement which defines and names a numeric expression or equation. The format is:

DEF FN(name)(arg)[,(arg)...)] = (expression)

(name) is a valid variable name. This name, preceded by FN, will be the name of the function.

(arg) is an argument. It represents a variable name in the function definition that will be replaced with a value when the function is called.

«expression» defines the return value of the function. It can be numeric or string but must match the type that was declared by the «name».

The definition of the function is limited to one statement. Arguments (arg) that appear in the function definition serve only to define the function; they do not affect program variables that have the same name. A variable name used in the (expression) does not have to appear in the list of arguments. If it does, the value of the argument is supplied when the function is called. Otherwise, the current value of the variable is used.

The function type determines whether the function returns a numeric or string value. The type of function is declared by (name), in the same way as variables are declared. If the type of (expression) does not match the function type, a "Type mismatch" error is displayed. If the function is numeric, the value of the expression is converted to the precision specified by (name) before it is returned to the calling statement.

A DEF FN statement must be executed to define a function before you may call that function. If a function is called before it has been defined, an "Undefined user function" error is displayed. On the other hand, a function may be defined more than once. The most recently executed definition is used.

**Default Value** A program may provide a default value whenever it requires information to be input which is the same from one use to another in the majority of cases. This is a value which will be used if no other value is input. Pressing the Return key will cause the default value to be used, although many programs use other systems for specifying default values. If there are a large number of values to be used for all data items involved.

**DEFDBL** A Microsoft BASIC statement which signifies that all variables listed are double-precision floating point numbers (numbers with decimal fractions up to sixteen digits). For example, if you place the statement: DEFDBL ABC at the beginning of your program, all variables starting with ABC (such as ABCDATA, ABCMISC, etc.) will be double-precision floating point numbers.

Otherwise double-precision floating point numbers can be declared by having their variable names end in #.

Variable names must start with a letter, can have up to 40 characters, must not be any reserved words, such as IF, ON, THEN, GOTO, etc., or a reserved word followed by a type declaration character (\$,%,!,#). See Reserved Words Microsoft BASIC for complete list. See also Variable Names.

**Define Name** This is a command option used in Microsoft Multiplan to assign a name to a cell, a part of a row of cells, a part of a column of cells or a range of cells on this electronic spreadsheet. If the name is given to a cell that contains a formula such as a total of a column of cells, this name may be used in a subsequent formula instead of the formula in the cell which was given the name. Define Name is available from the Select menu on the menu bar at the top of the Microsoft Multiplan screen display.

Names assigned by this command may be up to 31 characters in length, may contain any keyboard character except a space and may not resemble a number or a cell reference. In the case of an individual cell, if the cell being named contains any text, this text will be proposed as the name of the cell by the program. If the cell is blank, the last name defined by the user will be proposed by the program in a dialog box. If the text in the selected cell contains blank spaces, these spaces are replaced with underline symbols. The Define Name command is a powerful tool for the Multiplan user. See Select Menu, Menu Bar.



Fig. D4 An example of using the Define Name option in Multiplan.

**DEFINT** A Microsoft BASIC statement. If you place the statement DEFINT ABC at the beginning of your program, all variables starting with ABC (such as ABCDATA, ABCMISC, etc.) will be integer whole number variables because they start with a series of characters defined with the DEFINT string variable prefix. Otherwise integer variables must end in % for whole numbers from -32768 to +32767. Integer variable names must start with a letter, can have up to 40 characters, must not be any reserved words, such as IF, ON, THEN, GOTO, etc., or a reserved word followed by a type declaration character (, %, !, #). See Reserved Words Microsoft BASIC for complete list. See also Variable Names.

**DEFSNG** A Microsoft BASIC statement. DEFSNG signifies that all variables listed are single-precision floating point numbers (numbers with decimal fractions with up to six digits). For example, if you place the statement: DEFSNG ABC at the beginning of your program, all variables starting with ABC (such as ABCDATA, ABCMISC, etc.) will be single precision floating point numbers.

Otherwise single-precision floating point numbers can be declared by having their variable names end in !.

Variable names must start with a letter, can have up to 40 characters, must not be any reserved words, such as IF, ON, THEN, GOTO, etc., or a reserved word followed by a type declaration character (, , , , ,). See Reserved Words Microsoft BASIC for complete list. See Variable Names.

**DEFSTR** A Microsoft BASIC statement. If you place the statement DEFSTR ABC at the beginning of your program, all variables starting with ABC (such as ABCDATA, ABCMISC, etc.) will be string variables because they start with a series of characters defined with the DEFSTR string variable prefix. Otherwise string variables must end in \$ for 0 to 255 letters, numbers, punctuation marks and other characters. String variable names must start with a letter, can have up to 40 characters, must not be any reserved words, such as IF, ON, THEN, GOTO, etc., or a reserved word followed by a

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type declaration character (\$,%,!,#). See Reserved Words Microsoft BASIC for complete list. See Variable Names.

**DEFtype** A Microsoft BASIC statements which declares variable types as integer, single-precision, double-precision, or string. The format is:

DEFtype <a href="https://www.etten/etten/contention-intention-listen-lis

(type) is INT, SNG, DBL or STR.

(letter) is a letter of the alphabet (A-Z).

The DEF type statement declares that the variable names beginning with the letter or letters specified will be that type of variable. The DEF type must preceed any use of the variables specified. See DEFDBL, DEFINT, DEFSNG, DEFSTR.

**Delay Loop** Use to freeze or hold screen display (Microsoft BASIC). To freeze the screen briefly while the operator using your program reads a message, just write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y

To freeze the screen until the operator is done with it, put in a dummy input statement and instruct the operator to press ENTER to proceed. The input variable need not be used in your program:

1000 INPUT "Press ENTER to continue";A\$

**DELETE** A Microsoft BASIC command used to erase specified range of lines from a program. The format is:

DELETE (dine1)](-dine2)]

dine1> is the number of the first line you want deleted.

(line2) is the number of the last line you want deleted.

Microsoft BASIC will return to command level after a DELETE is executed. A period (.) may be used in place of the line number to indicate the current line number. When you specify a line number that does not exist in the program, the error message "Illegal function call" will be displayed.

For example:

**DELETE 100** 

deletes line 100.

**DELETE 100-200** 

deletes lines 100 to 200 inclusive. The DELETE statement is not implemented in Compiler Microsoft BASIC.

**Delete Character** MacWrite, MacPaint, Microsoft BASIC, Microsoft Multiplan, and other applications for the Macintosh use the backspace key to delete characters from the screen. The I- beam cursor must be placed to the right of the character to be deleted and the mouse button must be clicked. This causes a vertical bar cursor to appear at the pointer position if the user is in an edit mode. The backspace key is

then pressed causing the cursor to move one space to the left and delete the character to the left of its starting position each time the backspace key is pressed. See I-beam, Mouse Button, Backspace Key.

**Delete File** A file may be deleted from a Macintosh disk by dragging the file's icon from the Directory window to the Trash Can and instructing the system to Empty Trash. This operation is accomplished from the Finder. Files may be deleted while the user is in Microsoft BASIC by entering DELETE followed by the filename in the Command window. Unless a specific volume (disk) name is provided or the file has been loaded from the external disk drive or a hard disk, Microsoft BASIC will assume the file is located on the disk in the internal disk drive. See Trash, Command Window.

**Delete Name** An option that is available on the Microsoft Multiplan Select menu from the menu bar at the top of the screen display. It removes any name previously assigned to a cell, portion of a row, portion of a column or range of cells. This option may only be used if a name has been assigned to the cell or cells that were highlighted by the user prior to selecting the command. If this area of the spreadsheet has not been given a name earlier, the command option is dimmed on the menu. See Select Menu, Menu Bar, Define Name.



Fig. D5 Positioning the I-beam pointer to delete text with the backspace key. When the mouse button is clicked, this I-beam becomes a vertical bar cursor.

**Deleting Cells** A row or column of cells may be deleted from a Microsoft Multiplan worksheet by highlighting the row or column to be deleted and using the Cut option from the Edit Menu on the menu bar. Several rows or columns may be deleted in the same fashion. A single cell may also be deleted in the same way. This process removes the cells from the active worksheet and places them in the Clipboard where

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they will remain until they are Pasted to a new location on the Worksheet or until another row, column, cell, or range of cells is saved to the Clipboard. See Cut Option, Paste Option, Menu Bar, Edit Menu, Clipboard.

**Deleting Text** Text may deleted from any line in MacWrite by moving the I-beam pointer to a position just to the right of the text to be deleted and clicking the mouse button. This action causes a vertical bar cursor to be displayed at the point in the text where the pointer was positioned when the mouse button was clicked. To delete the text to the left of the vertical bar cursor, press the Backspace key as many times as is required to remove the desired text from the screen. Once the desired text has been deleted, the pointer should be moved to the next point where text entry will begin and the mouse button should be clicked. This will move the insertion point for text to the new pointer location in the document.

Text may also be deleted by placing the 1-beam to the left of the text to be deleted, clicking the mouse button and dragging the cursor over the text to be deleted. This text will be highlighted. It may then be Cut or Cleared from the pull-down Edit menu on the menu bar. Another method of clearing or deleting highlighted text is to press the Command key and the X key together or press the Backspace key. The same method can be used in MacPaint in the Text mode. It may also be used in Microsoft BASIC in the Edit mode when a line has been moved from the "List" window to the "Command" window for editing. See Mouse Button, Clicking, Vertical Bar Cursor, MacWrite, MacPaint, Microsoft BASIC, List Window, Command Window, Insertion Point.

**Delimiter** A delimiter is a character which indicates the beginning or end of a sequence of characters, or separates one sequence of characters from another. In the English language, a space is the common delimiter used to separate words. Other delimiters are the comma, period between sentences, and a paragraph indentation to mark the beginning of a new paragraph. In computer language, spaces are often used as delimiters, as are commas, semicolons, colons, parenthesis, equal signs and various other special characters.

**DELTA** A Microsoft Multiplan function that resets the internal value of DELTA used in a completion test or in iterations to zero. This function may be used to compute and present the amount of change in value as calculations are made in a particular part of a Multiplan worksheet. This type of calculation is called "finding the local value of DELTA in a worksheet."

**Descenders** The parts of printed or displayed characters that extend below the baseline.

**Descending Order** To order material from highest to lowest in numeric value or alphabetically. The Multiplan Edit menu on the menu bar contains a Sort command option. When this option is selected, a dialog box is displayed. This dialog box allows the choice of ascending or descending order. If descending order is selected, the text or values in the highlighted row or column or highlighted portion of a row or column will be sorted in descending order. See Sort, Dialog Box, Menu Bar.

**Desk Accessories** are special programs or areas of the Macintosh's memory available from Macintosh ROM that may be used by the applications currently available for the Macintosh. They are accessed by selecting the Apple menu from the menu bar of the screen display. They consist of a Calculator, an Alarm Clock, a Control Panel, a Note Pad, Key Caps, a Scrapbook and a Puzzle.

The Calculator resembles a 10-key electronic calculator and allows routine calculations to be made using the mouse or the keyboard. The Alarm Clock displays

the current time in the upper right-hand section of the screen display when it is activated. It also sounds an alarm tone when it has been set. The Scrapbook can be used to hold text or pictures used frequently. This material may be cut from the Scrapbook and Pasted into various applications as needed. The Note Pad consists of eight pages of text notes that the user wishes to separate from documents being worked on. It also may be used to edit material that cannot normally be edited in an application. This material may then be cut from the Note Pad and Pasted back into the application from which it was cut. The Control Panel is used to set and adjust the volume of the sounds generated by the Macintosh's speaker, the time and date of the computer's clock, the number of clicks required to select or activate an application, the rate that commands on menus blink, the background pattern of the Desktop, the rate at which keys repeat, the rate of insertion point blinking and the response of the keyboard to touch. See Alarm Clock, Apple Menu, Menu Bar, Control Panel, Desktop Pattern, Insertion Point, Cut Option, Paste Option, Scrapbook, Note Pad.

**Desktop** The Desktop is the manner in which the Macintosh's working environment is presented to the user. When a disk is first loaded, the desktop is presented. At that time, it consists of a background pattern, a menu bar, a disk icon and a trash can icon. It changes aspect as disk icons are opened, file folders are opened and file folders are closed. The Desktop is a visual representation of the applications and files that are available to the user. It may be organized by the user as he wishes by placing similar files together in file folders or by placing files along with particular applications in file folders. See Menu Bar, Disk Icon, Trash, Icon.



Fig. D6 The Macintosh Desktop display.

**Desktop File** A file created by the Finder for each initialized disk and stored on the disk. This file is updated each time programs and data files are stored on or erased from a disk. It contains information about the disk itself and about each program or file on the disk. The Desktop file associates a data file with the application that created the data file. Thus, if you have written a letter or memo with MacWrite, it is asociated with MacWrite in the Desktop file. Then, if you select the same memo

## 80 • Desktop (From and to Microsoft BASIC)

from the Desktop, MacWrite is opened automatically prior to opening the data file that is the memo. See Initialize a Disk, Finder, MacWrite.



Fig. D7 The Macintosh System Folder with the Desktop File highlighted.

**Desktop (From and to Microsoft BASIC)** Microsoft BASIC may be accessed from the Macintosh Desktop display as long as the Microsoft BASIC disk has been inserted into the Macintosh's disk drive and the icon for this disk has been opened. To access Microsoft BASIC for the purpose of writing a new program, place the pointer on the "Microsoft BASIC" icon on the Directory display and double-click the mouse button. This will cause Microsoft BASIC to be loaded from disk and make it available to the user. Microsoft BASIC may also be accessed at the same time that a program to be edited or run is loaded by placing the pointer on the program icon and double clicking the mouse button. This action will cause Microsoft BASIC to be loaded and then cause the program to be loaded and run.

The Desktop display is accessed from Microsoft BASIC by selecting the Close option from the File menu. This causes the current program to be closed and causes Microsoft BASIC to be closed. Then the Desktop is displayed once more. See Mouse Button, Double-clicking, Clicking, Close, File Menu.

**Desktop Pattern** The Desktop pattern is the background pattern that is displayed on screen when the Desktop display is being shown by an application. This pattern may be changed by accessing the Control Panel, placing the cursor on the right-hand Desktop display window and clicking the mouse button. Then the crosshair is moved over to the left-hand portion of the display which represents the screen pixels. By clicking the mouse button while the crosshair is on a blank spot, the pixel under the crosshair is turned on. By placing it over a dark spot and clicking the mouse button, the pixel is turned off. The Desktop pattern may be made into a grid

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or even changed to a blank white background by changing the pixels with the mouse button and the crosshair. See Mouse Button, Crosshair, Cursor, Control Panel, Desktop.



Fig. D8 The Desktop Pattern set on the Macintosh Control Panel.

**Destructive Backspace** is carried out by the Backspace key on the Macintosh keyboard. This function causes the cursor displayed on the screen to move to the left one space and to erase the character currently to the left of the cursor. This technique is useful in editing program lines or text. It is used along with the Backspace key in such applications as MacWrite and also by MacPaint in the Text mode. See Backspace Key, Cursor.

**Development System** A computer system with the capabilities required for efficient hardware and software application development for a given microprocessor. Such a system typically includes a microcomputer, monitor, printer, mass-storage (often disks or hard disk), PROM programmer and an in-circuit emulator. Software is often developed on a system totally different from the system it will run on when the target system does not have enough memory or other resources to support development, or because the system is not actually available yet.

**Development Tools** Hardware and software aids intended for use in developing programs and/or hardware systems. These tools are made available to software and hardware developers by the computer manufacturers, as long as that company wishes to have products marketed for its computers by independent developers. Some development tools are marketed by independent manufacturers for computers that are manufactured by companies such as Apple. Such tools are generally not

## 82 • Device Dependent

possible unless the developer has the manufacturers support and has access to material supplied by the manufacturer.

**Device Dependent** is a term associated with input and output. If a program or language is device dependent, it must be used with a particular computer or a particular peripheral, such as a modem or printer, or it will not function. Certain communications programs are device dependent as they will only function with a particular modem. Printer utility programs can generally be configured for several different printers. Computer languages are generally not device dependent in terms of peripherals. See Device Independent.

**Device Independent** is generally used to describe a program or language that may address or access any device connected to a computer system by internal circuits or by external connectors such as plugs or ports. See Device Dependent.

**Devices and Ports** A port is an address providing a connection between the computer's internal processor and an external device. Ports are used to attach input and output devices.

**Diablo** A Xerox-owned company which makes computer peripherals and computer systems. A supplier of daisy-wheel printers.

**Diagnostics** A set of routines used to diagnose system malfunctions and/or perform standard performance tests. The Macintosh's start-up diagnostic programs are examples.

**Dialog Box** Special windows called dialog boxes are used to inform the Macintosh user of the options that are open when working with an application or a programming language. The dialog box presents a message when the user exercises an option that requires a decision or requires giving an instruction to the computer or its peripherals. It also presents two or more buttons that may be used to indicate the decision made or the instruction to be carried out. Dialog boxes are used to decide whether or not a disk should be formatted, to name a document being saved, to instruct the program to save a document, to provide detailed instructions for the use of a printer and all other things that require decisions or instructions from the user. See Window, Button.

**Dialog Manager** The Dialog Manager is a collection of about 23 subroutines in the User Interface Toolbox in the Macintosh ROM. These subroutines are used to create and handle dialog boxes and alert boxes.

**Die/Dice** The circuit elements built of small rectangular pieces of silicon on a wafer. Each wafer has several dozen to hundreds of rectangles or dice. Once mounted in a package, they are called a chip.

**Digital** Having discrete states. Digital logic may have from two to sixteen states. Most logic is binary logic with two states, on or off.

**Digitizer** A device which converts analog information to its digital equivalent. Often used for devices obtaining input from a plotting surface and providing coordinates as output, such as a graphics tablet. Digitizers are often used to convert images viewed by a TV camera to pictorial images on a computer screen or to images that may be printed on a printer such as the ImageWriter. Digitizing is used in mapping and in space exploration to allow data to be sent over long distances by radio-like transmissions.



Paper:	() US Letter	() A4 Letter		ОК
🔿 US Legal		🔿 International Fa	nfoid	
Orientat	tion: 🔘 Tall	🔿 Tall Adjusted	() Wide	Cancel

Fig. D9 A and B Examples of Macintosh Dialog Boxes.

Digitizers See Video-Digitizer.

**DIM** A Microsoft BASIC statement which gives BASIC information about how data will be named. It causes space to be reserved, but does not perform any operations on the data. To understand the function of DIM, you must first understand the fundamental concept of arrays. An array is a group of data quantities, all the same type, that form a group to be processed in a similar way. Suppose, for example, you need to write a program that accepts 20 numbers from the operator, then performs calculations based on all 20 numbers. A brute force approach to this problem would produce twenty names: NUMBER1, NUMBER2, ..., NUMBER19, NUMBER20. The program to read these from the operator would look like this:

110 INPUT ''FIRST NUMBER'',NUMBER1 120 INPUT ''SECOND NUMBER'',NUMBER2 .

190 INPUT ''NINETEENTH NUMBER'',NUMBER19 200 INPUT ''TWENTIETH NUMBER'',NUMBER20

Subsequent calculations on the numbers would be even more cumbersome. It is easy to imagine the statements required to calculate the sum, the average, and other statistical measures. Of course this approach totally misses the point of the computer's ability to use loops. Arrays give us the ability to name the individual numbers (or character strings) in a related collection in a way that simplifies repetitive operations. To name our group of 20 numbers, we would use the DIM statement:

10 DIM NUMBER(20)

This informs BASIC that a group of 20 numbers will be used. All of the numbers have the generic name NUMBER followed by a number from 1 to 20 in parenthesis.

#### 84 • DIM

The first number is NUMBER(1), the second number is NUMBER(2) and the twentieth number is NUMBER(20). When we combine this flexible naming convention with the ability to use a variable inside the parenthesis, processing becomes very easy. To read in the 20 numbers, for example, use the following short program:

10 DIM NUMBER(20) 20 FOR SUBSCRIPT = 1 to 20 30 INPUT ''NUMBER('',SUBSCRIPT,'') ='',NUMBER(SUBSCRIPT) 40 NEXT SUBSCRIPT

Notice how we broke into the prompt in statement 30 to inset the subscript (or positioning number within the group of related items). Once these numbers are in the computer, performing various operations on each member of the group is easy. The following code will compute and print out the sum of the 20 numbers read above:

50 FOR SUBSCRIPT =1 TO 20 60 SUM=SUM + NUMBER(SUBSCRIPT) 70 NEXT SUBSCRIPT 80 PRINT SUM

Once you have got the general idea, there are thousands of ways to use subscripts for both numbers and character strings. Most books on BASIC programming will give more examples of how to use subscripts with dimensioned arrays to solve common types of programming problems.

Often data is in the form of a table, where each entry is in a certain row and column location. Data in this form requires two subcripts for unique specification, such as TABLE(2,14). This specifies a particular number at row 2, column 14 of a table of related data numbers known collectively as TABLE. Use the DIM (short for dimension) statement to let BASIC know how much space to reserve for this group of data items. BASIC uses the maximum subscripts stated in your DIM statement to determine if your loops may have gone awry by asking for a data item with a subscript larger than planned for or for which it does not have data values. If your table of data items contains 30 columns and 20 rows, the DIM statement would be:

#### 10 DIM TABLE(30,20)

Looking at the DIM statement more generally, up to 255 different maximum subscripts may be specified for a single array name such as TABLE. While problems requiring more than two subscripts are rare, they do occur. Also, you can list as many variable names with their maximum subscript values as you like in one DIM statement, separating them with commas. The maximum subscript value is 32767, large enough for most everyday problems.

Now for some little twists. Probably because old-line computer programmers like to start numbering things from zero instead of 1 to squeeze the most possible different numbers out of a fixed number of bits, subscripts start from zero instead of from 1. Fortunately, you can override this often confusing situation by placing an OPTION BASE 1 statement at the start of your program. This informs BASIC that you like to count data items starting from 1. But if you leave it out, all subscripted data items will have one extra slot named, for example, NUMBER(0). Put in the OPTION BASE 1 unless there is some very good reason why you need to start counting data items from zero.

Next, if you need a quick and dirty program in a hurry, BASIC will let you use an array without a DIM statement. In this case the maximum subscript is 10 by default.

However, failing to explicitly dimension your arrays and tables will often come back to byte you in the end.

Other interesting notes about DIM and the arrays it creates are:

All numeric data items in arrays have a starting value of zero.

All strings in arrays have a starting value of null--the string of length zero.

The rules for variable types apply to arrays just as to individual variables.

You can only dimension an array once unless you ERASE it.

Arrays and the DIM statement are the key to short programs which process large amounts of data.

**Dimmed Commands** When a menu is selected from the menu bar, the commands that are currently available are listed in bold text under the Command Options. Commands that are currently not available for use appear dimmed and are generally hard to read, and may not be available in the particular working context you are currently using. For example, if you are using MacWrite and access the Edit menu, the Paste option will not be available if there is nothing on the Clipboard. The Cut, Copy, Undo and Show Clipboard command options will be highlighted and the Paste command will be dimmed. See Menu Bar, Edit Menu, Cut Option, Copy Option, Paste Option, Undo Option.



Fig. D10 Example of dimmed commands on Edit menu.

**Dimmed Icon** is displayed on the Desktop for a disk that is not currently in a disk drive. This icon is much less substantial than an icon for an active disk. The dimmed icon is displayed when a disk has been ejected from the disk drive to allow another disk to be loaded and used. The disk that is currently in the disk drive is highlighted while the ejected disk is dimmed. See Icon, Desktop.

**DIP Switches** A collection of small switches on a DIP, used to select options on a circuit board without modifying the hardware. Printers such as the ImageWriter

## 86 • Dip Switches

SWITCH	SETTING	FUNCTION
1-1 1-2 1-3	OPEN OPEN	When all three of these switches are open, American text and accents are used.
1-1 1-2 1-3	CLOSED CLOSED OPEN	When these switches are set in this configuration, British text and accents are used.
1-1 1-2 1-3	OPEN OPEN CLOSED	When switches are set in this congifuration, German text and accents are generated.
1-1 1-2 1-3	OPEN CLOSED CLOSED	When switches are set in this configuration, French text and accents are generated.
1-1 1-2 1-3	CLOSED OPEN CLOSED	When switches are set in this configuration, Swedish text and accents are generated.
1-1 1-2 1-3	CLOSED OPEN OPEN	When switches are set in this configuration, Italian text and accents are generated.
1-1 1-2 1-3	CLOSED CLOSED CLOSED	When switches are set in this configuration, Spanish text and accents are generated.
1-1 1-2 1-3	OPEN CLOSED OPEN	When switches are set in this configuration, American text and accents are generated.
1-4 1-4	CLOSED OPEN	Page Length = 72 lines. Page Length = 66 lines.
1-5 1-5	CLOSED OPEN	Ignores eight data bit. Uses eight data bit.
1-6 1-7	OPEN OPEN	Configured along with 1-7 to print Pica.
1-6 1-7	CLOSED OPEN	Configured along with 1-7 to print Elite.
1-6 1-7	OPEN CLOSED	Configured along with 1-7 to print Ultracondensed.
1-6 1-7	CLOSED CLOSED	Configured along with 1-7 to print Elite Proportional.
1-8 1-8	OPEN CLOSED	Adds line feed after CR. No line fee after CR.
2-1 2-2	OPEN OPEN	Configured along with 2-2 sets baud rate at 300.
2-1 2-2	CLOSED OPEN	Configured along with 2-2 sets baud rate at 1200.
2-1 2-2	OPEN CLOSED	Configured along with 2-2 sets baud rate at 2400.
2-1 2-2	CLOSED CLOSED	Configured along with 2-2 sets baud rate at 9600.
2-3 2-3	OPEN CLOSED	Setx XON/XOFF protocol. Sets Data Terminal Ready protocol.

have DIP switches for ensuring that certain circuits are open and certain options are available to the user. The DIP switch settings for the ImageWriter are listed below:

SWITCH	SETTING
1-1	OPEN
1-2	OPEN
1-3	OPEN
1-4	OPEN
1-5	OPEN
1-6	CLOSED
1-7	OPEN
1-8	OPEN
2-1	CLOSED
2-2	CLOSED
2-3	OPEN
2-4	CLOSED

This table summarizes all of the DIP switch settings that may be used with the ImageWriter. The normal switch settings for the Macintosh are as follows:

**Directory** The table of contents of a file system which allows convenient access to specific files. The Macintosh's disk Directory is used by the Finder to locate a particular file on a disk. The Directory includes the name of each file and a notation of the tracks on the disk on which the file is stored. See Finder.

**Directory Window** When a disk icon is opened on the Macintosh Desktop, a window is displayed. This window lists the programs, files, documents and applications that are stored on the disk. The window and its contents are produced by the Finder. It may be viewed by icon, by name, by size, by type and by date as selected from the Special menu on the Menu bar. The default display is by icon. See Desktop, Icon.

**Disk** A flat, circular magnetic storage medium which is rotated while in use. The material used to record data is very much like recording tape although it is circular instead of flat. The Macintosh uses 3-1/2 inch disks in plastic mountings with metal hubs and a read/write slot that is protected by a sliding metal door. These disks may be write-protected by using a sliding tab on the lower right-hand corner of the disk. Each single-sided disk can store up to 400K of information. When double-sided disks become available, they will store up to 800K of information. Data is stored on a flexible, magnetically sensitive, coated plastic disk that rotates very quickly inside a plastic envelope. These disks are sometimes called "microfloppy disks."

Each disk drive has a read/write head that travels over the disk as it rotates and reads data from the disk or writes data to the disk as directed by the program or the user. The disk rotates at a speed between 390 and 605 revolutions per minute. Data is recorded on 80 concentric rings or tracks on the disk's surface. The outermost sixteen tracks on each disk are divided into twelve sectors. The second set of sixteen tracks are divided into eleven sectors. The third set of sixteen tracks are divided into ten sectors. The fourth set of sixteen tracks is divided into nine sectors. The fifth and last set of sixteen tracks is divided into eight sectors. The disk is rotated at a slower speed when the disk head is reading or writing the outer tracks. This speed is controlled by the disk drive controller circuitry on the Macintosh's analog board. The process of setting up a disk so that it may be used by the computer and the programs used with the computer is called "formatting" or "initializing."

**Disk, Backup** Because disks can be rendered unreadable by physical damage, magnetic contamination or dirt, it is wise to keep at least two copies of any important information.

See Disk Copying.

## 88 • Disk, Bad Sector

**Disk, Bad Sector** A sector on the disk which will not read/write data correctly. Usually due to a minor physical flaw in the disk. One or two bad sectors will not seriously affect the disk's use. The Macintosh will mark them as bad and avoid using them. If more than one or two bad sectors are found, the files that are accessible on a disk should be copied onto another disk and the bad disk should be trashed.

**Disk Buffer** A disk buffer is an area of a computer's Random Access Memory (RAM) set aside to hold information that has not yet been written to disk. The Macintosh uses the disk buffer to keep information about those disks that have been inserted in a disk drive although the disks may not currently be in the disk drive because they have been ejected for one reason or another. Certain application programs used on the Macintosh also use the buffer as a holding area prior to writing information to disk. These programs empty the buffer by "flushing" it prior to allowing the disk to be ejected. Any time the Finder is used to eject a disk, it flushes the buffer. See RAM, Eject Disk.

**Disk Capacity** Measured by the number of kilobytes of information that may be stored on a disk. The capacity is dictated by the size of the disk's recording surface, the ability of the read/write head to track on this surface in small increments as it moves back and forth toward or away from the center of the disk, the ability of the disk controller circuitry to interpret information read by the disk, the ability of this circuitry to control the amount of movement of the read/write head, the number of read/write heads and the manner in which a disk is formatted. Each of these factors influence the capacity of a disk.

Currently, the Macintosh is equipped with a single-sided disk drive with only a single read/write head. The Macintosh uses single-sided disks that can store up to 400K of information. Double-sided disk drives, using disks with 800K capacity, will probably be available for the Macintosh shortly. This capacity could be increased even further if the disk controller circuitry and formatting methods were changed, and if the read/write heads on the disk drives could read narrower tracks as accurately as they read tracks with the current track width and current spacing between tracks. See Formatting a Disk, Initialize a Disk, Track, Sector, Double-sided Disk, Single-sided, Kilobyte.

**Disk Care** Since disks are really made of mylar or mylar- type material that has been treated to record electronic signals, they are somewhat delicate. Disk manufacturers take measures to protect disks and to give them as much useful life as possible. The recording surface is attached to a metal hub that allows the disk to be rotated at high speeds without damage. The recording material is enclosed in a semirigid plastic case lined with dust- collecting material impregnated with a lubricant to protect the disk as it is rotated. The slot used by the read/write head is protected with a sliding door that is opened when a disk is inserted in a disk drive. Each disk is provided with a write- protect feature that allows the user to ensure that no data can be written to a disk if he wishes to protect the material already saved on the disk.

All of these measures are designed to protect the disk itself from damage and to protect the data on the disk. The disks used by the Macintosh are hardier than those used on other computers. Although this is the case, these disks and the data they hold can still be damaged if the user does not exercise care. The door that protects the read/write slot should be closed when a disk is not in a disk drive. It prevents dust from collecting on the recording surface of the disk, and prevents the user from touching the surface and getting skin oil or perspiration on the surface of the disk.

The recording surface of a disk can be damaged by dust and foreign material, and disks should never be left out where liquids can be spilled on them or where they can be crushed or bent. They should not be exposed to magnets which will disrupt the

data stored on the disk or may even cause it to be erased. Disks should not be subjected to extreme heat or to extreme cold as they could suffer physical damage that makes them useless. They should not be exposed to direct sunlight for long periods of time as this could damage the recording surface. Disks should be treated with respect as they normally hold programs and data that is valuable to the user. They should be stored in a safe place that is not subject to magnetic influences, extreme heat, extreme cold, heavy dust or liquid damage.

**Disk Compatibility** Disks are compatible if they can be used by more than one computer system. Compatibility depends on the similarity of the disk drive mechanisms used to read the disk or write to it, and on the manner that the disk has been formatted. Currently, the disks that have been formatted on a Macintosh can only be used by a Lisa2 which has the same type of disk drive as the Macintosh. See Disk Drive, Formatting a Disk, Lisa.

**Disk Copying** As you find more and more uses for your Macintosh, you will also find certain programs that you use frequently and have generated document files, graphic files or data files that are important. Since things can go wrong with computer systems or disks can be damaged in a number of ways, ensure that you have duplicate copies of those programs that you value or use frequently. Also ensure that any documents, data files or graphic files you value are duplicated. Some commercial programs are protected from being copied by the user. The program documentation should tell you whether a disk may be copied or not. Disks that contain data that is written by commercial programs can generally be copied by any disk copy program. If this is not the case, the manufacturer will supply a special copy program that allows data to be backed up.

Disks that contain programs you have written or programs that are not commercial can be copied with a utility program that is on your System Disk or on many application disks. This program is called "Disk Copy." To use the program, insert a disk that contains the program into the disk drive. When the disk icon is displayed, place the pointer on the disk icon and double-click the mouse button. This will cause a disk directory to be displayed on the Desktop. Move the pointer to the disk copy icon and double-click the mouse button. This will cause the program to be loaded from the disk and to be run. The disk that contains the program will eject automatically after the program has been loaded and has begun to run.

A message will appear on the screen that describes the disk copy program and instructs you to insert the disk you wish to copy in the internal disk drive. The computer will read this disk and will copy the contents of the disk into the Macintosh's RAM until RAM is full. A message appears on the screen indicating that the first quarter of the disk is being read into memory. When RAM is full, the disk will be ejected automatically. A message asking you to insert the disk to be used for the copy will then appear on the screen. Insert a blank disk or a disk that you wish to use for the copy. If the disk is blank, the program will display a dialog box that asks if you wish to initialize the disk. Instruct the program to initialize the disk at this time. If the disk is not blank, the program will ask if you wish to erase the contents of the disk currently in the disk drive. If not, cancel the copy command and the disk will be ejected. This is done by placing the pointer on the Cancel button on the screen display instead of the OK button and clicking the mouse button.

The program will then direct you to insert the disk you wish to use for the copy. This disk is called a "destination disk" by the program. Insert a disk that you wish to use, then activate the OK button. The destination disk will be formatted by the copy program. The program will write the material stored in RAM onto the disk and will eject the destination disk and instruct you to insert the source disk. Insert the disk you are copying. The program will then read the second quarter of this disk into RAM, eject the disk and instruct you to insert the destination disk.

## 90 • Disk, Destination

This cycle will occur two more times until the entire disk has been copied. Then the program will inform you that the copy has been made successfully and will ask if you wish to make another copy. If the copy has not been made successfully, you may have to go through the copy process again.

About Disk Copy		
With Disk Copy you can copy entire disks quickly using a one-drive system.		
Messages at the bottom of the screen will ask you to insert alternately the disk you want to copy and the destination disk. Any uninitialized destination disk will be initialized automatically.		
To minimize the number of disk swaps needed, Disk Copy uses the space in memory that's allocated to the screen display; therefore, unusual patterns will appear on the screen during the copying process.		
OK Cancel		

Fig. D11

**Disk, Destination** The same thing as a target disk. It is the disk to which a program, file or document is being copied from another disk.

**Disk Directory** On each disk Macintosh maintains an index or directory of all files. See Directory.

**Disk Drive** A disk drive is a device used to record data on a magnetic medium similar to recording tape, and to read data that has been stored on such a medium. This magnetic medium is cut into a very thin disk fixed inside of a protective cover. Since the recording medium is a disk, the device that reads from it and writes to it is called a "disk drive," which uses read/write heads to read data from or to write data to a disk. When data is written to a disk, it is copied from the computer's RAM to the disk via circuits within the computer or via a plug-in circuit board called a "disk controller card." The Macintosh uses built-in circuitry on the analog board to control the communication between the computer and the disk drive.

If a disk drive has a single read/write head, it is called a "single-sided drive" and requires disks manufactured to accept data on a single side. If a disk drive has two read/write heads, these heads are located opposite each other on either side of the disk and are called "double-sided disk drives." The read/write head or heads on a disk drive are positioned over the read/write slot on the disk. If a disk drive can use 8-inch disks, it is called an "8-inch drive." If it can handle 5-1/4-inch disks, it is called a "5-1/4-inch drive." The Macintosh uses 3-1/2-inch single-sided disks at present.

Disk drives may be installed internally in the computer's case or may be external devices connected to the computer system by cables. The Macintosh has an internal

disk drive that uses single-sided disks with 400K storage capacity. It can use an external disk drive that is attached via the disk drive port on the back panel of the computer. A disk drive is very much like a typical record player, causing the disk to spin at a high rate of speed and reads the data from the disk or writes the data to the disk while it is spinning. The Macintosh varies the rate of spin according to the location of the read/write head on the disk. When the head is on the outer tracks of a disk, the speed is much slower than when it is reading from or writing to the innermost tracks on a disk.

A disk drive and its controller circuits depend upon the manner in which a disk is formatted or initialized to use the disk. When a disk is formatted, it is set up to accept data and to inform the controller circuits where the head is at all times. Macintosh disks are formatted in the manner described in the Disk entry and in the Formatting Disks entry. See also Disk, Disk Drive Controller, Read/Write Head, Track, Sector.

**Disk Drive, Connecting** An external disk drive can be connected to the Macintosh via the second port from the left on the back panel of the computer. The connection is made by plugging one end of a connector cable with the proper plug into this port and tightening the locking screws on either side of the connector. The other end of this cable is connected to a compatible external disk drive. Currently, the only compatible disk drive is one produced for Apple Computer by Sony.

**Disk Drive Controller** The circuits that control the communication between the computer and its disk drives are called the "disk drive controllers." These circuits are placed on plug-in cards on the Apple III computer and on all of the Apple II family of computers except the Apple //c. The Apple //c and the Macintosh use a single chip called the "IWM" (Integrated Woz Machine) as a disk drive controller. The Macintosh controller, which is a variable speed controller, differs from the controllers on other computers. The disk spins faster when the disk head is located on the outer tracks of the disk and spins slower when the head is located on the inner tracks. This method ensures that data is written accurately to the disk and read accurately from the disk. See Track, Chip.

**Disk File** A file residing on a disk which may consist of data generated by a program, a program written in a computer language used by the Macintosh, a system file that is used by the Macintosh to operate successfully, a document generated by an application program or an application program written by the user or by a commercial software vendor.

**Disk, Floppy** A flat circular sheet of mylar substrate coated with a magnetic oxide, rotating inside a protective jacket which continuously cleans the surface. This term is frequently used to describe 5-1/4-inch disks used on computer systems other than the Macintosh. The 3-1/2-inch disks used by the Macintosh are called "microfloppy disks."

**Disk, Free Space On A** The free space on a disk is displayed by the Finder when the disk is booted and the disk icon has been clicked. The disk directory is displayed in a window on the screen along with the amount of free space available on the disk. Free space is the amount of disk capacity expressed in kilobytes available for data storage after subtracting the amount of space taken up by system files, data files, documents and programs. See Disk Icon, Directory, Window.

**Disk Icon** The Macintosh uses pictorial representations of files, documents, applications and disk drives to identify each of these things to the user. These pictorial representations are called "icons." When a disk is inserted in a Macintosh disk drive, an icon

## 92 • Disk, ImageWriter File

resembling a disk is displayed on the Desktop. This icon is positioned right over the name of the disk (volume). When this icon is clicked, a Directory display is opened on the Desktop. This directory lists all of the files, file folders, applications and documents on the disk. It may be viewed by icon, by name, by size, by kind and by date by making a selection from the View menu. See Icon, Desktop, View Menu.

**Disk, ImageWriter File** The Macintosh uses programs called "drivers" to communicate with devices such as the ImageWriter printer. The ImageWriter driver is used to control the printer, its type settings, its spacing and the communication between the computer and the printer. This driver is located in the System Folder on Macintosh application disks such as MacWrite and MacPaint. The file that contains the driver is called "ImageWriter." It must be present on a disk for any printing activity using the ImageWriter to occur. See ImageWriter, Driver, System Folder.

**Disk, Initialize** The process of initializing or formatting a disk is used to make the disk work with the computer system and controller circuitry using the disk. This process sets up the disk to accept data from the system. It usually involves marking the tracks and sectors used to store data. It sets up the disk with markers that enable the computer to know the location of the read/write head at all times and sets up references for the system to recognize where each file starts and stops. If an uninitialized disk is inserted in the Macintosh's disk drive, a dialog box is displayed on the screen asking if you wish to initialize the disk. If you do, you would click the OK button and the system will initialize the disk. Blank disks, damaged disks that already contain data and disks already initialized for another computer system may be initialized. If a disk that already contains data is initialized, all of the data contained on that disk will be erased. See Track, Sector, Read/Write Head, Disk, Initialize a Disk, Formatting a Disk.

**Disk, Listing of Files** In Microsoft BASIC, use the FILES command to list all files on a disk. This command is useful to find a program on file, if you are unsure of the exact spelling of its name. This demonstrates the usefulness of mnemonic file names that remind you of the contents of a file. A REM at the start of each Microsoft BASIC program is also recommended to identify it when listed.

**Disk, Listing of Files** The Macintosh Finder reads the directory of each disk that is inserted into the computer's disk drives. When the disk icon is opened by the user, a display of the files on the disk is shown on the screen. This display may be shown by Icon, by Date, by Name, by Size, or by Kind as dictated by the user from the View menu. All of these file listing displays, except the by Icon display show the name of each file, its type, its size and the date it was last modified. The by Icon display shows the file name and a special icon that identifies the file type. See Icon, By Icon Option, By Name Option, By Kind Option, By Date Option, View Menu, Finder.

**Disk, LOAD Instructions** Any Microsoft BASIC program SAVEd on disk can be loaded back into the Macintosh's memory to modify or to run. Programs are loaded by using the LOAD command from the File menu on the menu bar at the top of the Microsoft BASIC screen display. When this menu is being displayed, a program can be removed from the computer's memory by using the New command. A new program may be loaded from the disk by using the Open command. When this command is selected, a dialog box is displayed requesting the name of the program to be loaded. The name must be entered where required in the dialog box.

Programs may also be loaded from the Command window in Microsoft BASIC by typing "LOAD (PROGRAM NAME)" and pressing the Return key.

For a program named "SAMPLE," on the disk in the internal disk drive or in the default drive if another drive has been activated by the user, enter:

LOAD ''SAMPLE''

If no name is provided after a load instruction, a dialog box is displayed on the screen to allow the user to enter the name of the desired program.

All LOAD instructions erase any program lines you have in memory before the LOAD, close all open files and delete all variables. If you want to combine a SAVEd program with the one you are writing, see MERGE.

To run the program, use LOAD SAMPLE, R or its synonym, RUN SAMPLE, R. If you use , R any files that are open stay open for the next program. Unless this is specifically needed, it is safer to use RUN SAMPLE which first closes any files now open, then loads SAMPLE into memory and runs it. See MERGE, CHAIN, SAVE, Dialog Box, Menu Bar.

**Disk, Locking** Disks are locked when they have been write-protected, a measure that is taken to protect data on a disk from being written over. Macintosh disks are write-protected by sliding a small tab located on the upper left corner of the bottom of the disk toward the edge of the disk. The movement of this tab in the direction described exposes a hole that runs through the disk. When the tab is in the position described and the hole is exposed, the disk cannot be written to. The illustration below shows a locked disk and an unlocked disk:



Fig. D12 Illustration of locked and unlocked disks showing position of write protect tab.

Disks may also be locked and unlocked by using the Get Info option from the File menu and clicking the Lock box.

On disks supplied by Apple Computer, Inc., the write-protect tabs are red. On disks supplied by Memorex, another manufacturer of disks, the tabs are the same color as the disk. On disks supplied by Hewlett-Packard, the write-protect tab does not slide, but must be broken off. It can then be snapped back in place. Disks should always be locked when they are being used in situations where the user

## 94 • Disk Maintenance

wishes to prevent data from being written to the disk. One example of this is when an entire disk is being copied, it is possible for the user to inadvertently insert the source disk (the disk being copied) in the disk drive when the copy program requests that the destination disk (the blank disk used to receive a copy of the original data) be inserted in the disk drive. If the user makes this mistake without locking the disk, the data on the origin disk could be lost. See Write-protect.

**Disk Maintenance** File management or disk maintenance are terms used to describe keeping track of files on disks. This includes creating them, finding them by name, ensuring that adequate free space is available on the disk, maintaining backups and deleting files no longer needed. These functions are supported by the various Desktop functions, but require thoughtful planning by the user to ensure proper results. When a disk icon has been clicked, the Finder displays pertinent information about each disk when the By Icon display or any of the other directory displays are shown on the screen.

The by Name, by Size, by Kind and by Date displays each show the size of the document, program, or file on a disk. The View menu should be used to select the directory display and the type of file maintenance work that is being carried out. For instance, if data files are being backed up, the by Kind display is more useful than the by Icon display because all files of the same type are listed together and the size of each file is shown. Each of these directories can be printed out on the ImageWriter by using the Command-Shift-4 key combination to perform a screen dump when the Caps Lock key is locked down. If the internal drive is the only disk drive available to the user, the by Icon directory of the source disk and the by Icon directory of the origin disk may be displayed on the screen at the same time as is shown in the illustration below.



Fig. D13 Macintosh screen with files set up to copy from one directory window to the next.

This type of display is obtained by opening the icon of the origin disk and then ejecting the disk without closing the icon. Then the destination disk is inserted and its icon is opened. The directory of the origin disk is dimmed as this disk is not in the disk drive. Files are copied by dragging the icon of the file to be copied from the origin disk to the icon or directory of the destination disk. The Finder will instruct you as to when the origin disk should be inserted and when the destination disk should be inserted. Files may be erased from a disk by moving the icon of the file from the directory display to the Trash Can icon, which may be opened by doubleclicking the mouse button when the pointer rests on this icon. This causes the contents of the Trash Can to be displayed in a window in the same manner as the contents of a disk directory. Files may also be erased by moving the icon from the directory window of the disk in the disk drive to the Trash Can window. These files will be held in the Trash Can until you use the Special menu on the menu bar to select the Empty Trash option or until the disk is ejected and the system is turned off. See Directory, Icon, Disk Icon, Menu Bar, Mouse Button, Trash Can, Erase Files, Special Menu, Window, Empty Trash.

**Disk, Number of Files** The number of files that may be stored on a given disk is dictated by the capacity of the disk and the size of each file already on the disk. The disks used by the Macintosh on the built-in disk drive and on external disk drives, except hard disk systems, are 400K capacity disks. If a disk is a start-up disk, it contains the System Folder which contains the Finder, the ImageWriter File, the System, the Clipboard file, the Scrapbook file, and the Note Pad file.

On application disks such as MacWrite/MacPaint, this folder occupies 209K of space. This leaves only 191K for application programs and document files. MacWrite occupies 55K of space; MacPaint occupies 61K of space. If these two applications and the System Folder are the only files on the disk, only 85K is left for additional files such as documents generated by MacPaint or MacWrite. MacPaint requires a minimum of about 10K for a document that is blank. As drawing lines are added to this document, more space is occupied. If the page is filled with assorted shapes, it then occupies about 20K of space. Thus, there is only space for about two or three additional documents on the disk described above. More files could be saved on the disk if the disk only contained MacPaint or MacWrite and the System Folder. Even more files could be saved on the disk if it was only a disk used to store data (documents) and it contained no applications or the System Folder. Such disks can be created and used by making backups of the MacWrite/MacPaint disk and trashing those applications that are not wanted from the backups.

Data disks may be created and used by initializing blank disks and copying document files from the MacWrite/MacPaint disk to the data disk and then erasing the document files from the applications disk. As you can see from the description above, there is no specific number of files that can be contained on a disk in a general or an average sense. See File, System Folder, Startup Disk, Backup Diskettes, Applications Disk.

**Disk Operating System** A Disk Operating System (DOS) is a collection of programs or subroutines that allow the computer to communicate with mass storage devices such as disk drives or hard disk systems, to manage files stored on such devices and to inform the user about the files that are stored on a disk. The Macintosh's Finder is its Disk Operating System as viewed by the user.

**Disk Organization** A 400K capacity disk used on the Macintosh by its internal 400K disk drive or by an external 400K disk drive is divided into eighty concentric rings called "tracks." In a decimal sense, the outermost track would be called "track 0" and the innermost track on a disk would be called "track 79." The sixteen tracks that

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are located on the outermost perimeter of the disk (track 0 through track 15) are divided into twelve sections called "sectors." Each sector can store 512 bytes of data. The next sixteen tracks moving toward the center of the disk (track 16 through track 31) are divided into eleven sectors. Each of the next sixteen tracks moving toward the center of the disk (track 32 through track 47) is divided into ten sectors. Tracks 48 through 63 are divided into nine sectors. Tracks 64 through 79 are divided into eight sectors. A number of tracks on each disk are used for a directory which holds the name, location and length of each file. It also holds the date the file was last modified. Each file is recorded by type in the directory. This directory is copied to the Desktop when a disk is inserted into a Macintosh disk drive. When a disk is formatted or initialized, each track and sector is marked on the disk magnetically and a directory is started on the disk. Each disk is also given a name by the user. See Track, Sector, Disk, Initialize a Disk, Formatting a Disk.



Fig. D14 Track and sector arrangment on a Macintosh disk.

Disk, SAVE Instructions In a Microsoft BASIC for a program named "SAMPLE."

On disk enter: SAVE "SAMPLE"

On an alternate disk named B enter: SAVE "B:SAMPLE"

To run the program at a later time, use the LOAD command to copy it from the disk you saved it on, back into the Macintosh's memory. See LOAD. If you want to save the program in ASCII format, which allows you to MERGE two programs together, put ,A after the close quote of the program name thus:

SAVE ''SAMPLE'', A

See MERGE.

To SAVE the program as a protected file in encoded binary form use ,P instead of ,A. Then it cannot be listed, saved, edited (or unprotected). While a clever programmer could probably get around this, it will prevent a quick and casual or accidental modification to your program.

The SAVE instruction does not alter your program in memory. It is important to be aware that if you write a Microsoft BASIC program, it will be lost (erased) unless you SAVE it before you either: turn off the Macintosh, go to the Desktop (System command) or use the NEW command. See also EDIT.

**Disk, Source** The disk from which information/data is coming. Target disk is the disk to which information/data is going.

**Disk, Startup** A disk that contains the Macintosh System folder. This disk makes the portions of the Macintosh operating that are only available on disk available to the computer. It contains the Finder, the ImageWriter file, the System file and other files.

**Disk, System** Used to contain system software or utility- type programs. The system files may reside on only one disk. Ordinarily this will be the disk in the internal disk drive on a two-disk drive system. On a single-drive system, the system disk will be loaded prior to loading the data disk. Once the system disk is loaded, it may be ejected and the data disk may be inserted into the disk drive. Once the data disk icon has been opened, the document or file to be used with the system disk may then be opened. Once the document or file has been loaded, the system may request that the system disk be inserted again. When the updated document or file is being saved by the user, the data disk will be requested once again. A system disk may also store user programs and/or data. See Data Disk, Applications Disk.

**Disk, Target** The disk to which information/data is going. Source disk is the disk from which information/data is coming.

**Disk, Write-protected** A disk is write-protected if the "lock" square is open. This is detected by a small spring- loaded switch or a light beam inside the disk and is sensed by Macintosh disk drive programs. You will get an error message (Locked Disk) anytime you attempt to alter a file on a write- protected disk by changing it, deleting it, copying a file onto the write-protected disk or formatting the disk.FL

You are allowed to use files, load them or copy from the write-protected disk. The purpose of these limitations is to prevent accidental loss of the only copy of programs or data. In most cases the procedure is to copy the write-protected disk onto an unlocked disk, put away the write-protected disk as a permanent copy, then modify the unlocked disk. In some cases, you will unlock the disk by closing the lock tab (after thinking it over) and proceed to change the disk.

It is a good practice to lock any important disk you will backup. Then if you accidentally ask for the backup in the wrong direction (from the old disk to your important disk), you will get a second chance to make the backup rather than losing your data. See Locking a Disk.

**Display Device** A computer output device which displays graphic and/or alphanumeric information, such as a CRT or a seven-segment LED. The Macintosh's display device is a screen built into the system. A number of special Macintoshes have been built or adapted to allow external monitors or projection devices to be used with the Macintosh for presentations to large groups.

DMA Direct Memory Access. A method used to provide high-speed data transfers

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between a peripheral and the main memory. Data is exchanged at maximum memory speed. Several means for accessing the memory are possible. Disconnecting the MPU from the buses is accomplished by a HOLD signal, and requires tristate data and address buses. DMA is preformed under the control of a Direct Memory Access Controller (DMAC). The Macintosh has four channels of DMA, three for I/O and memory transfers, one for refreshing the system's dynamic memory.

**Document** A document is any file generated by a particular application such as MacWrite, MacPaint or Multiplan on the Macintosh. This file contains material generated by the application and requires that the application be loaded prior to loading the document. A document file will automatically load the application file prior to loading itself, if a document file is selected with the mouse from the directory display on the Desktop. A document file may also be loaded from the File menu on the menu bar of all applications by choosing the Open option from this menu. A dialog box listing all available documents for that application will be displayed on the screen. The desired document can then be loaded by highlighting it on the document list and clicking the Open button in the dialog box.



Fig. D15 The Open option in use from the File menu.

**Document Icon** Pictorial representations called "icons" are used to display the disks in Macintosh disk drives and to display the files, documents, file folders and applications on a disk. Documents are files generated by an application such as MacWrite and MacPaint. These icons have a distinctive design. A MacPaint document icon is a paint brush on a page with a turned down upper right-hand corner. A MacWrite document icon is a square with several lines suggesting text and a hand writing on the page.

**DocuPlan\*** A word processing program designed for preparing long documents and itemized lists. It supports footnotes, superscripts, subscripts, indexes, and a tables of contents. Chang Labs.

**Doing Business with your Macintosh**\* By Rudolph Langer, describes the uses of the Macintosh in the business environment. It explains how to use the Macintosh, how to select software, and describes the use of the major software types that are available for the Macintosh. The types of software covered are spreadsheets, databases, word processors and graphics programs. Sybex.

**Dollars and Sense\*** Dollars and Sense is a money management tool for the home and the small business. It is used to track income and expenses. Both income and expense may be classified to assist in budgeting and in handling taxes. Graphs are displayed to compare budget with actual experience. Checkbook reconciliation is also carried out. Monogram.

**DO-loop** A feature of a high-level language (e.g., FORTRAN) which allows a segment of a program to be executed repeatedly while or until a certain logical or arithmetic condition is fulfilled.

**DOS** (D-O-S or "doss") Disk Operating System. A program or collection of programs functioning as an operating system whose main secondary storage medium is disk. It usually supplies facilities such as symbolic files, automatic space allocation, dynamic memory allocation, program relocation and loading, utilities, etc. The Finder is the Macintosh's Disk Operating System.

**Dot-matrix** A method of forming characters by using small dots. Usually patterns are 5 by 7 or 7 by 9, though for very high-quality characters patterns of 11 by 13 dots or more are required, and applies to displays, printers and other output devices. The ImageWriter printer is a dot-matrix printer. Dot- matrix printers offer the advantage of flexibility in output that can be controlled by the user through various programs or through the use of control codes sent to the printer. Low-and high-resolution graphics can be output by this type of printer. Many Macintosh applications programs such as MacWrite and MacPaint use the graphics features of the ImageWriter to print documents, screens and files. Microsoft BASIC can treat the ImageWriter as a text printer rather than a graphics printer. A variety of text styles and sizes may be generated by this type of printer through the use of control codes. Daisy-wheel printers are not as flexible as dot-matrix printers although daisy-wheel printers can generate different type size and styles by changing the wheel that is being used. Daisy-wheel printers generally produce higher-quality output than dot-matrix printers, but they generally cannot be used to produce graphic images of the same nature and quality as dot-matrix printers.

**Double-clicking** A process used to load and open an application, a document or a disk icon from the Desktop or from the directory display on the Desktop. Double-clicking is accomplished by placing the pointer on the icon or the name of the file, application, or disk to be opened and pressing the mouse button very quickly two times. See Mouse Button, Desktop, Directory.

**Double-density** A term generally used to describe the capacity of a storage media such as a floppy disk. Such floppy disks are not used by Macintosh disk drives. They are generally organized in 48 tracks per side.

**Double-precision** Double-precision numbers are assumed as the default precision in Microsoft BASIC for the Macintosh. These numbers are computed up to fourteen digits of precision. Numeric variables are assumed to have this degree of precision unless otherwise declared. Numbers will be printed to this degree of precision on the display screen or on a printer, unless otherwise defined.

## 100 • Double-precision Floating Point

**Double-precision Floating Point** Double-precision floating point numbers (numbers with decimal fractions with up to fourteen digits) can be declared by having their variable names end in #. DEFDBL signifies that all the following variables are double- precision floating point numbers. See also Variable Names, DEFDBL.

**Double-sided Disk Drives** A double-sided disk drive is a disk drive that can read data from and write data to both sides of a disk at the same time. These disk drives usually have twice the capacity of a single-sided disk drive. The read/write heads are located above and below the disk.

**Double-strike Type Format** Some dot-matrix printers use a technique called "double striking" to produce darker than normal characters on paper. When this technique is used, the printer rolls the paper upward an extremely small distance and types the character once more. The ImageWriter does not use this technique to create darker characters. It produces darker characters called "boldface characters" in the text mode. These characters are printed by operating the printer at a slower speed than normal and printing each character twice with a slight shift of print head position. See Bold, ImageWriter, Dot-Matrix, Control Characters for Printer.

**Double-sided Disk** A type of disk with both surfaces (sides) used for data storage. This includes the 800K internal or external disk drive for Macintosh. Such disk drives have two read/write heads that read data from both sides of a disk or write data to both sides of disk simultaneously.

**Dow Jones Market Manager**<sup>+</sup> A program that may be used to manage stock market transactions and to track the progress of investments made on the stock market. It allows up to 26 portfolios to be managed. The program will automatically dial Dow Jones News/Retrieval and record the current status of the stocks and other investments in the portfolio. Dow Jones Software.

**Dow Jones Spreadsheet Link\*** An application that links Dow Jones stock market information to an electronic spreadsheet program. The software may be used to dial the Dow Jones News/Retrieval service. This data is then assimilated into the spreadsheet. Dow Jones Software.

**Down One Space** The cursor in a Macintosh application such as MacWrite is moved down one line on the screen by pressing the Return key. The same technique is used in MacPaint in the Text mode. This action moves the cursor to the extreme left-hand side of the screen. Otherwise, the cursor must be moved to a new position by moving the pointer to the new position on the screen with the mouse and then pressing the mouse button one time.

**Draft Mode** The Draft mode is one of the three printing modes available to most applications on the ImageWriter printer. This mode may be selected from the dialog box displayed when the Print option is selected from the File menu on the menu bar.

**Dragging** The process of placing the mouse pointer on an icon on the Desktop, pressing the mouse button and moving the icon to a different place in a directory window, from a directory window to the Desktop, from one directory window to another, from one disk icon to another, or any of the other similar combinations of icon movements.

Shapes may be dragged from one place to another on the screen display in such applications as MacPaint by using the lasso or the rectangle to select the shape to be moved and then pressing mouse button to drag the image to a new position. When the proper position has been reached, the mouse button is released.
Windows can be dragged from one place to another on the screen by placing the pointer on the title bar, dragging them to the new location, and releasing the mouse button. Window sizes are enlarged by placing the pointer on the size box in the lower left-hand corner of the window, pressing the mouse button, dragging the corner until the size is proper and releasing the mouse button. The highlight is dragged down the entries of a pull-down menu in the same fashion with the proper selection being made by releasing the mouse button when the proper choice is highlighted. See Pointer, Desktop, Directory.

Quality:	@ High	O Standard O Draft	OK
Page Range:	@ All	O From: To:	
Copies: Paper Feed:	1 © Continuous	() Cut Sheet	Cancel

Fig. D16 Dialog box displayed by the Print option of MacWrite showing the three print modes available for the ImageWriter in this application.

**Drawing Tools** The drawing tools that are available in MacPaint are represented by icons displayed along the left-hand side of the MacPaint screen display. These tools include a lasso, for defining shapes to be manipulated; a rectangle, for defining areas and shapes to be manipulated; the grabber, a hand used to move the screen window around on the page; the letter A, used to select text entry; a paint can, used to fill enclosed areas with the current pattern from the pattern menu at the bottom of the screen display; the spray can, for shading areas of the screen with the current pattern from the pattern menu; the paint brush, used with selected brush sizes and brush mirrors for drawing brush-like lines on the screen; the pencil, for drawing pencil-like lines on the screen; the eraser, for erasing screen sections and erasing the entire screen: the line icon, used to draw lines between an anchored point on the screen and any other termination point on the screen; the hollow rectangles (one with square corners and one with rounded corners) for drawing open squares and rectangles; the filled rectangles, for drawing rectangles and squares filled with the current pattern from the pattern menu on the bottom of the screen; the hollow oval, for drawing open circles and ellipses; the filled oval, for drawing circles and ellipses filled with the current pattern from the pattern menu; the open freehand-shape icon, the filled freehand-shape icon, the open polygon, and the filled polygon icon. All of these drawing tools enable the user to realize the power of an exceptionally fine mouse-driven computer assisted drawing program.

**Drive Button** Whenever a dialog box is displayed in connection with saving a document or a Microsoft BASIC program, it contains a button called "drive." When this button is clicked, the disk drives and hard disk that are connected to the Macintosh are displayed one at a time above the button. This allows the user to save the document or program on a particular disk drive or on the hard disk.

**Drive, Device** A mechanical and electrical/electronic device which operates a tape transport, a floppy disk or a hard disk medium for data storage and retrieval. It may include several motors for rotation, head positioning, etc., as well as position sensors, control circuits, lights and switches.

Drive, Source The disk drive from which information/data is coming.

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Drive, Target The disk drive to which information/data is going.

**Driver** A special program or subroutine in a larger program, that has been written to allow the computer or its application to communicate with and operate an external device such as a printer, the keyboard or other input device, the screen display, a disk drive, a modem, a plotter or any similar device.

**Drives, Microfloppy** A microfloppy disk drive is the generic name used to describe disk drives that use disks 3-1/2-inches in diameter to store data. The Macintosh's internal disk drives are microfloppy drives.

**Drives, Winchester Disk** A Winchester Disk is a hard disk media used to record data in a hard disk drive. This media may be an activated metal cylinder or a highcapacity cartridge of some rigid material. These disks spin much faster than the floppy and minifloppy disks used by the normal disk drive. They also have a larger surface area. The device that is used to read data from these disks and write data to them has a much more precise control of the read/write head than the control experienced with floppy and minifloppy disk drives.

**DSR** Data-Set Ready (RS-232C standard). A line on a modem indicating to the data terminal that the received carrier is normal. See RS-232C, CTS, DTR.

**DTE** Data Terminal Equipment. Equipment which receives or originates data, as opposed to Data Communications Equipment, which merely transmits data from one device to another.

**DTR** Data Terminal Ready (RS-232C standard). A line on a terminal indicating to the modem that it is ready to send data. See RS-232C, DSR, CTS.

**Dual Intensity** A printer or display device which can reproduce symbols in regular and boldfaced or highlighted formats.

**Dual-sided Disk Drives** Macintosh disk drives come in two varieties, single-sided (400K) and dual-sided (800K). The only difference is that the dual-sided drive has two read/write heads to store information on both the top and bottom side of the disk. You can use an 800K dual-sided disk drive for the add-on external drive to suppliment the internal 400K drive which comes with the Macintosh. There may be additional formats available to Macintosh users through non-Apple hardware and software. See Double-sided Disk, Double-sided Disk Drives.

**Dumb Terminal** A low-cost data terminal, ordinarily a CRT, which does not have advanced features such as editing keys or local processing.

**Dummy Input Statement** Used to hold or freeze screen display in Microsoft BASIC. To freeze the screen until the operator is done with it, put in a dummy input statement and instruct the operator to press Enter to proceed. The input variable need not be used in your program:

1000 INPUT "Press Enter to continue";A\$

To freeze the screen briefly while the operator using your program reads a message, just write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y\$FL **Dump** Transfer the contents of one memory device to another. Internal registers may be dumped to memory, memory can be dumped to disk, printer or screen, etc.

**Duplex** Bidirectional communication method allowing simultaneous data transfers in both directions. May use separate lines or multiplex a single line.

**Duplicate Command** When the directory window is being displayed on the Desktop at any time when the Macintosh is in use, a file may be duplicated. First, highlight the file by placing the mouse pointer on the file icon, click the mouse button and select Duplicate from the File menu on the menu bar. This will cause a copy of the selected file to be duplicated on the disk and a new icon will be opened in the directory showing Copy of followed by the name of the duplicated file.



Fig. D17 The Desktop after one file has been duplicated and before another is duplicated. Note the "Copy of (file name)" on the display and the highlighted Duplicate command on the File menu.

Duplicate Disks See Backing Up a Disk.

**Dvorak Keyboard** The Dvorak keyboard is a non-QWERTY keyboard designed to make keyboard use more natural. It is popular with some educators.

**Dynamic** Circuitry which stores information as charges on MOS capacitors. Usually volatile, it requires periodic refreshing.

**Dynamic Memory** MOS RAM memory using dynamic circuits. Every bit is stored as a charge on a single MOS transistor, allowing very high density (only one transistor is used per bit). Since the stored charge leaks, a typical dynamic memory must be

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refreshed every two milliseconds by rewriting its entire contents. This does not slow down the system, but does require additional memory refresh logic. Dynamic memory chips are cheaper than static ones, and are generally preferred for memory sizes over 16K. The Macintosh's RAM memory is dynamic. Dynamic memory is also volatile, i.e., the data stored is lost when power is turned off or interrupted.

**Dynamic Memory Allocation** Varying allocation of memory to multiple concurrent programs according to their needs and a strategy for optimizing performance.

# E

**E** ASCII = 69, HEX = 45 **e** ASCII = 101, HEX = 65

E Enable. Also, the hexadecimal symbol for the decimal number 14:

E base 16 = 1414 base 10 = 1416 base 8 = 141110 base 2 = 14

e Powers of in BASIC, natural logarithms. See EXP.

**Easy Guide to your Macintosh, The\*** By Joseph Caggiano. This book describes the Macintosh and its use to the new Macintosh user. It deals with MacWrite, MacPaint, and Multiplan in detail. System expansion is also discussed completely and "One Minute Recipes" are presented to walk the new user through commony-used procedures. Sybex.

**Echo** A character received from the keyboard is sent to the printer or screen for display.

**Echo, Hardware Testing.** A loop-back or "echo" technique is used to test the circuits of an input/output device by "looping" whatever is output back into the computer as if it were input. In this way the circuits inside the computer are tested in isolation from the circuits of the external device to locate a fault.

**Echo, Keyboard to Screen** Echo describes the process of sending characters keyed on the keyboard to the screen for a visual confirmation of what has been typed. There are no hardwired connections between the keyboard and the screen. The keyboard simply enters characters into memory. The ROM programs of Macintosh further copy the characters from memory to the screen, creating a duplication or "echo" of what was keyed.

**EDIT** A Microsoft BASIC command used to display a specified line from a program in the Command window. The format is:

#### EDIT dine>

(line) is the line number of an existing line in a program that you want to edit. If the line does not exist an "Undefined line number" error is displayed.

When the EDIT command is used, the cursor is positioned at the end of the specified line in the Command window. Changes or corrections may then be made to the line following the rules for editing. Once the line has been displayed in the Command window, characters may be added or deleted by moving the pointer arrow to the insertion or deletion point in the line and clicking the mouse button.

#### 106 • Edit

This will cause a vertical bar cursor to be displayed at that point. To add characters, type them in. To delete characters, backspace over them by pressing the Backspace key.

The Edit menu on the menu bar at the top of the screen provides three additional editing options that use the Clipboard. The first is Cut which removes highlighted characters from a program line and saves them to the Clipboard. Characters may be highlighted by dragging the cursor over all of the characters to be dealt with by the EDIT command that follows. The second option is Copy. This option leaves the highlighted characters intact on the screen and places a copy of them on the Clipboard. The last of these options is Paste, used to copy characters from the Clipboard into a program line at the point specified by the location of the cursor. All changes made to a line are incorporated into the program when the Return key has been pressed. This replaces the unedited line in the program listing with the edited line and clears the Command window for the next line to be edited. When all editing has been completed, the edited program should be saved to disk by typing SAVE (filename) followed by Return on the Command line or by using the Save option from the pull-down File menu from the menu bar. If you wish to retain copies of both the edited and unedited programs on disk, give the program a new name when you use the Save command in the Command window or use the Save As... option from the File menu. If you use the latter, a dialog box will request that you give the program a name prior to saving it.

The Microsoft BASIC version for the Macintosh uses the List command option from the Control menu on the menu bar to list a program to the screen in a special List window. The program that is currently in memory can be listed in the List window by typing LIST in the Command window and pressing the Return key. If you wish to edit a line from this list, you would place the pointer on the line number of the line to be edited and click the mouse button. This causes the line to be displayed in the Command window at the bottom of the screen. Material can be added to the line by placing the pointer at the insertion point for the material and clicking the mouse button. This causes a vertical bar cursor to be displayed at the insertion point. Any new text, commands or numerals can then be inserted by typing the material from the keyboard. When all of the changes have been made to the line that is being edited, the pointer should be moved to the end of the line and the Return key pressed. This will cause the edited line to be moved back into the program listing in the List window. If Return is not pressed, the edited line will not be incorporated into the program.

**Edit** Edit means to change the contents of a file including both program files and data files. Program files may be edited by loading the program into memory and editing the file with such tools as the List window and Command window in Microsoft BASIC or with special program editors that allow lines to be listed and changed. Some of these editors allow global search and replace activity and cross-check variables to ensure that the same variable is used in related situations. MacPaint documents must be edited by reloading them into MacPaint, making the necessary changes and saving them again. The same procedure would apply to MacWrite and Multiplan documents.

Editors are classified as line-oriented editors if they basically work on one line at a time and deal with text by line number.

Full-screen editors by contrast allow you to change any data currently displayed on the screen. Most treat paragraphs or even entire documents as a unit, allowing reformatting, change of margins with justification, block moves, etc. Most word processing programs are full-screen editors.

The Microsoft BASIC editor lies between these two categories. It allows you to change any Microsoft BASIC line on the screen, but still treats the data as a

collection of lines. You must press Return while the Cursor is on a line you have changed with the Microsoft BASIC editor or the changes are not effective.

	Home Budgeting	
	List	T
10	CLS	1
30	REM Home Budgeting/Cashflow Analysis	I
40	DEFDBL A-Y:DEFINT Z	
50	DIM D(12), ID(3,2), CD(3,3), C1(5,5), C1\$(5), ED(25,2)	
60	PU\$="\$\$#########	I
70	REM D() Day Offset Factors	I
80	REM ID()Salaried Income	I
90	REM C1()Credit Instruments	I
100	REM EO()Expenses	
110	REM_C1\$()Descriptions of credit cards	1
120	REM CO()Fixed-Term Loans	ł
130	DATA "Mortgage", "Car Loan", "Other Loan"	I
140	REM expenses	ł
	Command	
50	DIM D(12), I0(3,2), C0(3,3), C1(5,5), C1\$(5), E0(25,2)	Γ
-		-

#### ₲ File Edit Control

Fig. E1 The Microsoft BASIC screen display showing the List window and the Command window with the vertical bar cursor at the insertion point for changing a program line.

Edit Menu The Edit menu is one of the four pull-down menus displayed on the menu bar in Microsoft BASIC for the Macintosh. This menu provides three command options to the user. These options are Cut, Copy, and Paste. The Cut option removes highlighted characters from a program line in the Command window of Microsoaft BASIC and places these characters in the Macintosh Clipboard. Characters are highlighted by placing the pointer arrow on the first character to be highlighted, pressing the mouse button and dragging the pointer until the last character is highlighted, then releasing the mouse button. The Copy option leaves the highlighted characters in the line being edited and copies them into the Clipboard. The Paste option copies characters from the Clipboard to the point designated by the vertical bar cursor in the program line in the Command window. The cursor is positioned by moving the pointer arrow to the insertion point on the line and clicking the mouse button. Any characters that are in the Clipboard will be erased if new characters are copied or cut to the Clipboard. Make sure Clipboard contents are pasted where they are required in a program prior to cutting or copying anything new to the Clipboard.

MacWrite's Edit menu has two additional options: a Can't Undo option that is used to protect blocks of text and commands, and a Show Clipboard option to display the contents of the Clipboard in a window on the screen.

MacPaint's Edit menu is even larger. It contains Undo, Invert, Trace Edges, Flip Horizontal, Flip Vertical, Rotate and Clear options in addition to Cut, Copy and Paste. The Undo option is used to cancel the last action taken by the MacPaint user. The Invert option is used to change black on white to white on black for the shape or shapes enclosed in the rectangle or the lasso from the drawing tools. The Clear

#### 108 • Edit Pattern

option erases any image or images that are surrounded by the rectangle or the lasso. Trace Edges places an outline around any image or images contained within the rectangle or lasso. Flip Horizontal is used to flip any image within the rectangle or lasso on its vertical axis. For example, an arrow that has the arrowhead pointing to the right- hand side of the screen will be flipped so it points to the left- hand side of the screen when this option is selected. Flip Vertical flips an image on its horizontal axis. Thus an arrow with the arrowhead pointing up would point down after this option was used. The Rotate option turns an image ninty degrees.

Microsoft Multiplan has an even larger Edit menu, which includes Undo, Cut, Copy, Paste, Clear, Show Clipboard, Paste and Link, Unlink, Paste Name, Paste Function, Absolute Reference, Fill Right, Fill Down and Sort. Each of these functions can only be carried out on a highlighted portion of a Multiplan worksheet. The first seven of the options are the same as described above. Paste and Link takes the current contents of the Clipboard into the current worksheet at the cell or range of cells that has been highlighted. It also links the highlighted portion of the current worksheet with the section of the earlier worksheet that was Cut to provide the material on the Clipboard. Unlink is used to break the link between an earlier worksheet and the current worksheet. Paste Name is used to paste a named cell or range of cells from a place on the current worksheet into a formula in the current active cell. The Paste Function option is used to paste a Multiplan function into a formula in the current active cell in a Multiplan worksheet. The Absolute Reference option is used to associate a particular cell with the formula in the current active cell on a worksheet rather than associating a cell in the same relative position to a cell from which a formula is being copied. Fill Right is used to copy the values, functions, or formula from the current active cell or column of cells to the columns to the right of the current active cell or column of cells. Fill Down is used to copy the contents of a cell or row of cells to the rows below the current active cell or row of cells. Sort is used to sort the contents of a row or column within a highlighted area. The sort can be done in ascending or descending order as required and as specified by the user in a dialog box.

The Edit Menu allows material in highlighted or outlined areas to be changed. It also makes use of the Clipboard as required to remove data or as a source of data to be added.

**Edit Pattern** The patterns displayed on the pattern palette at the bottom of the MacPaint screen display may be edited selecting the Edit Pattern option from the Goodies menu. To select a pattern to be edited, double-click the pattern on the palette. This will cause a window containing the normal pattern and the blown up version of the pattern to be displayed. An OK button and a Cancel button are also displayed in the same window as the patterns. Individual dots are turned on and off in the blown up version of the pattern to alter it. Once the pattern suits the user, the OK button should be clicked to place the altered pattern in the palette. See OK Button, Cancel Button, Window, Pattern Palette.

**Editing a Document** A document created with MacWrite or any word processor may be edited by opening the document to display it on the screen. Once the document is being displayed, the pointer must be moved to the point in the document where characters must be added, deleted or changed. When the insertion or deletion point has been located with the pointer, the mouse button must be clicked to cause a vertical bar cursor to be displayed.

Text or other characters may be added to the document at the insertion point by typing the characters into the document from the keyboard. Characters may be deleted from the document by moving the pointer to the deletion point and clicking the mouse button to get the cursor. Single characters may be deleted by pressing the Backspace key. This removes the characters immediately to the left of the cursor. Several characters may be deleted by dragging the pointer over the characters to highlight them and then pressing the Backspace key after the characters have been highlighted. Several characters may be changed or replaced by new characters by highlighting a particular portion of the screen display, typing in the correct characters and pressing the characters keys you wish to insert. Characters may also be cut or copied to the Clipboard or pasted into the document at the insertion point by using these options from the Edit menu on the menu bar. See Document, Mouse Button, Clicking, Cut Option, Copy Option, Paste Option, Menu Bar, Clipboard, Highlight.

**Editing a Footer** A footer is a notation that will be repeated on the bottom lines of all pages of a document generated by MacWrite. The contents of a footer may be changed once they have been set up for a MacWrite document by placing the pointer on the Format menu on the menu bar, pressing the mouse button and dragging the highlight for this menu to the Open Footer option. This will cause the contents of the footer to be displayed in a Footer window on the screen. A flashing vertical bar cursor will appear at the beginning of the characters in the footer if you move the pointer into the Footer window and click the mouse button.

Characters may be deleted by using the Backspace key for a single character to the left of the cursor location or by pressing the Backspace key to delete all characters that were highlighted by placing the pointer on the first character to be deleted and dragging it across the screen to the last character to be deleted. Characters may also be cut or copied to the Clipboard by using the Cut and Copy options from the Edit menu. Characters may be added to the characters already in the footer by moving the pointer to the desired insertion point for these characters and clicking the mouse button. Then the characters that are to be inserted are typed in from the keyboard. See Footer, Menu Bar, Dragging, Pointer, Clipboard.



Fig. E2 A Footer display from MacWrite with the vertical bar cursor at an insertion point.

#### 110 • Editing a Header

**Editing a Header** A header is edited in the same fashion as a footer in MacWrite. See Editing a Footer, Header.

**Editing Cells** Individual cells in Multiplan may be edited by placing the plus sign pointer on the cell to be edited and clicking the mouse button. This action causes the contents of this cell to be displayed in the formula bar under the Menu Bar at the top of the Multiplan screen display. Next, move the pointer to the formula bar and click the mouse button. This activates the formula bar and displays a vertical bar cursor at the end of the cell contents that are being displayed in the formula bar.

To insert characters, move the pointer to the location where characters are to be inserted and click the mouse button. This moves the vertical bar cursor to the insertion point. Enter whatever characters are required at the insertion point by typing them in. Then, press the Return key or the Enter key to cause the changed formula, value or label to be moved to the cell that is being edited. Characters may be deleted at the insertion point by pressing the Backspace key to delete one character at a time. More than one character may be deleted by dragging the mouse pointer across all of the characters to be deleted. This process highlights these characters. Then press the Backspace key to delete all of the highlighted characters. Characters that have been highlighted may also be cut or copied to the Clipboard by using the Edit menu after the characters have been highlighted. Editing changes may be cancelled at any time by moving the pointer to the Cancel icon that appears between the cell address and the formula bar. This icon is an X within a circle.

		linti	tled		
	1	2	3	4	5
1				Contract of the	
2	1			:	1
3	INFLATION RATE(%)::::>				1
4	]				1
5	UNINFLATED COSTS				
6	FUEL			1	
7	UTILTIES			:	1
8				:	
9				:	1
10	:			:	
11	:			:	ľ
12					
13	]:			:	ľ
14				1	
15				1	
\$					¢

¢,	File	Edit	Select	Format	Options	Calculate

Fig. E3 The Multiplan screen when the contents of a cell are being edited.

**Editing Text** Text files that are generated by an application such as MacWrite may be edited in the same fashion as documents are edited. See Editing a Document. Text in an application such as MacPaint may be edited by opening the document that contains the text to be edited. This will cause MacPaint to be opened at the

same time. The text must then be positioned in the display window and the text icon must be clicked to allow text to be entered or deleted. The pointer must then be moved to the insertion or deletion point on the display. The mouse button must be clicked when the pointer is at the proper screen location.

To delete text, use the Backspace key to delete single characters. Several characters may be highlighted by dragging the cursor over them with the mouse button pressed and releasing the mouse button when the last character has been highlighted. Text may also be highlighted and then transferred to the Clipboard with the Cut and Copy options on the Edit menu. Text may also be added when the application is in the Text mode by using the Paste option from the Edit menu.

Text files that are generated by Microsoft BASIC programs can be edited with a special text editor. Edit.BAS is available in the public domain. This editor was written by Loftus E. Becker, Jr. and allows the user to edit programs or text files. It is very likely that a number of program and text editors will be released for the Macintosh shortly. See Editing a Document, Document, Icon, Public Domain, Edit Menu, Cut Option, Copy Option, Paste Option, Editor.

**Editor** A program which facilitates the entry and maintenance of text in a computer system. Typical operations include insert word/line, delete word/line, append, search for string, substitute, etc. An editor is designed to allow creation and modification of data. Microsoft BASIC and various word processors provide editing capability for any line displayed on the screen (full screen editors). Their basic function is to create and change text data such as a letter, report, program or book. Nontext editors usually display and modify a byte of storage as either two hexadecimal digits or a three-digit numeric ASCII value. See Edit.

**Editor, Text** An editor program specialized for text files. A text editor manipulates ASCII characters such as letters, punctuation marks, etc.

**Educational Software** Software designed to teach subjects normally taught in the classroom atmosphere. It is also software that develops or reinforces professional skills such as typing, business strategy, sales strategy, etc. It may also be software that teaches the mastery of various programs such as Lotus 1-2-3 or the mastery of a programming language. Most educational software consists of drills, tests and instruction sessions. The following educational software for the Macintosh has either been released or announced: How to Use your Macintosh, MacEdge, MacMath, MacSpell, Run for your Money, Typing Tutor III.

**Eject Disk** Due to the design of the Macintosh disk drive, disks may not be removed from the disk drive by hand as is done with most floppy disk drives. Disks must be ejected from Macintosh disk drives, by selecting the File menu when the Desktop is being displayed, scrolling down to the last option on this menu and releasing the mouse button. This option is called "Eject."

Disks may also be ejected by pressing the Command key and the E key together. Another method not recommended unless you encounter some problems with a disk that do not allow you to eject a disk with the two methods described above is the "manual eject." This method requires that you hold the mouse button down and turn the computer off, then on very quickly. The disk will eject shortly after the computer is turned on. The dialog box displayed when you use the Open command option from the File menu has an Eject button that may be used to eject the disk currently in the Macintosh disk drive. This feature allows the user to open a file from a disk other than the disk currently in the disk drive. See File Menu, Eject Command, Eject Button.

#### 112 • Eject Button

**Eject Button** The Eject button in the dialog box presented to the user by the Macintosh when the Save or Open option are selected from the File menu in an application program such as MacPaint and MacWrite. This button may be selected by moving the pointer to the button and clicking the mouse button. This option enables the user to save a document to a disk other than the disk currently in the disk drive, or to load a document from a disk other than the disk currently in the disk drive. This feature is very useful when you wish to save space on an application disk and wish to store documents on a data disk. See Data Disk, Mouse Button, Button, File Menu, Eject Disk, Pointer.



Fig. E4 The dialog box displayed by the Save command option and by the Open command option. Both dialog boxes illustrate the Eject button.

**Eject Command** The Eject command is used to eject a disk from Macintosh disk drives. To eject a disk, first select the disk by clicking its icon with the mouse button. Then select Eject from the File menu. This will cause the disk Finder to be updated and will cause the disk to be ejected. See Finder, Eject a Disk.

**Electronic Disk (RAM Disk)** A RAM disk is a process that makes use of the Random Access Memory of a computer to emulate a disk drive. This process usually requires more than 48K of memory depending upon how much space is going to be devoted to emulating a disk drive. 64K systems are usually too small to make effective use of such an emulation. 128K systems lend themselves very well to such a use of available memory space provided the applications programs or programming languages

that are loaded into memory do not use excessive amounts of RAM.

Systems that are larger than 128K are generally the best systems to use RAM as an extra disk drive. The advantage of using a RAM disk is that it increases the speed of interaction between the computer and any data or program files that are stored in the RAM disk.

RAM disks must be set up by some sort of preboot program that properly configures the RAM space as a disk drive and sets up the emulation procedures. Once this has been done, programs and files that the user wishes to employ with the RAM disk must be copied from a floppy disk or microfloppy disk into the RAM disk. Then the RAM disk must be opened as the active disk drive. When the user is ready to stop using the RAM disk and wants to shut down the system, the files that were changed in the RAM Disk must be copied to the conventional disk from which they were originally copied. Currently there are no RAM disk implementations available for the Macintosh.

**Ellipsis** An ellipsis is used in a number of electronic spreadsheet programs, such as VisiCalc, to specify a range of cells. It consists of a line of three periods (...) and is placed between the first and last cell location in the range. The ellipsis is used in all of the menus on the menu bar of Multiplan to signify that a dialog box will be presented when the command is selected. See Menu Bar, Dialog Box.

**Empty Folder** When the directory of a Macintosh disk is displayed on the screen, one of the icons or one of the files listed is called the "Empty Folder." This file shows OK of data on file. This folder is used to consolidate files on the Desktop into folders, and allows the user to classify files of the same type or files generated by the same application together. Before any files are transferred into the Empty Folder, it should be duplicated and called "Copy of Empty Folder," and used to hold the files you wish to store together.

Files can be moved into the Empty Folder by dragging the file icon of any files you wish to place in the folder over to the folder icon and releasing the mouse button. This will cause the file icon to be removed from the Desktop directory display and be displayed when the icon for the folder is opened. In the examples below, the Copy of Empty Folder is shown, then the Desktop is shown with two letters transferred into the folder and with the folder renamed "SFAC Letters." Finally, a copy of the directory of that folder is illustrated.

**Empty Trash** Macintosh applications use the Trash Can icon as the receptacle for those files that are to be erased from a disk. The Empty Trash command option from the pull-down Special menu on the menu bar must be used to erase the contents of the Trash Can from the disk. Until this option is used, or until the computer is turned off, the contents of the Trash Can are still available and may be recovered by dragging the file icon out of the Trash Can.

**Emulation** Simulation in real time. Computer A emulates computer B by executing an emulator program that makes it behave like computer B (i.e., it interprets the same instructions). MacWorks is a program that allows the Lisa to emulate the Macintosh. MacTerm and other terminal programs used for communications allow the Macintosh to emulate computer terminals such as the IBM 3270 or IBM 3278 for the purpose of communicating with these computers. See MacWorks, MacTerminal.

**Enable** To make a device ready or available to function. Opposite of disable.

**Enchanter**<sup>+</sup> A sequel to the Zork series of text adventure games. The player must use magic to prevail in this adventure. Infocom, Inc. In UK: Softsel.



### 🕯 File Edit View Special



Fig. E5 The Desktop directory with the Copy of Empty Folder illustrated.

## 🗳 File Edit View Special



Fig. E6 The Empty Folder has been renamed and two letter files have been moved into the folder.

### 🕯 File Edit View Special



Fig. E7 The file folder created by using the renamed Copy of Empty Folder to hold files.

**END** END is a Microsoft BASIC statement used to terminate program execution, close all files and return to command level. The format is:

#### END

END statements may be placed anywhere in a program you wish to terminate execution. END differs from STOP in that is does not cause a "Break" message to be printed, and it closes all files. An END statement at the end of a program is not imperative.

**End a Program or System Function** A program or function may be stopped by using the Stop or Suspend command options from the Control menu on the menu bar. The Stop command stops the program while it is running, and causes the line number at which the program stopped to be displayed in the Output window of the Microsoft BASIC screen display.

The Interrupt key on the left-hand side of the Macintosh may be used to interrupt or suspend a program. The Reset key in the same location will stop a program, erase it from memory, and reboot the computer.

A program may also be stopped by pressing the Command key and the C key at the same time. A program that is stopped in this manner must be restarted by using the Run option from the Control menu or by typing RUN followed by pressing the Return

#### 116 • End Current Line

key in the Command window of the screen display. The Suspend command option stops the program until any key is pressed. See STOP, Suspend, RUN, Menu Bar, Control Menu, Command Key, Interrupt Reset Switch.

**End Current Line** Press the Return key to end the current line, send the line to the requesting program and put the cursor at the start of the next line. This is valid under the Desktop and Microsoft BASIC.

**Enter Key** The Enter key is the second key from the right on the bottom row of keys on the Macintosh keyboard. This key terminates an entry and may terminate a command, depending on the application. It communicates the completion of data entry to the computer. When a dialog box is displayed, pressing the Enter key is the same as clicking the outlined button in the dialog box. The Return key performs the same function with dialog boxes but serves another function in applications such as MacWrite where it inserts a line feed in a document. See Clicking, Dialog Box, Return Key, Button.

**Environment** The state of all registers, memory locations and other conditions in a system. Also used to refer to a software environment such as the Macintosh visual Desktop environment.

**EOF** A Microsoft BASIC Function which indicates an End-Of-File condition. The format is:

‹variable› = EOF(filenum)

(filenum) This is the number specified on the OPEN statement.

The EOF function can be used to tell if the end of a specified file has been reached, and to avoid an "Input past end" error. EOF returns -1 (true) if end of file has been reached on the specified file or 0 (zero) is returned if end of file has not been reached.

EOF is meaningful only for a file opened for sequential input from disk or cassette, or for a communication file. A -1 for a communications file means that the buffer is empty.

EOF End of File.

**EPROM ("ee-prom")** Erasable Programmable Read-Only Memory. A PROM which can be reprogrammed several times. Typically, an ultraviolet-erasable PROM which can be erased by exposing it for several seconds to hard ultraviolet light. It is then reprogrammed with a special PROM programmer and will retain its contents for years. A UV-erasable EPROM may be recognized by the quartz window over the chip. Other EPROMs are electrically erasable.

**Era 2**<sup>•</sup> A communications system that allows the Macintosh to network with other personal computers, mainframes and large public databases. It uses the Microcom Networking Protocol, giving the computer access to the IBM PC, the IBM PC XT, the IBM PC Jr., the TRS80 Model 3 and computers in the Apple II family. Era 2 consists of a 1200-baud modem and the communications software required to provide th access described above. It provides autodial and autoanswer features, and can use pulse or touch tone phone lines. Menu selection is available to set baud rate, parity and other communications settings. Microrim, Inc. In UK: P+P micro distributors.

**ERASE** A Microsoft BASIC Statement which removes (from memory) arrays from a program. The format is:

ERASE (arraynamex, arrayname)...

(arrayname) This refers to the name of the array you wish to erase.

If you are running short on memory space in a program, you may wish to use the ERASE statement to establish more memory space to be used for other purposes. You may also want to redimension an array, in which case it is necessary first to erase that array. Otherwise, a "Duplicate definition" error occurs.

The ERASE statement is not implemented in the Microsoft BASIC Compiler.

#### Erase a File in Microsoft BASIC See KILL.

**Erase All Program Lines** NEW In Microsoft BASIC, to start a new program, old program lines are erased. To start a new program type:

NEW

This completely erases all lines in Microsoft BASIC's memory. If it is something you want to keep and do not already have on disk, SAVE it first. If you do not erase the program in memory before starting on another, you will usually wind up with an unusable combination of mixed lines from your old and new programs.

#### Erase Current Variables (Not Program) in Microsoft BASIC See CLEAR.

**Erase Files** Files may be erased from a disk by moving the file icon from the directory window in the Finder into the Trash Can and using the Empty Trash command from the Special menu. Files may be erased from a disk in Microsoft BASIC by using the DELETE command followed by the filename. Files may be erased from memory in Microsoft BASIC by using the NEW command. This command will erase all programs, data and files from the memory.

Erase Last Character Press Backspace to delete last character entered.

Erase Program Lines in Microsoft BASIC. DELETE To delete program line 100 enter:

DELETE 100 or 100

To delete program lines 100 to 200 enter:

**DELETE 100-200** 

To delete all program lines up to 100 enter:

DELETE -100

To delete program lines from 100 on with DELETE you must specify the final line number. If you want to delete lines to the end of your program, either LIST to find the last line number, or enter a dummy line at the largest possible line number, 65529. Then enter:

DELETE 100-65529

A dummy line might be:

65529 END.

#### 118 • ERR and ERL

**ERR and ERL** Microsoft BASIC Variables. The variable ERR contains the error code for the last error, and the variable ERL contains the line number of the line in which the error was detected. The formats are:

‹variable› = ERR
‹variable› = ERL

The ERR and ERL variables are usually used in IF...THEN statements to direct program flow in the error handling routine. See ON ERROR GOTO.

If you do test ERL in an IF...THEN statement, be sure to put the line number on the right side of the relational operation, like this:

IF ERL = dine number THEN...

The number must be on the right side of the operator for it to be renumbered by RENUM. If the statement that caused the error was a direct mode statement, ERL will contain 65535. Since you do not want this number to be changed during a RENUM, if you want to test whether an error occurred in a direct mode statement you should use the forms at:

IF 65535 = ERL THEN...

ERR and ERL can also be set using the ERROR statement. See ERROR.

**ERROR** A Microsoft BASIC Statement which will simulate the occurrence of a Microsoft BASIC error, or will allow you to define your own error codes. The format is:

#### ERROR (n)

«n» must be an integer expression between 0 and 255.

The Macintosh has error messages which are referenced by certain codes. If the value of (n) is the same as an error code used by Microsoft BASIC, the ERROR statement simulates the occurrence of that error. If an error-handling routine has been defined by the ON ERROR statement, the error routine is entered. Otherwise the error message corresponding to the code is displayed and execution halts.

To define your own error code, use a value that is different from any used by Microsoft BASIC. To be safe, use codes higher than 200 (the Macintosh's messages are below this range). Your new error code may then be tested in an error-handling routine, just like any other error.

If you create your own code and do not handle it in an error-handling routine, an "Unprintable error" message is displayed and execution halts.

**Error Codes, Macintosh Operating System** The Macintosh Operating System issues error codes in circumstances where the Macintosh encounters problems with disks, hardware and software. The error codes are displayed in alert boxes when encountered with the notation ID = (error code number). A table of Macintosh system error codes follows below:

ERROR CODE		DESCRIPTION
1	General System	Queue element not found during deletion
2	General System	Invalid queue element
3	General System	Core routine number out of range

4	General System	Unimplemented core routine
17	I/O System	Control error
10	1/O System	Status area
18	I/O System	Status error
19	I/O System	Read error
20	I/O System	Write error
21	L/O System	Bad unit error
21	I/O System	Dau unit entit
22	I/O System	Unit empty error
23	I/O System	File open error
74	I/O System	File close error
27	L/O System	Tried to remove open driver
25	I/O System	Thea to remove open anver
ERROR CODE		DESCRIPTION
26	I/O System	Driver not found in resource file
27	I/O System	I/O call aborted by KILLIO
20	1/O System	Driver not energed
28	I/O System	Driver not opened
33	File System	Directory full
34	File System	Disk full
35	File System	No such volume name
33	File Custom	File L/O error
36	File System	File I/O error
37	File System	Bad file name
38	File System	File not open
20	Filo System	End of file
29	rile System	
40	File System	Read/write head position before
		beginning of file
41	File System	Memory full
42	File System	Too many files open
42	File System	Too many mes open
43	File System	File not found
44	File System	Disk write-protected
45	File System	File locked
45	File System	Valuma (disk) lookod
46	File System	volume (disk) locked
47	File System	File busy (while deleting)
48	File System	Duplicate file name (while
		renaming)
40	FIL C	File elses du ener
49	File System	File already open
50	File System	User parameter list error
51	File System	Reference number error
50	Filo System	Cet file position error
52	File System	Veloce as a started
53	File System	volume was ejected
54	File System	Permissions error (open tile)
55	File System	Volume mounted and on line
56	Filo System	No such drive
50	rile System	Not a Man dial
57	File System	Not a Mac disk
58	File System	Named volume belongs in
		external file system
50	Filo System	Entry lost when renamed
33	rile System	Ded mester disectory block
60	File System	Bad master directory block
61	File System	Write permissions error
64	Disk Drive	Drive not installed
65	Disk Drive	Read/write attempted on
00	DISK DIIVE	-filing drive
		omme unve
66	Disk	Could not find five nibbles in 200
		tries
67	Dick	Could not find valid address mark
6/	DISK	D to offention follow
68	Disk	Read verification failed
69	Disk	Address mark checksum wrong
		DECOURTION
ERROR CODE		DESCRIPTION
70	Disk	Bad address mark
70	Diek	No data mark header
/ 1	LAISK	INU UALA IIIAIN HEAUCI

#### 120 • Error Codes, Microsoft BASIC

72	Disk	Bad data mark checksum
73	Disk	Bad data mark
74	Disk	Write underrun
75	Disk	Step handshake failed
76	Disk	Track 0 detect error
77	Disk Controller	Unable to initialize Integrated
		Woz Machine
78	Disk Controller	Tried to read second side of disk
79	Disk Controller	Unable to correctly adjust disk speed
80	Disk	Wrong track number on address mark
81	Disk	Sector number not found on track
85	Clock	Unable to read same clock value
97	Cleal	twice Written time did net verify
80		Parameter RAAA did not verify
8/	KAM	written
88	RAM	INITUTIL found parameter RAM
80	Sorial Ports	SCC receiver error
<u>60</u>	Serial Ports	SCC break received
100	Scran Manager	No scrap exists
100	Scrap Manager	No object of that type in scrap
102	Storage Allocator	Not enough room in hean
100	Storage Allocator	Nil bandle in HandleZone
110	Storage Allocator	Address odd or out of range
111	Storage Allocator	WhichZone failed
112	Storage Allocator	Tried to purge unpurgeable block
113	Storage Allocator	Address in zone check failed
114	Storage Alocator	Pointer check failed
115	Storage Allocator	Block check failed
116	Storage Allocator	Size check failed
192	Resource Manager	Resource not found
193	Resource Manager	Resource file not found
194	Resource Manager	AddResource failed
195	Resource Manager	AddReference failed
196	Resource Manager	RemoveResource failed
197	Resource Manager	Remove Reference failed

**Error Codes, Microsoft BASIC** Microsoft BASIC uses error codes much like those of the Macintosh Operating System to inform the user of problems or errors that occur in Microsoft BASIC programs or in the use of programs.

#### Error Code Number of Last Error See ERR.

**Error Correction** Methods used to correct erroneous data produced by defective or unreliable data storage and transmission systems.

**Error Message** A statement or code printed out or displayed on the screen by a program to let you know what is happening. Error messages tell you something about your problem. The alarm box displays typical Macintosh error messages.

**ESC** ESCape. Causes the terminal and/or processor to interpret subsequent characters differently. Escape codes are used to indicate a sequence of control messages in ASCII. For example, ASCII 27 is an escape code to the ImageWriter dot-matrix printer to interpret one or more following bytes as control information rather than data to be printed.

**Escape** Use ASCII 27 (escape) for printer control in LPRINT statements to set lines per inch, page length and print size. See Control Characters for Printer for more information and examples.

**Even Parity** A byte in which an even number of bits are set to 1 is said to have even parity.

**Event** An event is an activity that may be detected by a computer and acted upon. On the Macintosh, an event could be the press of a key, the click of the mouse button, the click of a mouse button coupled with dragging the mouse or the double-click of the mouse button. It could also be the insertion of a disk in a disk drive.

**Event Manager** The Macintosh's Read Only Memory consists of 64K of memory space dedicated to making the computer's user interface available to the programmer. The user interface is what the user sees on the screen in situations where he must select an application, select a document, make a decision, manage files, initialize disks, catalog disks, make programs run, etc. All of the things that the user sees and uses to talk to the computer or to make the computer carry out tasks are managed or created through over 400 subroutines or programs in ROM. This collection of subroutines and programs is called the "User Interface Toolbox." The Event Manager is one of the more important units in the toolbox. It is a collection of subroutines that receives and interprets keypresses from the keyboard, movements of the mouse, mouse button presses and disk insertion. It also generates events that are used to manage windows. This unit consists of about eleven subroutines.

**Execute** To cause a program or batch file to start functioning or to run. In Microsoft BASIC, when you enter RUN in the Command window or use the Run option from the Control menu on the menu bar, you get the program resident in memory. If the program is on a disk, from the Command window, use:

#### LOAD(filename), R or RUN(filename), R

An exception is any disk set up in "turnkey" format. These disks have a startup file which is executed automatically when the Macintosh is turned on or rebooted.

#### Execute (Microsoft BASIC program) See RUN and LOAD.

**Execution Time** The time required to execute an instruction, including fetch-decodeexecute. Also used to refer to the point in the processing of a program when it is given control of the CPU, as contrasted with compile time, link time and load time.

**EXP** A Microsoft BASIC function which calculates the exponential function and returns the mathematical number "e" raised to the x power. "e" is the base for natural logarithms. If x is greater than 145, an overflow occurs.

**Exponent** The notation of the power to which a number is to be raised in a mathematical expression. For example, the expression X squared is expressed as X2 in Microsoft BASIC.

#### Exponential (Microsoft BASIC) See EXP.

**Expression** Expressions are statements that combine such things as variables, constants, functions and other expressions with operators to arrive at a result. Microsoft BASIC uses four types of operators: Arithmetic operators, Relational operators, Logical

#### 122 • Extended Arithmetic

operators and Functional operators.

Arithmetic operators are the signs that make things happen in mathematics. They include +, -, \* (times) and / (divide). Relational operators compare values or expressions. They include =, <, >, <, <=, >=.

Logical operators test conditions of multiple operations, bit multiplication and Boolean operations. Logical operators allow the program flow to change based upon logical conditions. Such expressions as IF...THEN...ELSE and IF...THEN are used to let the program test conditions and decide where to go next.

Functional operators are predetermined expressions defined by the user with the DEF FN statement or they are expressions that are already defined in the programming language or the application program that is being used, such as COS, TAN and SIN.

**Extended Arithmetic** Double-precision floating point operations. Also used to refer to expanded capabilities, such as built-in trigonometric functions.

**External Device** Port Connections. An address providing a connection between the computer's internal processor and an external device is through the computer's ports. Ports are used to attach input and output devices. The Macintosh can address a disk drive port, a mouse port, an audio output port and two RS- 232/422 serial interface ports. All of these ports are located on the computer's back panel.

External Memory See Memory.

## F

**F** ASCII = 70, HEX = 46. **f** ASCII = 102, HEX = 66.

**F** Flag, Finish in BNPF code, or the hexadecimal symbol for decimal 15, the largest hexadecimal digit:

F base 16 = 15 15 base 10 = 15 17 base 8 = 15 1111 base 2 = 15

**FactFinder\*** A program that allows the user to store both text and graphics files generated by the Macintosh in folders. Graphics must be moved back and forth from Factfinder via the Clipboard. Text may be entered directly or transferred via the Clipboard. Searches may be made of files based on phonetics, pattern analysis or by conventional means. FactFinder Software. In UK: P+P micro distributors.

**Fan-fold Paper** Continuous sheets of paper joined along perforations and folded in a zigzag fashion. Often used with printers because it can be continuously fed and folded without operator assistance.

**Fatal Error** A condition occurring during the execution of a program which requires termination of the program. Macintosh applications warn the user of such errors through the display of alert boxes. Alert boxes give the user an opportunity to back out of the situation that may cause the fatal error.

**Fat Bits** Fat Bits is an option that is available to the MacPaint user from the Goodies menu on the menu bar. This option blows up a portion of a MacPaint drawing so the individual dots on the screen may be seen and turned on or off to produce more accurate or more artistic drawings on the screen. The pencil icon is used in Fat Bits to turn screen dots on or off. They are turned on by placing the pencil point on a dot that is off and then clicking the mouse button. Dots may be turned off by placing the pencil point on a dot that is on (black) and clicking the mouse button. The mouse button may also be held down and dragged over a range of dots rather than clicking the button at each dot.

**Fault-tolerant** A program or system capable of correct operation even when one or more of its components have failed. Also called "error-tolerant" or "fail-soft."

**FCB** File Control Block. The block of information set up in main memory to maintain temporary information about a file.

FD Floppy Disk.

Field A logical grouping of data. It could be a group of related characters in a record

#### 124 • FIELD

(name field), a work area in memory or in the CPU, a zone within an instruction, such as opcode, address or comment.

**FIELD** A Microsoft BASIC statement which creates room for variables in a random file buffer. The format is:

FIELD [#] filenum, width AS stringvariablex(, width AS stringvariable>

(filenum) is the number under which the file was opened.

widthy is a numeric expression which specifies the number of character positions to be made available to (stringvariable).

«stringvariable» is a string variable which will be used for random file access.

The FIELD statement defines variables that are used to remove data from a random buffer after a GET statement or to enter data into the buffer for a PUT statement. For example:

#### FIELD 1, 25 AS G\$, 15 AS J\$, 35 AS Q\$

Here the first 25 positions (bytes) in the random file buffer are allotted to the string variable G\$, the next 15 positions to J\$ and the next 35 positions to Q\$. FIELD does not actually place any data into the random file buffer. This is done by the LSET and RSET statements. Refer also to LSET, RSET.

FIELD does not remove information from the file. Information is read from the file into the random file buffer with the GET (file) statement.

The total number of bytes made available in a FIELD statement must not be more than the record length that was specified when the file was opened; otherwise, a "Field overflow" error occurs.

Any number of FIELD statements may be executed for the same file number, and all FIELD statements that have been executed are in effect at the same time. Each new FIELD statement redefines the buffer from the first character position. This is similar to having multiple field definitions for the same data.

Be careful using a fielded variable name in an input or assignment statement. Once a variable name is defined in a FIELD statement, it points to the correct place in the random file buffer. If a subsequent input statement or LET statement with that variable name is replaced on the left side of the equal sign, the variable is redefined in string storage and no longer points to the file buffer.

**File** A logical grouping of information given an identifying name and considered as a unit by a user. A file may be divided into records, blocks or other units, as required by the memory device. Files in Macintosh applications such as MacPaint and MacWrite are called "documents."

File, Data. A file which contains data to be processed by a program.

**File Icon** Icons are used to represent files and to identify file types in the Directory window on the Macintosh Desktop. MacPaint documents and MacWrite documents are files. The icons representing these files are distinctive. The icon for a MacWrite document icon resembles a letter with the upper right-hand corner turned down. A text file icon resembles a blank pad with a pencil in the middle. A MacPaint document icon resembles a blank piece of paper with a paint brush and a brush line across the bottom. See Icon.

File, Length of (Microsoft BASIC) See LOF.

File, Delete or ERASE Move a file to the Trash icon to remove it from the disk. The

file will not be actually destroyed until you select Empty Trash from the Special menu on the menu bar.

File, Edit or Change Contents. Edit means to change the contents of a file, including both program files and data files. See Edit A Document.

#### File, Erase (Microsoft BASIC) See KILL.

File, Fragmented See Fragmentation.

**File Management (Disk Maintenance)** File management or disk maintenance is the record keeping on disks. This includes creating them, finding them by name, ensuring that adequate free space is available on the disk, maintaining backups and deleting files no longer needed. These functions are supported by the various Desktop functions, but require thoughtful planning by the user to ensure proper results.

**File Management System** A group of programs designed to format and manage user files in a transparent way. The system allows symbolic names and attributes, and manages the physical allocation of storage. Usually part of the Operating System, as in the Macintosh.

**FilePlan\*** A database management program using a spreadsheet format for data entry. Each record may contain from 128 to 1024 characters from 32 fields. Each field is limited to 99 characters but field length may vary up to that limit. Fifteen records may be viewed at once. Data may be sorted on five fields at once. Fields and records may be defined after data has been entered into the program. Chang Labs. In UK: Softsel.

File, Program. A program file contains some type of program instructions specifying how data is to be processed.

**File Menu** The File menu is one of the pull-down menus available on the Macintosh Desktop. It is also one of the menus available on the menu bar while applications are in use. This menu allows the user to access, close and print files. The File menu on the Desktop contains the Open, Duplicate, Get Info, Put Back, Close, Close All, Print and Eject options. Only the Open, Get Info, Close, Close All and Eject options are highlighted when no file icon has been selected by placing the mouse pointer on a file icon and clicking the mouse button once, then all the options on the menu are highlighted.

The Open option causes the selected file or application to be opened and allows it to be put into use. The Duplicate option causes a copy of the highlighted file to be made on the current disk. The Get Info option displays key information about the selected file in a window on the screen. The Put Back option returns files to the folder or to the Desktop disk directory window from which they came. The Close option closes a file that is currently open or closes an open disk icon. The Close All option closes all the file, folder and disk icons currently being displayed on the Desktop. The Print option causes the contents of a document to be printed. Applications and utilities cannot be printed in this fashion. The Eject option causes the disk currently in a disk drive to be ejected.

The MacWrite File menu has a New option, an Open option, a Close option, a Save option, a Save As... option, a Page Setup option, a Print... option and a Quit option.

The Open and Close options are the same as those described above. The New option causes the document that is currently in use to be erased. The Save option causes the document currently being worked on to be saved to disk. If this docu-

ment has not been named, a dialog box will request that it be named prior to saving it. The Save As... option allows a document that is currently being worked on to be saved under a new name. This allows several versions of the same document to be saved.

The Page Setup option is used to define the type and size of paper in use. It also allows the user to choose Tall, Tall Adjusted and Wide formats for printing documents. Tall is an upright page with the first line of text at the top of the page. Tall Adjusted causes pictures to be printed proportionately. Wide turns the text on its side. The Quit option allows the user to stop working on a document and a dialog box asks whether the document should be saved or not as changed.

The MacPaint File menu has the New option, the Open... option, the Close option, the Save option, the Save As... option, the Revert option, the Print Draft option, the Print Final option, the Print Catalog option and the Quit option.

The Open, Close, Save, Save As and Quit options are the same as described above. The Revert option causes the last saved version of a document to be loaded. The Print Draft option causes a draft of a drawing to be printed. This method of printing is faster than the printing of a final version of a document. The Print Final option causes a high-quality copy of a document to be made on the ImageWriter printer. The Print Catalog option causes a catalog of the documents on the current disk to be printed on the ImageWriter printer. Miniature versions of the entire document are printed in this catalog.



Fig. F1 The File menu from the Macintosh Desktop.

	File Edit S	earch Format F	ont Style ntitled	
1, . ₽ 	Upen Close Save Save		1 <u>4</u>	
	Page Setup Print Quit			
dran.				
				۲. ۲
			10 X 10	Ď

Fig. F2 The File menu from the MacWrite application.



Fig. F3 The File menu from the MacPaint application.

#### 128 • File Separator

**File Separator** A special pattern of bits or a special frequency which separates one file from another on magnetic media such as tape or disk.

File, Text A file containing character data, letters, numbers or special characters.

**FILES** A Microsoft BASIC Command which will display the names of files residing on a disk. The format is:

#### FILES [dilespec>]

(filespec) This is a string expression naming the disk drive or volume (disk) on which a file resides. If no filespec is provided, the files on the internal disk drive are listed.

**Files per Disk, Number of** On each disk Macintosh maintains an index or directory of all files. The number of files that may be stored on a disk depends upon the capacity of the disk and the space taken up by the applications and other files on the disk. See Disk Capacity.

**Fill Down Option** Electronic spreadsheets such as Microsoft Multiplan allow the contents of cells to be copied into other cells on the same worksheet. These contents may consist of numbers (values), text and formulas. Microsoft Multiplan accomplishes this copying process by using a Fill Right or a Fill Down option from the Edit menu on the menu bar. The Fill Down option is used to copy the contents of a single cell or the contents of a range of cells in a row down a column or range of columns. It will copy downward one row or several rows depending upon the number of rows that were highlighted by dragging the plus sign pointer through rows.

**Filled Shapes** These are drawing options available from the MacPaint Drawing Tool menu on the left-hand side of the MacPaint screen display. The shapes available are the filled rectangle, the filled rectangle with rounded corners, the filled oval, the filled irregular curve and the filled polygon. When each of these shapes is drawn on the MacPaint screen, it is automatically filled with the pattern that has been currently selected from the pattern menu at the bottom of the MacPaint screen display.

Filling in Areas (MacPaint) Areas defined by boundaries in MacPaint may be filled with the currently selected pattern from the pattern menu at the bottom of the MacPaint screen by using the paint can option from the drawing tools displayed on the left-hand side of the MacPaint screen. The spilled paint portion of the pointer (which looks just like the icon) must be positioned within the boundaries of the shape to be filled and the mouse button clicked to fill the shape with the selected pattern. Be careful to place the spilled paint portion of the icon within the boundaries of the shape. If it is outside of the boundaries, the screen window will be filled with the pattern. The only way to reverse the fill is to use the Undo option from the Edit menu. See Pattern Palette, Mouse Button, Drawing Tools, Paint Can, Undo Option, Edit Menu.

**Financial Planning Software** This software is written to assist the user with financial planning and analysis. It may be a spreadsheet program that allows the user to design and implement his own formats for analysis. It could also be written specifically to perform financial analysis and planning, real estate investment analysis, general investment analysis, stock market investment analysis, or similar planning and ananlysis. See Multiplan, Lotus Macintosh Product, Microplan, AgDisk, Personal Tax Planner.

Find a File on a Disk If you are in Microsoft BASIC enter in the Command window the word:

FILES

or

FILES, filespec (disk name)

This is useful to find a program on file if you are unsure of the exact spelling of its name. If you still cannot identify your program from FILES listings of all disks, you may have to load and list likely looking candidates until you find it. This points out the usefulness of program and file names that remind you of what the purpose is (mnemonic names), and of a REM at the start of each program to make it easy to identify when listed.

Find Character or String in a String (Microsoft BASIC) See INSTR.



Fig. F4 MacPaint screen dump showing the use of the paint can pointer to fill in areas.

**Find Command (MacWrite)** A particular word or phrase may be found in the text of a MacWrite document by selecting the Find command option from the Search menu on the menu bar. This will cause the Find window to be displayed on the screen. The word or phrase to be found must be typed into the rectangle in the Find window after the words Find What. This will cause the first occurrence of the selected word or phrase to be found and highlighted on the screen. The entry in the Find What rectangle is limited to 44 characters of text. When MacWrite is carrying out this function, it ignores capitalization, accents on characters, fonts, font size and font style.

#### 130 • Find Next Button

The document is scrolled automatically by the program that carries out this command from the first location recognized by the user. Scrolling continues to the end of the document then wraps around to the beginning of the document until it returns to the first occurrence that was found. To find the next occurrence, click the Find Next button in the dialog box. When the last occurrence of a word or phrase has been found, an alert box is displayed to inform the user that no other occurrences have been found. Click the OK button in the alert box to get back to the document. See Search Menu, Menu Bar, Find Window, Alert Box, Document.

	Find Find	
Find what	Wor	•
Find Next	O Whole Word @ Partial Word	
user to find words words or phrases a	s in a document and to replace the words with other as required.	
The list bolow was	e written to demonstrate the use of the Find feature of	
The list below was MacWrite.	s written to demonstrate the use of the Find feature of	
The list below wa: MacWrite. Words	s written to demonstrate the use of the Find feature of	
The list below wa: MacWrite. Words Worms	s written to demonstrate the use of the Find feature of	
The list below wa: MacWrite. Words Wor <mark>ms</mark> Worldly	s written to demonstrate the use of the Find feature of	
The list below was MacWrite. Words Worims Worldly Worst	s written to demonstrate the use of the Find feature of	
The list below was MacWrite. Words Words Worldly Worst Worsted Wrap	s written to demonstrate the use of the Find feature of	

Fig. F5 The Find window that is used in MacWrite to find a particular word or phrase.

**Find Next Button** The Find Next button is the only button that is present in the Find window used to instruct MacWrite to Find a particular word or phrase in the text of a MacWrite document. See Find Command (MacWrite).

**Find What Rectangle** The Find What rectangle is the term used in MacWrite documentation to describe the input window used in the Find window displayed when the Find command is selected from the Search menu in MacWrite. See Find Command (MacWrite).

**Find Window** The Find window is a dialog box that is displayed on the Macintosh screen when the Find option has been selected from the Search menu on the menu bar when MacWrite is in use. See Find Command (MacWrite).

**Finder** The Finder is the most important unit in the Macintosh System Folder. It is a part of the Macintosh Operating System accessed from disk. It provides the user with a visual manner of dealing with documents and tools that are stored on disk. It allows the user to organize and manage documents stored on a disk. The Finder is available from the Desktop when a disk is booted. It is also available from within

applications such as MacPaint and MacWrite. The Finder can carry out many different tasks with disks and the files on disks. It can copy documents, open documents, close documents, erase (discard) documents, move documents and rename documents. It can also open, close, rename, copy and erase disks. The Finder organizes documents and applications on the Desktop in folders and on disks. It is responsible for ejecting and initializing disks.

The Finder is used by selecting icons (pointing at them and clicking the mouse button), moving icons (pointing at them, clicking the mouse button, dragging them to where you want them and releasing the mouse button) and selecting commands from pull- down menus (pointing at the menu, dragging the highlight down to the proper selection, and releasing the mouse button).

The Finder could not operate without access to ROM. It performs many of its functions and provides its displays by using routines stored in ROM. When you point at a disk icon and click the mouse button, the Finder presents a window that shows which files are on the disk selected. This window is called the "Directory window."

The Finder receives information from the Event Manager when you point at a file or application icon and double-click the mouse button. When this information is received, the Finder checks the pointer location and loads the application selected or loads the application and the document that was selected. To load the program the Finder checks the disk directory and tells the disk drive controller circuits where to position the disk drive's read/write head to read the document or application from the disk into RAM. Once an application has been loaded, the Finder screen display is replaced with the application's screen display. Thus, the finder is the conduit between the user and the computer for file manipulation and between the computer and its storage devices such as disks and hard disks.

**Finder Menus** The Finder menus are displayed on the Desktop when a disk is inserted into a Macintosh disk drive and its System file and Finder file are loaded into the computer's memory. These menus include the Apple menu, the File menu, the Edit menu, the View menu and the Special menu.

**Firmware** A program stored in a ROM. Originally, firmware was used only for microprograms inside the CPU. In microprocessors, many kinds of programs reside in ROM, and firmware designates any ROM-implemented program. About two-thirds of the memory space in the Macintosh ROM contains the User Interface Toolbox. The remainder of the space in ROM is taken up by the Operating System. See ROM, User Interface Toolbox, Operating System.

**FIX** A Microsoft BASIC function which removes all digits to the right of the decimal point. The format is:

 $\langle variable \rangle = FIX \propto$ 

x> this may be any numeric expression. For example:

FIX(34.34) returns 34

FIX(-76.89) returns -76

FIX is different than INT and CINT in that FIX simply strips the decimal portion of your number, while INT gives the lowest integer.

**Fixed Media** Fixed media cannot be removed from the device which reads and writes on the media. See Media.

**Fixed-point** Integer representation with the decimal point assumed to be in a fixed position, in contrast to floating point.

#### 132 • Flag

**Flag** A status indicator for a special condition. A flag is normally stored in a flip-flop or in a register. In the MC68000 chip, the status register has five flags. These flags are Carry (C), Overflow (O), Zero (Z), Negative (N) and Extend (E).

**Flip-flop** A circuit used to store one bit of information. An FF is bistable with two stable states (0 and 1). Registers are generally assembled out of flip-flops.

**Flip Horizontal** Flip Horizontal is a command option accessed from the Edit menu in MacPaint. When this command is used, the shape that has been selected on the screen with the rectangle or the lasso icon is rotated 180 degrees around the vertical axis so that the shape is turned in the horizontal plane. See Edit Menu, Lasso.R

**Flip Vertical** Flip Vertical is a command option accessed from the Edit menu in MacPaint. When this command is used, the shape that has been selected on the screen with the rectangle or the lasso icon is rotated 180 degrees around the horizontal axis so that the shape is turned in the vertical plane. See Edit Menu, Lasso.

**Floating-point (Representation)** Representation of numbers in a fixed length format, such as 24 or 32 bits. The number N is normalized and encoded as a mantissa field M and an exponent field. The name reflects the fact that the representation remains fixed as the decimal point floats, i.e., the changes in magnitude are reflected by adjustment of the exponent field with renormalization of the mantissa field. The precision of the representation is limited by the number of bits allocated to the mantissa field. This is in contrast with fixed-point.

**Floppy Disk** A flexible mylar disk for mass-storage of information. The disk is sealed in a square plastic jacket and lined with a soft material which cleans the disk as it rotates. A cut-out slot provides access for the moving head which must actually come in contact with the disk surface in order to read or write. Other holes in the jacket provide access to sector index holes in the disk. Disks are hard-sectored if the sector start points are marked by holes in the disk. Soft-sectored disks have only one (or a few) holes to mark the start of the track. The sector start marks are placed on the soft-sectored disk, under software control, in a process known as "formatting the disk." The Macintosh uses soft-sectored 3-1/2-inch disks in its standard drives. Macintosh disks are dual-density and either 400K (single-sided) or 800K (dual-sided).

**Floppy, Mini** A smaller floppy that is 5-1/4-inches square, compared to 8 inches for the original floppy.

Floppy, Micro A 3-1/2-inch disk, such as those used by the Macintosh.

**Flowchart** A symbolic representation of a process. Boxes represent commands or computations. Diamonds represent tests and decisions (branches). A flowchart is a useful step between process specification and program writing. It aids in understanding and debugging the program by segmenting it into logical, sequential steps.

FMS File Management System.

**Folder** A folder is a term used to describe a subdirectory system used in an hierarchical file structure such as that used with the Macintosh. The folder in the Macintosh file system takes the place of the subdirectory in a hierarchical system. Files and applications stored on a disk may be organized into folders when the disk directory window is being displayed by the Finder on the Desktop. To organize a number of files into a folder, the Empty Folder on the Desktop should first be copied and renamed to reflect the nature of the files and applications that will be placed in the

folder. Then, those applications, documents or files that you wish to store in the folder should be dragged into the folder from the Desktop. The organization of files into folders helps unclutter the Desktop while it offers the user the means of organizing files as he desires. See Finder, Desktop, Empty Folder.

**Font Manager** The Font Manager is a unit in the User Interface Toolbox in the Macintosh's Read Only Memory. This unit is used to select the fonts used by QuickDraw. It contains about five subroutines and can return information about a font to an application program. See User Interface Toolbox, Fonts.

**Font Menu** The Font menu is available on the menu bar in MacPaint and MacWrite. This menu allows the user to select the font he desires for use in the application. MacPaint offers Chicago, Geneva, New York, Monaco, Venice and Athens. MacWrite has the same fonts on this menu. The illustration below shows each of these fonts in 12-point size.

**Font Mover** The MacPaint/MacWrite disk contains a utility program called Font Mover and a file called Fonts. Both the program and the file may be copied from the MacPaint/MacWrite disk to the System Disk provided with the Macintosh. Before Font Mover can be used, it must be present on the application disk on which you intend to use it. This program is used to transfer fonts from the Fonts file to the System file in MacPaint, MacWrite, and other applications. It is also used to transfer fonts from the System File in an application to the Fonts file. Font Mover presents two font catalogs, a command menu and a font description to the user. One catalog lists the fonts that are currently present in an application. The other catalog lists the fonts that are currently in the Font File. The command menu has four options: Help, «Copy«, Remove, and Quit. Help explains each option. «Copy« is used to transfer fonts from the System file to the Font file and vice-versa. Remove is used to remove a font from an application. Quit is used to get out of Font Mover.

**Fonts** Fonts are character sets used to print letters and numerals to the Macintosh screen and on paper with the ImageWriter printer. Currently, MacWrite and MacPaint offer a choice among Chicago, Athens, Geneva, New York, Monaco and Venice as fonts that may be used with the applications.

**Font Size** MacWrite and MacPaint offer a variety of font sizes for use in generating documents. MacWrite offers 9-point, 10-point, 12-point, 14-point, 18-point and 24-point fonts. MacPaint offers 36-point, 48-point and 72-point font sizes in addition to those offered by MacWrite. This variety allows such things as banners and headlines to be printed in sizes different from the size of the text. See Change Font Size, Document.

**Font Style** MacWrite and MacPaint each offer a variety of type styles to the user, available from the Style menu on the menu bar on both applications. MacPaint offers two fewer options than MacWrite due to the nature of the program. MacPaint offers Plain, Bold, Italic, Underline, Outline and Shadow styles. MacWrite offers Superscript and Subscript in addition to those offered by MacPaint. These font styles may be selected from the pull-down File menu or from the keyboard using the Command key in combination with other keys. The Style menu from each of these programs is illustrated below. This menu gives examples of each style and also provides the Command key combinations for each style.

134 • Footer

This is MacPaint Chicago 9 point plain type. This is MacPaint Geneva 10 point plain type. This is MacPaint 12 point New York bold type. This is MacPaint Monaco 14 point underline.

## This is MacPaint Venice 18 point typ This MacPaint 24 point Athens. **This is 36 point.**

This is MacPaint shadow type. This is outline & *Hadbe* & shadow.

This is MacWrite Chicego 9 point plain type. This MacWrite Geneva 10 point plain type. This is MacWrite New York 12 point bold type. This is MacWrite Nonaco 14 point underline. This is MacWrite Venice 18 point type. This is MacWrite Venice 18 point type. This is MacWrite Athens 24 point This is Chicego 12 point culling. This is Chicego 12 point culling. This New York 10 point superscript.

This is New York 10 point subscript.

## This is Geneva 12 point bold Italic.

Fig. F6 The fonts that are available from the Font menu in MacPaint and MacWrite.

**Footer** Footers are used in many documents generated by word processors to convey standard pieces of information such as page numbers on the bottom of each page. They are also used to make notations and references, such as footnotes, that are related to the text shown on a particular page of a document. MacWrite can generate up to six lines of footer information on each page by using the Open Footer command option on the Format menu. The use of this command option causes a Footer window to be opened to set up the footer information for a single page or for all of the pages of a document.

135

Untitl Untitl	<ul> <li>Plain Text</li> <li>Bold</li> <li>Italic</li> <li>Underline</li> <li>Owtiling</li> <li>Schadow</li> <li>Superscript</li> <li>Subscript</li> <li>Subscript</li> <li>Polint</li> <li>10 Polint</li> <li>10 Polint</li> <li>12 Polint</li> <li>14 Polint</li> <li>18 Polint</li> <li>24 Polint</li> </ul>	#P #B #U #U #0 #S #H #L	6
This is New York 10 point subscript. This is Geneva 12 point bold It	olic.		k I



Fig. F7 The Style menu from MacPaint and MacWrite. Note the two additional options in the MacWrite menu and the Command key combinations in both menus.

#### 136 • Footer Window

Tabs and line spacing may be set up within the Footer window. Text justification may be defined. The page number, the current time and the current date may also be displayed by dragging the icon for each of these options to the location within the window where each of these items are to be printed. Once a footer has been defined, the Footer window is closed by using the close box in the upper left-hand corner of the window. Footer windows and footers may be removed from a document by using the Remove Footer command option from the Format Menu. See Window, Document, Close Box, Footer Window.

**Footer Window** The Footer window is displayed on the MacWrite screen when the user selects the Open Footer command from the Format menu. This window contains a ruler, a title bar, a close box, six lines for defining footer, a tab icon, a decimal tab icon, line space icons and text justification icons. See Footer, Format Menu, Close Box, Window, Ruler, Title Bar, Decimal Tab, TAB.

**FOR and NEXT** Microsoft BASIC Statements. The FOR statement used in conjunction with the NEXT statement performs a series of instructions in a loop a given number of times. The format is:

FOR variable =  $\infty$  to  $\langle y \rangle$  [STEP  $\langle z \rangle$ ]

NEXT [<variable>][,<variable>...]

«variable» is an integer or single-precision variable to be used as a counter.

 $\infty$  is a numeric expression which is the initial value of the counter.

(y) is a numeric expression which is the final value of the counter.

(z) is a numeric expression to be used as an increment.

Within a single FOR...NEXT loop, all lines following the FOR statement are executed until the NEXT statement is encountered. Then the counter (x) is incremented by the amount specified by the STEP value (z). If you do not specify a value for (z), the increment is set to 1 (one). A check is then done to see if the value of the counter is now greater than the final value (y). If it is not greater, Microsoft BASIC goes back to the statement after the FOR statement and the process is repeated. If it is greater, the first statement following the NEXT statement is executed.

If the value of (z) is negative, the check is reversed. The counter is decremented each time the loop is executed and execution continues until the counter (x) is less than the final value (y).

The statements within the FOR...NEXT loop are not executed if (x) is already greater than (y) when the STEP value is positive, or if (x) is less than the (y) when the STEP value is negative. If (z) is zero, an infinite loop will occur unless you provide some way to set the counter greater than the final value.

"Nested loops" is the name given to a situation where one or more FOR...NEXT loops are placed inside a FOR...NEXT loop. Whenever FOR...NEXT loops are nested, each loop must have a unique variable name as its counter. The NEXT statement for the inner loop must appear in a statement before the NEXT statement for the outside loop. However, if nested loops have the same end point, a single NEXT statement may be used for all of them. Using the format:

NEXT variable1, variable2, variable3

is the same as
NEXT variable1 NEXT variable2 NEXT variable3

The variable or variables in the NEXT statement may be left out. In this case the NEXT statement returns to the most recent FOR statement. When using FOR...NEXT loops, include the variable or variables on all the NEXT statements. It is a good rule of thumb to use variable names on all NEXT statements in order to avoid confusion.

When a NEXT statement is encountered before its corresponding FOR statement, a "NEXT without FOR" error is displayed. Some examples are:

```
10 M=2:K=10
20 FOR I=M TO K STEP 2
30 PRINT I;
40 NEXT
RUN
2
4
6
8
10
```

**Foreground Program** A higher-priority program in a multiprogramming environment. Also, a program in charge of interfacing with a user or a process. See Background Program.

**Form Feed** Advance to top of page printer. The Microsoft BASIC statement to form feed is:

#### LPRINT CHR\$(12)

Or use the top of form or form feed control button (FF) on the printer. You may then need to adjust the paper in the printer so it actually is at the top of a page as defined by the perforations.

In a program, you may want to provide instructions to the operator and a pause through the use of a dummy input statement, or a delay loop to allow the adjustment of the paper.

**Format Menu** Format menus are available on those applications that require or provide a variety of different formats for text or number presentation. Word processors and spreadsheet programs use format menus to set up the display of pages, text and numbers. MacWrite and Microsoft Multiplan each use format menus to set up the presentation of output on the screen or on paper. The MacWrite Format menu provides command options called Insert Ruler, Hide Rulers, Open Header, Open Footer, Display Headers, Remove Footers, Set Page #..., Insert Page Break and Title Page.

The Insert Ruler option is used to change text formats, set up tables and to otherwise display rulers that show tab markers, margin markers, the paragraph indentation marker, line spacing icons, text justification icons and the cursor location on the screen. The Hide Rulers option is used to remove all rulers from the screen display. The Open Header and the Open Footer options are used to define and set up headers and footers in a MacWrite document. The Remove Footers option allows footers to be removed from a document. The Display Headers option causes headers that are currently in use to be displayed on the screen at the top of



R5C2	Dollar		
1	Percent 2 No Decimal	5	6
1	Decimal		
2	Scientific Par Graph		
4			
5	Number Of Decimals	••••••	
6			
7	Align Left %F	••••••	
8	Align Center %G		
9	Align Right %H		
0			
1	Lommas		
2	Column Illidth		
4			
5			

Fig. F8 The Format menus from MacPaint and Microsoft Multiplan. Note the numeric slant of Multiplan and the text slant of MacPaint.

each page of a document. The Set Page #... option sets the page number of the first page of a document. The Insert Page Break forces a page break where it is used in a document. The Title Page option causes header or footer to be displayed or printed on the first page of a document.

The Format menu in Microsoft Multiplan is more oriented toward the formatting of numbers than text. The various formats that are available in Multiplan may be invoked for a single cell, a part or all of a row or a column of cells or in a range of cells. The cells that are to be formatted are selected by dragging the plus sign pointer over the cells that will contain a particular format, causing them to be highlighted.

The Format menu in Multiplan offers the following options: General format, Dollar format, Per Cent format, Decimal format, Scientific format, Bar Graph format, the definition of the Number of Decimals in the Decimal format, Align Left for text, Align Center for text, Align Right for text, Comma format for numbers and the adjustment of Column Width from the keyboard.

**Formatting a Disk** Disks must be set up with such things as directory files, track markers and sector markers if they are to be useful to a computer system. The computer's operating system generally causes this process to occur by writing the required references to disk in a process called "formatting" or "initializing." The Macintosh's Finder performs this function any time an uninitialized disk is placed in a Macintosh disk drive. See Disk, Initialize a Disk.

**Formula Bar** Electronic spreadsheet programs such as Microsoft Multiplan use a portion of the screen display to show any formula that might be contained in a particular cell in the spreadsheet. Multiplan uses a window on the line just below the menu bar at the top of the screen display to show the formula, text or numeric value in the currently active cell in the spreadsheet. This window occupies more than half the width of the screen display on the right-hand side. See Spreadsheet, Active Cell.

**FORTH** A programming language and operating system. FORTH is characterized by threaded code and postfix, or reverse Polish notation. FORTH is an extensible language; you can create new commands-defined in terms of the existing commands or in machine language code. Your new commands then become part of the FORTH language in exactly the same way as the standard commands. This feature allows you to build up precisely the commands you would request if you were designing a language especially to suit a particular application or type of problem. FORTH is also highly transportable from one microcomputer to another, more so than Microsoft BASIC and most other languages. FORTH tends to run fast and closer to machine code than to higher-level languages like Microsoft BASIC. FORTH may be somewhat harder to master than Microsoft BASIC, but it offers many advantages. FORTH is available for the Macintosh from Creative Solutions, Inc.

# FORTH Development System\* See MacForth.

**FORTRAN** FORmula TRANslator. One of the first high-level languages, still widely used, especially by scientists and engineers. Microsoft BASIC is largely based on FORTRAN, using statement numbers and a similar set of commands. The differences are slight, mostly dealing with I/O statements. FORTRAN includes the FORMAT statement for formatting printed output. It is rich in mathematical functions and supports an extended precision calculations mode for scentific problems.

FORTRAN is a compiled language, not interpreted like Microsoft BASIC. A program is edited in a file, then submitted to a compiler for translation into executable object code. FORTRAN and Microsoft BASIC are so similar that Microsoft BASIC could be called an interpreted dialect of FORTRAN. Here is a sample FORTRAN program to sum the first 100 integers:

# 140 • Forward Reference

```
20 FOR I = 1 TO 100
30 J = J + I
40 NEXT I
50 END
```

**Forward Reference** Electronic spreadsheet programs can calculate all of the formulas contained in the cells of the spreadsheet by reading the cells across the horizontal rows, one row at a time, starting at the top of the worksheet, or they can calculate the contents of the worksheet by reading the columns down each vertical column, one column at a time, starting at the leftmost column. If a particular cell is encountered that contains a formula or expression that refers to another cell located in an area of the spreadsheet that has not yet been read, the cell is said to contain a forward reference. Thus if the worksheet is being calculated in row order and calculated through the fifth row from the top and the cell that is currently being calculated contains a reference to a cell in the twenty-third row from the top, this reference is a "forward reference."

Forward references usually cause an error message to appear in the cell that contains them, which may be overcome by causing the entire worksheet to be recalculated two or three more times. This manual recalculation is accomplished by using the Calculate Now option from the Calculate menu on the menu bar or by pressing the Command key and the equal sign key at the same time. See Calculate Menu, Calculate Now Option, Cell, Spreadsheet, Worksheet.

**Fragmentation** A situation in which mass memory (disk, hard disk, etc.) has been allocated in such a way that it has many unallocated areas (fragments) that are too small to be useful or to allow optimum performance. The remedy for fragmentation is compacting all of the allocated areas into a single area to make the space occupied by fragments available in one large block. See Memory Manager.

**FRE** A Microsoft BASIC function which will return the number of bytes in memory not being used by Microsoft BASIC. This number does not include the size of the reserved portion of the interpreter work area, which is normally 2.5K to 4K bytes. The format is:

 $\langle variable \rangle = FRE(\infty)$  $\langle variable \rangle = FRE(\langle s \rangle)$ 

 $\infty$  and  $\infty$  are dummy arguments.

Since strings in Microsoft BASIC can have variable lengths, strings are manipulated dynamically. Each time you do an assignment to a string, its length may change. For this reason, string space may become fragmented.

FRE with any string value will cause a housecleaning before returning the number of free bytes. This means that Microsoft BASIC is collecting all of its useful data and freeing up unused areas of memory that were once used for strings. The data is compressed so you can continue until you actually do run out of space.

Microsoft BASIC will automatically do housecleaning when it is running out of usable work area. You could even use FRE('''') occasionally to get shorter delays for each housecleaning routine.

CLEAR, (n) sets the maximum number of bytes for the Microsoft BASIC workspace. FRE returns the amount of free storage in the Microsoft BASIC workspace. Refer also to CLEAR.

**Freeze (Or Hold) Screen Display** To freeze the screen briefly while the operator using your program reads a message, just write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y

To freeze the screen until the operator is done with it, put in a dummy input statement and instruct the operator to press Return to proceed. The input variable (A\$) need not be used in your program:

1000 INPUT "Press Return to continue";A\$

**Frequency** The number of cycles per second. F=1/T where T is the period in seconds over which cycles are counted.

**Friday**• An electronic, menu-driven file-handling system which prompts the user where decisions are required. It will work with dBase II and the Lotus Macintosh Product. It can find filed information quickly, and perform mathematical functions such as totals, subtotals, commissions and others. A variety of reports are available and easily structured. Ashton-Tate.

**Front Panel** A panel with lights and switches to display information and allow direct control or access to memory or registers. A front panel requires a specific interface and a monitor program. Many microcomputers have no front panel and all access is then performed from a keyboard and screen.

**Frozen Keyboard, How to Restart** If the Macintosh fails to respond to the keyboard or to the mouse during the use of a program or application, it can be shut off by turning off the power switch and then turned back on by turning the power switch on again. If a disk is in the disk drive, the disk will be rebooted. If the problem arises as the disk is booted, you will want to eject the disk. This can be done by pressing the mouse button and holding it down while you turn the Macintosh power switch off and then on again very quickly. The last resort (if you do not like the approaches discussed above) has the same result as turning the computer on and then off: press the Reset button that was installed on the lower left-hand side of the case by you or the dealer when you bought the Macintosh. It will not eject the disk, but it will restart the system if the keyboard freezes. See Reset, Mouse Button, Eject Disk.

**Full Duplex** A communication technique which allows data to be transmitted and received simultaneously. This technique is accomplished by each computer using a different frequency of transmission.

**Full Justification** The ruler on the MacWrite screen display contains four boxes in the lower right-hand portion of the ruler. Each of these boxes is used to select the manner in which text will be justified in a MacWrite document. The box on the extreme right is called the "Full Justification box." When this box is clicked, the margins on the right-hand side of the document and the left-hand side of the document will be aligned. This justification is called "full justification." It provides a straight margin on both sides of the document. This justification will be used unless it is changed in the ruler or until another ruler containing another justification is inserted below the ruler that contains the acivated Full Justification box.

**Full Screen Editor** Edit means to change the contents of a file, including both program and data files. Several different editors are used with the Macintosh:

(1) the Microsoft BASIC editor;

(2) other editing programs such as a word processing program, other languages with built-in editors, or other software packages that have built-in editing capabilities (Multiplan, some database systems, etc.).

# 142 • Full Screen Editor, Cursor

Editors are considered line-oriented if they work on one line at a time and deal with text by line number.

Full screen editors, by contrast, allow you to change any data currently displayed on the screen. Most treat paragraphs or even entire documents as a unit, allowing reformatting, change of margins with justification, block moves, etc. Most word processing programs are full screen editors.

The Microsoft BASIC editor lies between these two categories. It allows you to change any Microsoft BASIC line on the screen, but still treats the data as a collection of lines. You must press Return while the cursor is on a line you have changed with the Microsoft BASIC editor, or the changes are not effective.

Editing of program lines in Microsoft BASIC for the Macintosh is accomplished by listing the program in the List window on the screen, pointing at the line number of the line to be edited, clicking the mouse button to move the line from the List window to the Command window, pointing at the position in the line that requires the insertion or deletion of characters, clicking the mouse button again to display the vertical bar cursor at the insertion point and then adding or deleting the characters required to make the program line correct. See Edit, List Window, Command Window, Insertion Point, Mouse Button, Vertical Bar Cursor, Delete Character.

**Full Screen Editor, Cursor** The cursor is the symbol which appears on the screen to let you know where an action (such as typing in a character, deleting, inserting, etc.) will take place. The cursor moves to the right as you type, and backs up to the left when you press Backspace or cursor left  $\leftarrow$  key. Backspace usually erases the characters from the screen as the cursor moves left, while cursor left  $\leftarrow$  usually does not. The fundamental way of moving the cursor around the screen is by rolling the mouse across the Desktop.

**Functions From the Menu** A menu is a screen display which lists a number of possible options and asks the user to select one. When a selection is made by keying in an identifying number or letter (or by positioning the cursor beside the desired item, using a light pen, etc.) the function is performed. This may require either a branch or subroutine call to the code for the selection, or may require that a program be loaded into memory and run.

# G

G ASCII 71, HEX 47. g ASCII 103, HEX 67.

Games See Cyborg, Deadline, Enchanter, Infidel, MacPuzzle, Mac-Slots, Millionnaire, Mind Over Mac, Murder By The Dozen, Pensate, Planetfall, Run For The Money, Seastalker, Sargon III, Sorcerer, Starcross, Suspended, The Coveted Mirror, The Quest, Transylvania, Wizardry, Xyphus, Zork (1, 11, & 111).

**Gap** The space between two records or two blocks of information on a magnetic medium, usually set to a predetermined value, such as all 1's. It allows blocks to be rewritten in a slightly expanded or reduced format, due to speed variations of the drive.

**Garbage Collection** A technique for collecting unavailable, unused space in a mass memory and making it available for reuse by any of several schemes.

**Gate** A single logic function. The NAND, NOR, AND, OR, XOR and NOT functions are examples of gates.

Generate Line Numbers Automatically (Microsoft BASIC) See AUTO.

**GET Files** A Microsoft BASIC statement which reads a record from a random file into a random buffer. The format is:

GET [#]<filenum>[,<number>]

(filenum) is the number under which the file was opened.

(number) is the number of the record which is to be read. It is in the range 1 to 16,777,212. When (number) is left out, the next record (after the last GET statement) is read into the buffer.

Following a GET statement, INPUT #, LINE INPUT # or references to variables defined in the FIELD statement may be used to read characters from the random file buffer.

Since Microsoft BASIC blocks as many records as possible in 512-byte sectors, the GET statement does not necessarily perform a physical read from the disk.

**GET (Graphics)** A Microsoft BASIC statement which reads points from an area of the screen. The format is:

GET (x1,y1)-(x2,y2), (arrayname)

x1,y1>x2,y2> refers to the coordinates in either absolute or relative form.

The specified rectangle has points (x1,y1) and (x2,y2) as opposite corners.

GET and PUT can be used for high-speed object motion in graphics mode. You could think of GET and PUT as "bit pump" operations which move bits onto the

# 144 • Get Info Option

screen (PUT) and off of the screen (GET). Remember that PUT and GET are also used for random access files, but in a different syntax.

The (arrayname) is used as a place to hold the image. It must be numeric, but may be any precision. The required size of the array, in bytes, is:

4+INT((<x>\*bitsperpixel+7)/8)\*<y>

where  $\infty$  and  $\omega$  are the lengths of the horizontal and vertical sides of the rectangle, respectively. The value of (bitsperpixel) is 2 in medium resolution, and 1 in high resolution.

**Get Info Option** A command option available from the File menu on the menu bar displayed by the Finder. When a file is selected from the Desktop, by pointing to the file icon or the file name and clicking the mouse button once to highlight the file, the pointer may be moved to the pull-down File menu and then dragged down to the Get Info command. When this command is highlighted, the mouse button should be released. A window then displays the file name, type, size, date last modified, the location (internal disk drive, external disk drive, hard disk), the date the file was created, a button for locking and unlocking files and any comments that you may wish to add about the file. The Get Info option works the same way for disk icons as it does for files.

é	File	Edit	Vieu	v Special			
	Open			MacDrive			
it.	, Duplicate %D		<b>%D</b>	2017K in dick 3010K available			
ĒC	Get	Info	, )) ()	rmation about MS-BASIC			
	Put	Back	R	MS-BASIC			
Close Close All Print			cation D bytes, accounts for 51K on disk rive, AppleBus				
	Ejec	t	ЖE	y, January 1, 1904 at 3:01 PM			
	Modified: Friday, January 1, 1904 at 5:21 PM Locked						
	MS-BA BEEN U DF THE	SIC IS URITTE LANG	A VE N FOI UAGE	RSION OF MICROSOFT BASIC THAT HAS I USE ON THE MACINTOSH. THIS VERSION IS LOADED INTO RAM AND USED.			

Fig. G1 Get Info window display.

**Glitch** A pulse or burst of noise. A small pulse of noise is called a "snivitz." Glitch is usually reserved for the more dangerous noise pulses which cause crashes and failures.

**Global Search and Replace** This is a common feature of word processors, allowing all occurrences of a word or phrase identified to the program by the user to be changed to another word or phrase supplied by the user. This feature is available in MacWrite from the Search menu's Change option. To use this feature, the Change All button must be clicked in the Change window. See Search Menu, Change.

**Global Variable** A variable whose name and value are accessible throughout the program or application system. A local variable is accessible only within the block where it is defined.

**Goodies Menu** The Goodies menu is a pull-down menu that is available in MacPaint. This menu contains eight command options. These options are Grid, FatBits, Show Page, Edit Pattern, Brush Shape, Brush Mirrors, Introduction and Short Cuts. Introduction is an explanation of each of the icons on the drawing tool palette and the pattern palette. It also describes the lines and borders that are available in MacPaint. Short Cuts describes the short cuts that are available to the user by double-clicking various icons and by using the Command key, Shift key and Option key in conjunction with clicking certain icons. It also illustrates which keys are reused to copy, constrain, stretch, undo and clear images. Brush Mirrors is used to set up the ability to draw mirror images with the paint brush. Brush Shapes is used to select a particular brush shape and size. Edit Pattern is used to alter the patterns in the pattern palette at the bottom of the MacPaint screen display. Show Page displays an entire 8-1/2 by 11 page with the current display window shown as a rectangle drawn with broken lines. FatBits blows up a portion of the screen to show the individual dots that make up a drawing. Each dot may be turned on or off by clicking it with the mouse button. Grid ensures that shapes are moved up or down along straight lines.

**GOSUB and RETURN** These are Microsoft BASIC statements used together and function to branch to and return from subroutines. The format is:

# GOSUB (line)

. dine> - begin subroutine

# RETURN [dine>]

(line) is the line number of the first line of the subroutine or the line number for the RETURN.

You can call a subroutine using GOSUB any number of times in a program and a subroutine may be called from within another subroutine.

The RETURN statement causes Microsoft BASIC to branch back to the statement following the GOSUB statement from where it exited. A subroutine may contain more than one RETURN statement (if you want to return from different points in the subroutine). You may place subroutines anywhere in a program.

In order to keep your program from returning a subroutine that should not be executed, it may be necessary to use a STOP, END or GOTO statement to direct program control around it. Refer also to ON GOSUB and ON GOTO.

**GOTO** A Microsoft BASIC statement used to exit from the normal program sequence to a specified line number. The format is:

# GOTO dine>

(line) is the line number in the program you want to execute next. The (line) specified after GOTO will be executed if it is an executable statement. If

# 146 • Grabber

(line) is a nonexecutable statement, such as DATA or REM, the program will continue until it finds the first executable line after that.

In debugging, the GOTO statement can be used in direct mode to re-return a program at a desired point. Refer also to ON GOSUB and ON GOTO.

**Grabber** Used by many people at Apple computer to describe the "hand" icon from the drawing tools on the left-hand side of the MacPaint screen display to move the View window around the page.

**Graphic Magician, The\*** A program that allows the user to generate detailed graphics pictures and integrate them into other applications such as text games. Penguin Software. In UK: Softsel.

Graphics See PUT.

**Graphics Software** See Clip 1, Clip Art, Cut 'N Paste, DaVinci, Graphics Magician, GraphPlan, Images, MacAnimation, MacDraw, MacPaint, MacPuzzle, Mac the Knife, McPic, Microsoft Chart, Picture Disk, PaintMover, PFS Graph, Shapes 'N Shots.

**GraphPlan\*** A program that integrates spreadsheets with business graphics. It has many built-in formulas and statistical commands, as well as graphics, sorting and ranking features. Legends are generated automatically. X-axis and Y-axis labels, tic marks, and numeric, time date, and logarithmic labels are generated automatically as required. The program can generate explodable pie charts, horizontal and vertical line charts and bar charts. Chang Labs. In UK: Softsel.

# Η

H ASCII 72, HEX 48. h ASCII 104, HEX 68.

**H** Hexadecimal. Used as a prefix or suffix to denote hexadecimal numbers in Intel format. Also, High, the most significant half of a register or a pointer.

**Habadex**<sup>•</sup> A desktop convenience program that puts a telephone directory, a telephone dialer, an appointment calendar, a letter writer, a list generator, a form generator, a label printer and a mailing list generator at the user's fingertips on the Macintosh. Preset forms are used to enter names, addresses, phone numbers, zip codes, company names, titles and other pertinent information into a database with this program. The program will search its records to find a specific entry which can be used to dial a phone number through a modem or special adaptor box. The calendar is selected by clicking on a particular month. The schedule for a particular day is obtained by zooming that day's number on the calendar. Zoom features are also available on name listings. A Quick Dial list may be set up for important friends and clients. A Things To Do list may also be set up and updated. Material can be merged from Habadex to MacWrite. Haba Systems, Inc. In UK: P+P micro distributors.

**Half-duplex** A mode of communication in which data may be transmitted in only one direction at a time between two devices such as computers. MacTerm allows the selection of half-duplex vs. full-duplex to ensure that the Macintosh can communicate with any device that requires the half-duplex protocol.

**Halt System Operation** The system operation of the Macintosh may be halted at the end of a session by turning off the main power switch on the back panel of the computer. The system may be "warm-booted" or "warm-started" (fooled into thinking it was turned off although it was not) by pressing the Reset button that you or your dealer have installed in the vents on the lower left-hand side of the computer case. Both of these methods cause any data that was left in RAM to be lost. If a disk is left in a disk drive, this disk will be booted when either method is used. If no disk is left in the disk drive when either procedure is followed, the disk request icon will be displayed on the screen (flashing disk icon with a question mark inside the image of the disk). See Disk Icon, Back Panel, Warm Boot, Interrupt Reset Switch, Reset, RAM.

**Handler** A program used to control or communicate with an external device such as a disk drive.

Hard Copy Computer output printed on paper.

**Hard Disk** A disk composed of a magnetic coating applied to a rigid substrate, such as aluminum or ceramic. The term is generally used to contrast with soft (floppy) disks, which are flexible. Floppy disks are slower and have less storage capacity. Some hard disks are permanently fixed within the hard disk drive that is used to read

# 148 • Hard Disk Drives

from them and write to them. Others are designed as cartridges that may be removed and replaced as needed.

**Hard Disk Drives** Devices capable of reading information from hard disks and writing information to hard disks. The disks used by these devices have a larger capacity than 3-1/2-inch, 5- 1/4-inch and 8-inch disks, and spin the hard disk much faster than a normal disk drive. The read/write heads on these devices can track better than the heads of a normal disk drive.

Hard disk drives are available for disks with a 5-megabyte up to 32-megabyte capacity. Some of these disk drives have the hard disk fixed permanently in the disk drive. Others use a cartridge that may be removed from the hard disk drive as required. Tecmar is producing a hard disk drive called the "Mac Drive." One of these systems is a 5-megabyte cartridge system. The other is a 10-megabyte fixed disk system. Davong Systems, Inc. is also producing a hard disk system for the Macintosh called the "Mac Disk." This system offers from 5 to 32 megabytes of hard disk storage. Micro-Design offers the PRO Series 5, 10 and 20 megabyte drives. See Mac Drive, Mac Disk, PRO Series.

**Hard-sectored** Describes a disk in which the recording surface has been divided into sectors using nonalterable methods, such as a ring of holes in the disk itself. In contrast soft- sectoring is done by software control. Hard-sectored disks require more hardware but can also store more information. The 3- 1/2-inch disks used by the Macintosh disk drives are soft- sectored. See Sector, Disk.

**Hardware** The boards, chips, wires, etc., of a system, as opposed to software (programs). Hardware also refers to expansion devices. For Macintosh expansion hardware, see Accessories, Digitizers, Hard Disks, Interfaces, Modems, Monitor Adaptors, Printers, Printer Buffers.

**Hardware vs. Software** Computer programs of all kinds are called software. Software is contrasted to hardware, the actual chips, wires, boards, etc., which make up the computer. A special case is Read-Only Memory (ROM) (q.v.), which is hardware that contains a permanent copy of software. These terms can create confusion. For instance, which term applies to the User Interface Toolbox, which means a ROM (hardware) containing a copy of machine language routines and subroutines (software)? Such ROMs are often called "firmware" to distinguish them from nonprogram hardware and from software in changeable media (RAM, disk, cassette, etc.).

**Header** Header is used to describe information placed in the top margin of each page of a document, such as a letter, a report or a book, and might consist of a company logo, the subject of a report and the author's name, the current date or the page number of the document. This information might appear on only one page or on each page of the document. Many word processing programs such as MacWrite allow the user to define and generate headers.

**Header Window** Headers are created with MacWrite by selecting the Show Header option from the Format menu. When this option is selected, a Header window is displayed on the screen with six lines to be set aside for placing information in headers. This window allows tabs and line spacing to be set, text justification, the inclusion of consecutive page numbers, the inclusion of the current date and the current time, along with such text as may be entered by the user.

Pictures generated by MacPaint or similar programs may be transferred into the header from the Clipboard by using the Cut or Copy options from the Edit menu to move the picture from MacPaint to the Clipboard, exiting MacPaint, loading MacWrite and pasting the picture into the header. This feature could be used to include logos

generated in MacPaint on letters and other documents generated by MacWrite. See Window, Format Menu, Clipboard, Cut Option, Copy Option, Paste Option, Edit Menu.

**Heap** The heap in the Macintosh is the general RAM memory area that may be allocated for use by data and programs on demand. Its use is controlled by the Memory Manager which makes more efficient use of the memory space than the Last-In First-Out systems used by most other computers. See Memory Manager, RAM. In UK: Softsel.

**Helix**<sup>\*</sup> Helix is an interactive information system for the Macintosh. It is a very powerful database management program. Input forms are created easily. Free-form reports are generated easily. Tables of calculated numbers may be generated from data. Pictures may be drawn on MacPaint and employed in Helix. Windows, pull-down menus and the mouse are used by this program. Calculations may be diagrammed visually. Icons are created by the program and associated with the information that is entered into Helix. Form letters may be generated by Helix. Complex search sequences may be used to collect data from the database. Data may be cut and pasted between forms. Files may contain numbers, text or pictures. Odesta Corporation. In UK: Softsel.

**Help Button** Microsoft Multiplan uses a unique approach to providing the user with information about the program and how to use it. This information is obtained by selecting "About Multiplan" from the Apple menu on the Finder display or on the menu bar in the application. When selected, a dialog box is displayed containing information about Multiplan and a button marked "Help." If this button is clicked, a series of help screens that describe the features and commands of Multiplan are displayed. See Button, Dialog Box.

**HEXS** A Microsoft BASIC function which returns a string representing the hexadecimal value of the decimal argument. The format is:

stringvariable = HEX\$((n))

 $\langle n \rangle$  is a numeric expression in the range -32768 to +32767.

When (n) is negative, HEX\$(-n) is the same as HEX\$(32767-n) (two's complement form).

# Hexadecimal to Decimal Conversion See HEX\$.

**Hide Clipboard Option** Once the Clipboard has been opened by selecting the Show Clipboard option from the Edit menu in MacWrite, it may be closed either by clicking the Close button in the upper left-hand corner of the Clipboard, or by selecting the Hide Clipboard option from the Edit menu. See Edit Menu, Show Clipboard Option, Close Box.

**Hide Footer Option** After a footer has been created in MacWrite, the Footer Window may be closed by clicking the close box in the upper left-hand corner of the window, or by selecting the Hide Footer option from the Format Menu on the menu bar. See Menu Bar, Format Menu, Window, Close Box.

**Hide Rulers Option** Rulers are used in MacWrite to indicate the position of margins, indentation, tabs, line spacing, text justification and cursor position. A ruler is displayed at the top of the screen when MacWrite is booted. Additional rulers may be added to the document in positions where the user wishes to change justification,

# 150 • Highlight

indentation, tabs, and spacing within the document, which are inserted by using the Insert Ruler option from the Format menu on the menu bar. Rulers may be hidden from the document's screen display by using the Hide Rulers option from the same menu. When this option is selected, all of the rulers on the screen display are hidden. See Ruler, Menu Bar, Format Menu.

**Highlight** The highlight is a device used in the Macintosh Desktop, the Desktop directory, in pull-down menus and in most applications to indicate which icons, documents, applications, files, portions of text or portions of a spreadsheet have been selected for action by a command. All of these things are selected and highlighted by clicking them with the mouse pointer. Multiple items may be selected by dragging the mouse pointer over each of the items or by holding down the Shift key and clicking each item to be selected individually. The Shift key is held down continuously with this method until the last item has been selected by clicking the mouse button.

**Highlighted Command** All commands available from the menus on the menu bar of the Finder and the menu bar of an application are displayed when the mouse pointer is placed on top of the menu's name and clicked. As the pointer is dragged down the list of options on the menu, each option passesd over is highlighted and appears as a black background with white letters. If the mouse button is released while an option is highlighted in this fashion, the option will be selected and executed by the Finder or by the application. See Menu Bar, Pointer, Finder.

**Highlighted Icon** When the pointer on the Desktop is placed on a file or a disk icon and the mouse button is clicked, the icon is darkened and called a "highlighted icon." Once highlighted, it may be acted upon by the File menu. See File Icon, Icon, Mouse Button, Desktop, File Menu.

Hold/Freeze Screen Display, How to To freeze the screen briefly while the operator using your program reads a message, write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y

To freeze the screen until the operator is done with it, put in a dummy input statement and instruct the operator to press Return to proceed. The input variable (A\$) need not be used in your program:

1000 INPUT "Press return to continue";A\$

**Holding Register** A register that holds data temporarily to bridge a speed or timing gap between two devices.

**Hollow Shapes** Five shape icons that appear on the drawing tool menu on the left-hand side of the MacPaint screen display are called "hollow shapes." They consist of a hollow rectangle, a hollow rounded square, a hollow oval, a hollow polygon and a hollow free-form shape. When one of these icons is selected as a drawing tool, the shape that it generates is not filled by the pattern currently active from the pattern menu on the bottom of the screen display. See Drawing Tools.

**Home Accountant\*** A personal financial management program, allowing the user to define specific account types and tie them to sources of income and checking. accounts. It can be used for tax planning, tracking checkbook transactions, budget

preparation, tracking actual costs against budget and for investment calculations. It has limited graphing ability. Continental Software. In UK: Softsel.

Home Software See Educational Software, Games, Personal Management.

**How to Use Your Macintosh\*** An on-disk training program that introduces the full power of the Macintosh to the new user. It presents a step by step introduction to the computer. American Training International. In UK: Softsel.

**Human Engineering** Designing hardware or software that is easy for people to use. In terms of hardware, it refers to designing equipment that will be comfortable for a person to use physically and easy on the eyes, and eliminating any other unnecessary fatigue or difficulties of use. For software, human engineering refers to ease of use and ease of learning, and has become a synonym for user friendly.

Several guidelines exist for writing user friendly programs. If a complex series of data items has been typed in and some entries turn out to be invalid, the user should be able to reenter the bad items without redoing everything. Error messages should indicate not only that an entry is invalid, but also just how it is invalid and, if possible, hints on correcting it.

# I ASCII 73, HEX 49. i ASCII 105, HEX 69.

**I-beam** A pointer used by MacPaint, in the Text mode. Also used by MacWrite and by Microsoft BASIC, when program lines are being edited in the Command window. This pointer is displayed in the screen dump below, and appears between the words "by" and "Megahaus" in the first line of the letter. It is used to position the vertical bar cursor in the proper position on the screen to input or delete characters. The vertical bar cursor is displayed at the I-beam's location at the time that the mouse button is clicked. See Vertical Bar Cursor, Clicking, Command Window, Pointer.

Untitled						
Shortly, Macinto programs to use business. Each o different from t and output repoi MegaFinder by for the Macintos	osh users will have a variet with information manager of the database managemen the others. Some will use t rts. Others will use the key legahaus is an example of a sh.]	ty of database management ment tasks for home and it programs will be slightly he mouse to design input froms yboard instead of the mouse. a database management program				

Fig. 11 A MacWrite screen dump that illustrates the I-beam. This pointer is located between the words "by" and "Megahaus" on the first line of the letter.

IC Integrated Circuit.

**Icon** A picture used to identify a function, a file type, a disk drive type or a drawing tool. The Macintosh lends itself to the use of icons because it supports the mouse as a selection and input device. The combination of the icons and the mouse provide the user with a convenient and easy to understand method of selecting functions,

selecting commands, manipulating files and otherwise dealing with the computer and its operating system. Icons are used by the Finder in the Desktop display and by many of the application programs that run on the Macintosh. See the frontispiece for a visual guide to icons.

**IF** A Microsoft BASIC statement which makes a decision regarding program flow based on the result of an expression. The formats are:

IF expression THEN (clause) [ELSE (clause)]

IF (expression) GOTO (line) [ELSE (clause)]\$FL

«expression» may be any numeric or string expression.

«clause» may be a Microsoft BASIC statement, a sequence of statements separated by colons or the number of a line to branch to.

dine is the line number of a line that exists in the program.

If the value of the numeric expression is not zero (true), the THEN or GOTO clause is executed. THEN may be followed by a line number for branching or one or more statements to be executed. GOTO is always followed by a line number.

If the value of the numeric expression is zero (false), the THEN or GOTO clause is ignored and the ELSE clause, if any, is executed. Execution continues with the next executable statement.

When you enter an IF...THEN statement in direct mode, and it directs control to a line number, an "Undefined line number" error message is displayed if you have not already entered a line with the specified number.

When using IF to test equality for a value that is the result of a single- or double-precision computation, remember that the internal representation of the value may not be exact. Single-and double-precision numbers are stored internally in floating point binary format, so the test should be against the range over which the accuracy of the value may vary.

IF...THEN...ELSE statements may be nested. You are restricted only by the length of the line entered. Each statement must contain the same number of ELSE and THEN clauses; otherwise, each ELSE is matched with the closest unmatched THEN.

**Images**<sup>•</sup> A disk that contains more than 150 images that may be used in MacPaint, MacWrite, and other applications which allows the use of the clipboard for graphics. Matrix Advocates Company. In UK: P+P micro distributors.

**ImageWriter** A specially modified printer built by C. Itoh for Apple Computer. It is a dot-matrix printer capable of producing high-quality text and graphics output to form feed or friction feed paper. The ImageWriter produces characters in a matrix that is seven dots wide and eight dots high with a separation of one dot between all dots that are printed. At ten characters per inch, the ImageWriter prints up to 120 characters per second or 72 lines per minute. Its standard character set consists of 96 ASCII alpha and numeric symbols and 25 European language characters. Vertical dot spacing is 1/72 of an inch. It can produce from 4.5 to 17 characters per inch and from 72 to 136 characters per line of print.

Paper feeds both forward and reverse. This allows the convenient generation of subscripts and superscripts. Line spacing varies from 1/144 to 99/144 of an inch and can be controlled by commands received from the computer. The maximum line feed rate is ten lines per second at a setting of six lines per inch. Paper width may vary from three to ten inches. Three inches is the normal label stock and ten inches is greater than the normal width of pin-feed stock that produces 8 1/2- by 11- inches pages. The ImageWriter is an 8-bit serial interface device. It supports proportional spacing if the fonts in use are proportional. It can produce high-quality pictures,



Apple Computer's Macintosh is shown here with mouse and detachable keyboard. Peripheral devices and accessories include a numeric keypad, an external disk drive, the Imagewriter printer, a modem, and the Macintosh carrying case.

charts and other graphics output. See Control Characters for Printer, and various entries under Print, Printer and Printing. Apple Computer, Inc.

**Immediate Response to One-character Answers** (without using Enter key). To provide immediate response to a one-character response (Y or N, drive letter, etc.), use INKEY\$ to input the reply. The program can then proceed and process the request without the user having to press Enter after the response. Examples:

10 PRINT ''Make another copy Y/N?'' 20 ANS\$=INKEY\$:IF INKEY\$ = '''' THEN GOTO 20 30 IF ANS\$ = ''Y'' OR ANS\$ = ''y'' then GOTO 1000 40 IF ANS\$ = ''N'' OR ANS\$ = ''n'' THEN GOTO 2000 50 GOTO 10

This technique can be used with a numeric response by applying the VAL function:

20 ANS\$ = INKEY\$: IF INKEY\$ = '''' THEN GOTO 20 30 NUMBER = VAL(ANS\$)

**Inactive Window** Any window on the screen display (Desktop, Microsoft BASIC, Microsoft Chart) that contains dimmed icons or is not on top of a stack of windows. A window becomes active when the pointer is placed inside the window and the mouse button is clicked. If windows are stacked one on top of the other, an inactive window is moved to the top of the stack when it is clicked. It then becomes an active window.

**Index Disk Directory** On each disk Macintosh maintains an index or Directory of all files, which is loaded into memory by the Finder when the disk is inserted in a Macintosh disk drive. The Directory is displayed in a window by the Finder when a disk icon on the Desktop is double-clicked. This window will be displayed for all of the disk icons on the Desktop although some of these disks may have been ejected. As long as the disk icon remains on the screen, although the disk has been ejected, the disk's Directory will be displayed and files may be selected from it. If a file has been selected for opening from an ejected disk, the current disk will be ejected and the ejected disk appear somewhat hollow or ghostly on the screen display. See Finder, Directory, Desktop, Double-clicking.

**Infidel\*** A text adventure game which is a treasure hunt with several good puzzles to solve. Infocom. In UK: Softsel.

**Information Window** The window that is displayed when the Get Info command option is selected from the File Menu in the Finder. See Get Info Option.

Initialize a Disk See Disk, Initialize.

**INKEY\$** A Microsoft BASIC variable which reads a single character from the keyboard. The format is:

```
(stringvariable) = INKEY$
```

INKEY\$ will read only one character, regardless of how many characters are waiting in the keyboard buffer. The returned value is a zero- or one-character string. zero length - indicates that no character is pending at the keyboard. one-character - contains the actual character read from the keyboard.

#### 156 • INPUT

The result of INKEY\$ must be assigned to a string variable before using the character with any Microsoft BASIC statement or function. When INKEY\$ is in use, no characters are displayed on the screen. All characters are passed through to the program except for Command-C, which terminates the program.

If you press Enter in response to INKEY\$, the carriage return character passes through to the program.

**INPUT** A Microsoft BASIC statement which receives input from the keyboard during program execution. The format is:

INPUT[;](''prompt''); ]variable>[,variable>...]

When the program encounters an INPUT statement, it pauses and displays a question mark (?) on the screen to indicate that data is to be typed in. When a "prompt" is included, this string is displayed before the question mark. When you use a comma (,) instead of a semicolon after the <"prompt" string, the question mark is not displayed.

The data entered is stored in the variable or variables declared in the variable list. Each data item typed in must be separated by commas, and the number of data items must match the number of variables in the list. The type of each data item entered must also agree with the type specified by the variable name (string or numeric). Strings entered in response to an INPUT statement do not need to be surrounded by quotation marks unless they contain commas or significant leading or trailing blanks.

If you respond to INPUT with too many or too few items, or with the wrong type of value (string data instead of numeric data), Microsoft BASIC will display a "Redo from start" error message. If a single variable is requested and you do not want to enter any value, press Enter to indicate the default values of 0 for numeric input or null for string input. If more than one variable is requested, pressing Enter will cause a "Redo from start" error message to be displayed (too few items were entered). No input values will be assigned to any variables until an acceptable response is given.

If INPUT is immediately followed by a semicolon, pressing Return to input data does not produce a carriage return/line feed sequence on the screen. The cursor remains on the same line as your response.

**Input** READ data into memory. Memory is any device which can store information and allow it to be retrieved when needed. The Macintosh relies primarily on Random Access Memory (RAM), Read- Only Memory (ROM), disks and hard disks. ROM and RAM together make up the internal or main memory of the Macintosh or any other computer. Data may be read into memory from any of these devices. It may also be read into memory from another computer via a direct connection or a modem.

**INPUT#** A Microsoft BASIC statement which reads data items from a sequential device or file and assigns them to program variables. The format is:

INPUT#(filenum), (variable)[, (variable)...]

(filenum) is the number used when the file was opened for input.

«variable» is the name of a variable that will have an item in the file assigned to it. It can be a string or numeric variable, or an array element.

The sequential file may be located on disk, it may be a sequential data stream from a communications adapter or it may be the keyboard (KYBD:). The type of data

in the file must agree with the type specified by the variable name. No question mark is displayed with INPUT# (unlike INPUT statement).

The data items in the file must appear just as if the data were being typed in as responses to an INPUT statement. For numeric values, leading spaces, carriage returns and line feeds are ignored. The first character encountered (not a space, carriage return or line feed) is assumed to be the start of the number. The number ends with a space, carriage return, line feed or comma.

If Microsoft BASIC is scanning the data for a string item, the leading spaces, carriage returns and line feeds are also ignored. The first character found (not a space, carriage return or line feed) is assumed to be the start of the string item. If this first character is a quotation mark (''), the string item will consist of all characters read between the first and next quotation mark. If the first character of the string is not a quotation mark, the string is an unquoted string; it will end with a comma, carriage return or line feed, or after 255 characters have been read. If end of file is reached when a numeric or string item is being input, the item is cancelled.

INPUT# can also be used with random file processing.

**INPUTS** A Microsoft BASIC function which returns a string of (n) characters, read from the keyboard or from a file number. The format is:

stringvariable> = INPUT\$(<n>[,[#](

Is the number of characters that are to be read from the file.

(filenum) is the file number used on the OPEN statement. If (filenum) is left out, the keyboard is read.

When the keyboard is used for input, no characters will be shown on the screen. All characters (including control characters) are sent through, except Command-C, which is used to interrupt the execution in the INPUT\$ function. When responding to INPUT\$ from the keyboard, you do not have to press Enter.

The INPUT\$ function allows you to read characters from the keyboard which are significant to the Microsoft BASIC program editor. If you want to read these special characters, you should use INPUT\$ or INKEY\$ (not INPUT or LINE INPUT).

For communication files, the INPUT\$ function is preferred over the INPUT# and LINE INPUT# statements, since all ASCII characters may be significant in communications.

**Input/Output Ports** Sockets on the back or front panel of the computer that allow the internal circuits of the computer to be connected to devices that input to or accept data from the computer. I/O ports may handle data in a serial fashion (one bit after another over a single wire) or a parallel fashion (one bit after another over several wires).

The Macintosh back panel has five ports. Facing the back panel, the first port on the left is the mouse port, an input port. It accepts signals and data from the mouse or from other devices such as graphics tablets, digitizer pads and joysticks that are designed to emulate a mouse. The second port from the left is the disk drive port, an input/output port. Data may be carried to or from the computer's circuits by this port. It may handle a single external disk drive and transfers data at a rate of 62.5 kb per second. The third port from the left is a serial I/O port designed to use both the RS-232C and the RS-422 communications hookups and protocols. This particular port is designated as the modem port. Tecmar uses this port to connect the MacDrive hard disk system. The fourth port from the left is also a serial I/O port with the same characteristics as the third port from the left. This is designated as the printer port. The ImageWriter and other serial printers would be connected via this port. The last port on the back panel is the Audio Output port, used to connect the Macintosh to an external sound system or an external speaker. The computer may be

# 158 • Input Statement, Dummy

connected to a high-fidelity amplifier via its AUX connection if you wish to amplify the sound generated by the Macintosh. This port is an output-only port.

There is one port on the front panel of the Macintosh. It is an I/O port located in the lower right-hand corner and is used to connect the Macintosh's keyboard to the computer. This port is also used to connect the optional numeric keypad to the Macintosh. When this keypad is connected to the computer, the keyboard is disconnected from this port and connected to a port on the keypad. See Serial, Parallel, Protocol, RS-232C, RS-422, ImageWriter, Numeric Keypad.

**Input Statement, Dummy** To hold or freeze the screen briefly while the operator using your program reads a message, just write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y

To freeze the screen until the operator is finished, put in a dummy input statement and instruct the operator to press Enter to proceed. The input variable (A\$) need not be used in your program:

1000 INPUT "Press Enter to continue";A\$

Input/Output See Input, Output.

**Insert Characters** To place characters between those already on a line. This could be an omitted letter in a word or an omitted word in a line. This process is described in Edit.

**Insert Line** To place a line between two existing lines in a file (or in internal memory). The inserted line could also go at the very top or bottom of the file. In some cases the very first line to go into a file is also considered an inserted line.

**Insert Page Break Option** Word processing programs such as MacWrite allow the user to force a page break at any point required in the text. When the computer encounters a page break command or marker, it causes the printer to break off printing on the current page and to advance the paper to the top of the next page. MacWrite allows the user to insert page breaks via the Insert Page Break option that may be selected from the Format menu. This selection may be made anywhere in a document as many times as required. When this option is selected, a rectangle fills the screen in the area between the end of the text where the page break was inserted and the top of the next page. This rectangle expands and contracts as characters are added or deleted before the point where the page break was inserted. See Format Menu, Document.

**Insert Ruler Option** MacWrite uses rulers to set tabs, indentation, line spacing, text justification and to provide a reference for cursor location. When MacWrite is booted, a ruler is displayed at the top of the screen display. Additional rulers may be added anywhere in a document as many times as required, and would be inserted in situations where the user needs to set up special tabbing for outlines or tables. They would also be inserted in situations where text justification must be different from the justification elsewhere in the document. Once the ruler has been inserted and the required settings are made, it may be displayed continuously on the screen with all other rulers, or may hide all of the rulers. Rulers are inserted by selecting the Insert Ruler command option from the Format menu on the menu bar, or hidden by

selecting the Hide Rulers command option. See Menu Bar, Selecting, Justify, Line Spacing, Tab, Document.

**Inserting a Disk** Disks are inserted in the Macintosh's internal disk drive or its external disk drive by holding the disk label up, and with the sliding door that protects the read/write slot facing the disk drive slot. Disks should be inserted gently but firmly. When inserted properly, it will drop slightly in the slot and will be locked in by the disk drive mechanism. See Disk Drive, Read/Write Slot, Disk.

**Inserting Text** Text may be inserted in documents created by MacWrite by placing the I-beam pointer at the location in the document where text is to be added, and the mouse button clicked. This causes a vertical bar cursor to be displayed at the insertion point. If the text is to be entered from the keyboard, it should be typed in until the new text is completely entered for that insertion point. When the insertion is completed, the I- beam should be moved to the next location where text will be added. When all required text has been inserted, the document should be saved. If the insertion is to be made from the Clipboard, the insertion point would be selected in the fashion described for inserting text from the keyboard. Once the vertical bar cursor is being displayed, the Paste option may be selected from the Edit menu on the menu bar. This will cause the contents of the Clipboard to be inserted, starting at the location of the vertical bar cursor. See I-beam, Menu Bar, Edit Menu, Insertion Point, Clipboard.

**Insertion Point** The insertion point for text in MacWrite is where additional text is to be added to the document. The user determines this point in the text and marks it by moving the mouse pointer (an I-beam) to the location and then clicking the mouse button. Then a vertical bar cursor replaces the I-beam at the selected point. New text may be added at the location of the vertical bar cursor by typing in the characters and words to be inserted in the text. See I-beam, Vertical Bar Cursor, Document.

**Inside the Macintosh**<sup>+</sup> By Thom Hogan, delves into the Macintosh and its operation. It deals with the hardware that makes the Macintosh the computer that it is. It also discusses the MC68000 microprocessor in depth. The Macintosh disks, ROM and other aspects of the computer are discussed completely. Brady.

**INSTR** A Microsoft BASIC function which searches for the first occurrence of string (y\$) in (x\$) and returns the position at which the match is found. The optional offset (n) sets the position for starting the search in (x\$). The format is:

 $\langle variable \rangle = INSTR([\langle n \rangle, ] \langle x \rangle, y \rangle)$ 

«n» is a numeric expression in the range 1 to 255.

x\$,y\$> This may be any string variable, string expression or string constant. If (n) is greater than LEN(x\$> or (x\$> is null, or if (y\$> cannot be found, INSTR returns 0 (zero). If (y\$> is null, INSTR returns (n) or 1, if (n) is not specified. If (n) is out of range, an "Illegal function call" error is displayed.

**Instructions** A statement that causes a computer to carry out a specific action. Commands differ from instructions in several ways. A command is a complete specification of an action, while instructions must be combined in dozens or hundreds to make a useful program. Commands are acted upon immediately by the computer, while instructions are saved for later execution in a program. Commands are acted on by the basic operating system of the computer, while instructions must first be processed by a particular program, such as the Microsoft BASIC interpreter, a FORTRAN or Pascal Compiler, etc.

# 160 • INT

**INT** A Microsoft BASIC function which returns the largest integer that is less than or equal to (x). The format is:

 $\langle variable \rangle = INT(\infty)$ 

« is any numeric expression.

For example:

PRINT INT(57.97) returns 57. PRINT INT(-4.53) returns -5.

See FIX, CINT.

Integer, Convert To (by Rounding) See CINT.

**Integer Variable (Numeric)** Integer (numeric) variables for whole numbers from -32768 to +32767 end in % or start with a series of letters specified in a DEFINT statement.

Integer numeric variable names must start with a letter, can have up to 40 characters, must not be any reserved words (IF, ON, THEN, GOTO, etc.) or a reserved word followed by a type declaration character (,%,!,#). See Reserved Words for complete list. See Variable Names.

**Integrated Circuit** A complete electronic circuit with multiple components (transistors, diodes, resistors, capacitors, etc.) all constructed on a single, small silicon chip.

**Integrated Software** The trend in software is toward multifunction systems, which integrate several of the major applications: spreadsheets, databases, word processors, communications and graphics. Integration implies the ability to move freely from one application to another and move blocks of data. See Jack 2, Lotus Macintosh Product.

**Integrity of Data** Ensuring that data (or programs) cannot be altered improperly. For example, in a payroll system, steps must be taken to ensure that employees cannot alter their pay rates or hours worked. Data security consists of guaranteeing both data integrity and data secrecy or privacy.

**Interface** The point at which two systems make contact. Most microcomputers have multiple interfaces or "ports," such as a serial port to connect serial devices, a parallel port and possibly TV or monitor ports, power port, joystick ports, etc. Interface is also used to refer to the type of interconnection, with respect to its size or shape (subminiature 25-pin D connector), its mode of function (serial, parallel, etc.) or its electrical characteristics (RS-232, IEEE, RS-422, etc.). For additional interfaces available for the Macintosh, see Candy Apple IEEE-488, AppleLine, Monitor Adaptors.

# Internal Memory See Memory.

**Interpreter** A language translation program. Any programs that run directly on the Macintosh are machine language programs in the actual numeric instruction code of the Macintosh's MC68000 microcomputer chip. Most were originally written by a programmer as text (source) files. The source program contains relatively readable statements in a language such as FORTRAN, COBOL or Microsoft BASIC. These were then translated by a compiler program, producing an object program.

The object program contains the machine language instructions for the Macintosh's MC68000 which correspond to the instructions of the original source program. Microsoft BASIC programs work in this way with a Microsoft BASIC Compiler.

Regular Microsoft BASIC works in a slightly different way. It is a program (in machine language) which uses your Microsoft BASIC program as a guide to tell the computer what to do. It is therefore an interpreter, processing each line of the source program and interpreting what should be done. Since it must reinterpret your source program each time you run it, interpreted Microsoft BASIC can be as much as 100 times slower than compiled Microsoft BASIC.

When you write a Microsoft BASIC program, you have produced a source program in text form. The Microsoft BASIC interpreter, itself a machine language program, uses your source program as a data source of instructions or commands to control its execution.

To speed up a Microsoft BASIC source program by compiling it into a faster machine language program, you will need a Microsoft BASIC Compiler (not supplied with the Macintosh) soon to be available from software houses. To run your Microsoft BASIC Compiler, input the source program you wrote. The Microsoft BASIC Compiler will translate your source program into an executable machine language program.

**Interrupt** A signal to an MPU that an event has occurred requiring attention. The MPU will save enough information to resume the task it is currently working on, then execute a code from an interrupt servicing program. There may be multiple interrupt lines or other ways of distinguishing interrupts, in which case the MPU can tell from which interrupt signal it receives, which event has occurred (vectored interrupts). The MC68000 provides eight types of interrupt. Interrupts are a more efficient way of managing external events (such as a key press at a keyboard) than continually checking to see if any event has occurred (polling).

Interrupt Reset Switch When you unpack your Macintosh, you will find a plastic switch marked Interrupt Reset in one of the boxes. This is called the "Programmer's switch" in the Macintosh manual. It is not installed at the factory, under the theory that no one but a programmer will find it useful or will know how to use the switch. The manual warns that when this switch is used, you could lose information stored in the computer's memory. This switch can be useful to the nonprogrammer as well as the programmer. First, it must be installed properly. This is done by turning off the Macintosh, disconnecting all of the cords attached to the back panel, turning the Macintosh so you have a clear view of the left side of the computer, finding the ventilation slots on the lower portion of the left side, locating the rear portion of the lower three slots (the correct location in these slots is toward the rear of the computer and has no vertical braces within the vent), turning the Macintosh on its side, grasping the switch firmly between your thumb and forefinger with the words "Interrupt Reset" on top and inserting the two flat fingerlike tabs into the second slot from the bottom at the rear of the left side of the computer.

Once the switch has been inserted, press it down firmly with both thumbs. You may have to rock it gently toward the back of the computer then toward the front of the computer to make it lock in place. Once in place, the flat fingerlike projections will contact the Interrupt Reset switch located inside the computer case. Once installed, the computer should be set upright, and the power cord and other cords should be reconnected. The Macintosh can then be turned on again, and the switch can be tested.

The Interrupt switch is used to break the flow of a program and to return the user to the next highest control level. Thus, if you are running a BASIC program and press this switch, the program will stop its operation and will return to the command level of BASIC. The program will still be present in memory. The Reset switch is used to

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stop the operation of the program and the computer. Then it returns the user to a power-on state but everything that was in the computer's memory is lost. You may find a use for either of these switches if a program hangs up and locks you out of the keyboard. You may find the Interrupt switch useful to stop a program and rewrite a line or two.

**Introducing The Apple Macintosh\*** A book written by Edward S. Connolly and Phillip Lieberman, providing a general introduction to the use of the Macintosh. Howard W. Sams Co., Inc.

**Inverse** The normal Macintosh screen display in MacWrite, MacPaint, Microsoft Multiplan and many other applications is a white background with black letters. When certain portions of a document, worksheet, a pull-down menu or an icon are highlighted, the background becomes black and the characters become white. This type of display called "inverse."

**I/O** Input/Output. This abbreviation is used to describe devices, connections or circuits that can accept data from a source external to the computer and send it to an external device from the computer. Input devices provide data to a computer, output devices accept data from a computer and do something with it such as display or print it.

J

J ASCII 74, HEX 4A. j ASCII 106, HEX 6A.

Jack 2<sup>+</sup> An integrated software package for the Macintosh, offering word processing, database management, business graphics and a spreadsheet. Business Solutions, Inc. In UK: P+P micro distributors.

**Justify** To make the edges of a text file line up. Left justification is almost universal in English text. Right justification is usually present in text that has been typeset or processed by a word processor or special typewriter which inserts a variable amount of space between words or letters (proportional spacing).

# K

**K** ASCII 75, HEX 4B. **k** ASCII 107, HEX 6B.

**K** Measurement of bytes. Storage in computer memory. Byte is a label for storage to to hold one character (letter, digit, etc.) in computer memory, internal or external. Byte is abbreviated B, or in thousands KB, or simply K. Actually, 1K = 1024 because this number is an even power of 2. Macintosh has 128K (or 128KB) of internal memory, or 128,000 bytes (to be precise,  $128K = 128 \times 1024 = 131,072$  bytes). The Macintosh also has 64K or internal memory space devoted to ROM and to the User Interface Toolbox.

KB A Kilo-Byte. Measurement of bytes in thousands. See K.

**Kearsarge SX-70 Switcher/Spooler\*** A multichannel switcher/spooler that can serve up to four computers and two printers at once. Switching is software controlled and a buffer is included. Its memory capacity may be 8K, 32K, 64K, 128K or 384K. An expansion board may be installed to expand buffer memory to 512K. Kearsarge Industries.

**Keyboard** The computer keyboard is either a built-in or detached set of typewriterlike keys connected to the computer by a connector cord. The keyboard is an input device that allows the user to communicate commands or responses to the computer. The Macintosh keyboard is a detached keyboard connected to the front panel of the computer via a plug similar to the plug that connects your telephone to the wall. It is a sturdy, full-travel keyboard with raised keys including character keys (letters, numbers and special characters) and special keys (Shift, Caps Lock, Option, Command, Enter, Return, Backspace and Tab).

**Keyboard (ECHO Function).** ECHO means to send characters keyed on the keyboard to the screen for a visual confirmation of what has been typed. Since there is no hardwired connection between the keyboard and the screen, the keyboard simply enters characters into memory, then the ROM copies the characters from memory to the screen, creating a duplication or "echo" of what was keyed.

Keyboard, Read Data from See INKEY\$, INPUT, LINE INPUT.

**Key Caps** Key Caps is one of the Macintosh desk accessories available from the Apple menu in the upper left-hand corner of the screen display. It is selected by placing the pointer on the Apple, pressing the mouse button, dragging the highlight to the words "Key Caps" on the pull-down menu and releasing the mouse button. A window displays the keyboard and a data entry rectangle appears on the screen. This display is intended to show the user the effect of using the Shift key, the Option key and the Caps Lock key. Characters are entered in the rectangle at the top of the display by pointing at the character on the keyboard and clicking the mouse button or by typing the character from the keyboard. Once an entry has been made in the

rectangle, it may be cut or copied to the Clipboard and pasted into another document or application.



Fig. K1 The Key Caps display with the Shift key pressed.

**Keys (Rate of Repetition)** The Macintosh Control Panel available from the Apple menu allows the user to adjust the rate at which a key repeats when the key is held down. The repeat speed is adjusted by selecting a number from the upper panel of numbers next to the keyboard icon on the Control Panel. There is a turtle on the left and a rabbit on the right. If a lower number is selected, the repeat key is slow; if a higher number is selected, it is faster. See Control Panel, Icon, Clicking.

**Keystroke Data Base\*** A database management program for the Mainctosh. Brock Software Products. In UK: P+P micro distributors.

**Keystroke Report Base\*** A database report generator for the Macintosh. Brock Software Products. In UK: P+P micro distributors.

**Keyword** A word with special significance to a program. It must not be misspelled or used for other purposes, or erroneous results may occur.

KILL A Microsoft BASIC command used to delete a file from a disk. The format is:

KILL (filespec)

(filespec) is a valid file specification. The device must be a disk drive. If the device name is left out, the internal drive is used.

You can use KILL for all types of disk files. The name must include the extension, if one exists. For example, you may save a Microsoft BASIC program using the command:

SAVE ''SAMPLE''

If a KILL statement is given for a file that is already open, a "File already open" error occurs. For example:

100 KILL ''SAMPLE''

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will delete the file named "SAMPLE" on the disk.

**Kilobyte** One thousand bytes (technically, 1024 bytes). Kilobyte is abreviated K or k. The Macintosh has 128k or 128 kilobytes of internal RAM storage.

**Kleen Line Conditioners\*** Portable power regulators and air filters used with the Macintosh. They are designed to handle 250-, 500-, 1000- and 2000-watt loads. They provide voltage spike suppression, transformer surge suppression, wide band prefiltering and isolated winding line noise suppression. Electronic Specialists, Inc.

**KYBD** An abbreviation used as the device name for the console. Example:

10 OPEN ''KYBD:'' FOR INPUT AS #1

# L

L ASCII 76, HEX 4C. I ASCII 108, HEX 6C.

**Largest Line Number** In Microsoft BASIC, the largest possible line number for a program is 65529.

**Lasso** The lasso is the upper left-hand icon on the drawing tool palette running along the left-hand side of the MacPaint screen display. When selected, the lasso can be used to draw a dotted line around any figure or shape on the screen. As soon as the image or object has been completely surrounded, its border will begin to flash. This means that the object can be cut, copied, pasted, moved about the screen, erased and copied to another place on the screen. Once an object has been lassoed, it can be dealt with by using the Edit menu on the menu bar to Cut the object to the Clipboard, to Copy the object to the Clipboard, to Clear this object from the screen display and to Paste this object into another document. When the lasso is used, just the object surrounded by the dotted line will be affected by any action taken. However, when the dotted rectangle is used, everything within the rectangle including any background will be affected.

A lassoed object may be manipulated with a number of keys from the keyboard. It may be moved to another point on the screen by placing the pointer inside the object, pressing the mouse button, dragging it to a new location and releasing the mouse button. A copy may be made of the object by placing the pointer inside the object and pressing the Option key while the object is dragged to a new location on the screen. Repeating copies may be made by placing the pointer inside the object and pressing the Command key and the Option key while the object is dragged around the screen. When one image or object is placed on top of another after the lasso has been used, the background object will show through any spaces in the lassoed object. See Edit Menu, Menu Bar, Option Key, Command Key.

**LCOPY** A Microsoft BASIC statement that dumps the screen image to the Macintosh printer. The format is:

# LCOPY

The printer must be on-line for this statement to work.

**Left Alignment** Most word processors allow text to be aligned or justified in a variety of ways. One option is left justification (alignment). This option justifies all text on the left margin while text along the right margin remains ragged. This option is exercised in MacWrite by placing the mouse pointer inside the left alignment box in the ruler at the top of a MacWrite screen when the ruler is being displayed and then clicking the mouse button. It may also be used to justify the text under extra rulers that are added from time to time to change the nature of the display or the output in sections of a document. See Ruler, Document.



File Edit Search Format Font Style

Fig. L1 A MacWrite screen display with the left alignment box within the ruler highlighted.

Left Alignment Box The Left Alignment box is one of four boxes in the lower right portion of the ruler in MacWrite. Each of these four boxes is used to justify text in a particular fashion within a MacWrite document. The leftmost of these boxes is called the "Left Alignment box." When this box is clicked, the left-hand margin of the document is straight and the right margin is ragged. This justification is retained unless it is changed by clicking another alignment box or until another ruler is inserted and another alignment box is clicked in the new ruler. See Ruler.

Left, Justify See Left Alignment, Justify.

Left, Justify a String See LSET.

Left Margin Marker Most word processing programs that display a "what you see is what you get" format, or nearly that format, also display the location of the right and left margins. MacWrite uses a ruler across the top of the screen display. A small, black triangle with a small black arrow immediately under it marks a margin in MacWrite. The margin may be changed by placing the pointer on the double triangle symbol and dragging it to a new location with the mouse.

LEFT\$ A Microsoft BASIC function which returns the leftmost (n) characters of (x\$). The format is:

 $\langle stringvariable \rangle = LEFT$(\langle x \rangle, \langle n \rangle)$ 

(x\$) may be any string expression. m is a numeric expression which must be in the range 0 to 255. It specifies the number of characters you want in the result.

If (n) is larger than LEN( $\alpha$ \$), the entire string  $\alpha$ \$) is returned. IF (n)=0 a string of zero length is returned.

See also LEN, MID\$, RIGHT\$.



Fig. L2 The MacWrite ruler with the left margin marker at the pointer.

**LEN** A Microsoft BASIC function which returns the number of characters in (x\$). The format is:

 $\langle variable \rangle = LEN(\langle x \rangle)$ 

x\$> may be any string expression.
 The count returned includes blanks and unprintable characters.

Length of File See LOC, LOF

**Length of Line** To set to 80 characters per line (for example), return Microsoft BASIC statement:

WIDTH "'LPT1:",80

This command sets the output of a printer at 80 characters per line. It may also be used to set the line width on screen displays and on communications devices by substituting SCRN or COM1 for LPT1. Notice that this is a deferred command. It affects the next OPEN statement, not any file that is currently open. See WIDTH.

Length of String See LEN, Variable.

# 170 • LET

**LET** A Microsoft BASIC statement which assigns the value of an expression to a variable. The format is:

[LET] «variable»=«expression»

«variable» is the name of the variable or array element which is to receive a value. It may be a string or numeric variable or array element.

«expression» This is the expression whose value will be assigned to «variable». The type of expression (string or numeric) must match the type of the variable, or a "Type mismatch" error will be displayed.

LET is not necessary in Microsoft BASIC programs when assigning values to variables. You may simply use the format:

‹variable› = «expression»

**LINE** A Microsoft BASIC statement used to draw a line or number of lines on the screen. It is used in the graphics mode only. The format is:

LINE [(x1,y1)]-(x2,y2)[,[colon][,B[F]]]

x1,y1>,x2,y2> are the starting and ending coordinates in either absolute or relative form.

(color) is the number of the color in which the line should be drawn. If h = 30, the line color will be white. If it is any other number, the color will be black.

LINE -x2,y2>

will draw a line from the last point referenced to the point (x2,y2) in the foreground color.

**Line, Blank** An LPRINT statement with no other specifications will print a blank line (that is, feed the paper up one line and return to left margin).

**Line Editor** A line editor is a program or text editor that deals with one line at a time. Line editors are not usually as powerful as full screen editors. Edit means to change the contents of a file, including both program and data files.

Line, End Current While a program is being entered, pressing Enter or Return ends the current line, sends the line to the requesting program and puts the cursor at the start of the next line. While lines of text are being entered on the screen in a word processor, a line is ended and the cursor is moved to the left-hand side of the screen by pressing the Return key only at logical break points in the text. Otherwise, the word wrap feature automatically moves the cursor to the left margin at the end of a word.

**Line Feed** To advance one line on the printer (space up) without carriage return, enter Microsoft BASIC statement: LPRINT CHR\$(10) or use the "line feed" button (LF) on printer.

Entering just LPRINT gives a line feed, both a space up one line (line feed) and a Return to left margin (carriage return).

**Line Icon** One of the options available to the MacPaint user is the ability to anchor one end of a line on the screen and to draw the line to another point on the screen. This option is selected by clicking the line icon on the drawing tool palette on the left-hand side of the MacPaint screen. When clicked, a single line is drawn by placing the pointer at the origin point of the line, clicking the mouse button, dragging the pointer to the termination point of the line and releasing the mouse button. See Drawing Tools, Dragging.

**LINE INPUT** A Microsoft BASIC statement which reads an entire line of up to 254 characters from the keyboard into a string variable, ignoring delimiters. The format is:

LINE INPUT[;] [{''prompt''>;] stringvariable>

('prompt') is a string constant displayed on the screen before input is accepted. A question mark is not printed unless you include it with the prompt string.

stringvariable is the name of the string variable or array element to which the line will be assigned. All input from the end of the prompt to the Enter is assigned to stringvariable and trailing blanks are ignored.

If LINE INPUT is immediately followed by a semicolon, pressing return to end the input line will not produce a carriage return/line feed sequence on the screen. The cursor will remain on the same line as your response.

Pressing Command-C allows you to exit from LINE INPUT and Microsoft BASIC returns you to command level. You may then enter CONT to continue execution at the LINE INPUT.

**LINE INPUT#** A Microsoft BASIC statement which reads an entire line from a sequential file into a string variable, ignoring delimiters. The format is:

LINE INPUT#(filenum), stringvariable>

(filenum) is the number under which the file was opened.

«stringvariable» is the name of a string variable or array element to which the line will be assigned.

LINE INPUT# will read all characters in the sequential file up to a carriage return. The carriage return/line feed sequence is skipped over and the next LINE INPUT# will read all characters up to the next carriage return. The line feed/carriage return characters are returned as part of the string.

LINE INPUT# can be useful if each line of a file has been separated into fields, or if a Microsoft BASIC program saved in ASCII mode is being read as data by another program. LINE INPUT# can also be used for random files.

**Line Length** To set to 80 characters per line (for example), enter Microsoft BASIC statement:

WIDTH ''LPT1:'',80

**Line Number** The largest possible line number for a Microsoft BASIC program is 65529.

Line Number Where Error Occurred See ERL.

Line Numbers Generated Automatically in Microsoft BASIC See AUTO.

Line Numbers Renumber See RENUM.

**Line Spacing** Line spacing is adjustable in most word processing programs. Some require the selection of line spacing from a special print menu. Others require that the line spacing be set to single, double or triple spacing by setting up a special command line at the beginning of each document. MacWrite allows the adjustment

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of line spacing within a document each time a ruler is added by the user. It may also be set on the first ruler in the document. Line spacing is set in single space, 1-1/2 space and double space in MacWrite by clicking one of the three line spacing icons on the lower line of the ruler. See Ruler, Document.



Fig. L3 The MacWrite ruler with the single space line spacing icon indicated by the pointer.

Lines Use LIST to display all program lines on the screen. The format is:

LIST

To display program lines from start up to line 100 enter:

#### LIST -100

To display program lines from line 100 to end enter:

LIST 100-

To display program lines from line 100 to line 200 enter:

#### LIST 100-200

To display program line 100 only enter:

#### **LIST 100**

. All program and line lists are displayed in the List window. The user may scroll through the list by using the scroll bars on the right-hand side of the List window. See List for a discussion of the List window.
Lines Per Inch (8) To set the ImageWriter for this line spacing, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"B"

See Control Characters for Printer.

**Lines Per Inch (6)** To set the ImageWriter for this line spacing, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"A"

See Control Characters for Printer.

Lines, Program To start a new program, type:

NEW

This completely erases all lines now in Microsoft BASIC's memory. If it is something you want to keep and have not already got on disk, SAVE it first. If you do not erase the program in memory before starting on another, you will usually wind up with an unusable combination of lines from your old and new programs.

Link Command One helpful characteristic of Microsoft Multiplan is the ability of the program to link portions of one worksheet to another. For the Macintosh, portions of one or more worksheets may be named and then linked to one or more other worksheets. Each of the links is accomplished by first naming the portion of the worksheet to be saved, saving the same portion to the Clipboard, saving the origin worksheet, loading the worksheet to which the portion of the origin worksheet is to be linked and using the Name command from the Edit menu to signify the named portion to be linked from the origin sheet, highlighting the area of the destination worksheet to signify where the new information will be placed and then using the Paste and Link command from the Edit menu to affect the link. See Name Command, Paste And Link Option, Worksheet, Clipboard.

**Link Module\*** A program that links MicroPlan to mainframes, on-line databases, timesharing services and files from other applications programs. It will also allow MicroPlan files to be used by the applications programs to which it is linked. Chang Labs.

**Link Time** The point in the processing of a program with a language translator (Compiler or Assembler) when the program is tailored for a specific memory location. This occurs after compiling (compile time) but before execution (execution time). Some small systems do not require linking.

**Lisa\*** The computer that preceded the Macintosh in the Apple 32-bit computer family, which introduced the desktop display, pull-down menus and mouse operations. Many of the applications programs available for the Macintosh were first available for the Lisa in versions similar to those that operate on the Macintosh. The Lisa provides an environment for Macintosh software to be developed. Most of the tools available from Apple Computer Inc. for developing Macintosh software will only operate on the Lisa. Three versions of the Lisa combine Macintosh and Lisa features: the Lisa 2 that uses the Sony 3-1/2-inch microfloppy disk drive that is used by the Macintosh; the Lisa 2 has a minimum of 512K of RAM installed, which may be expanded considerably; the Lisa 2/5 uses the same disk drive, has more memory



Apple Computer's new Lisa 2 (left) and Macintosh are part of an expanded family of compatible products called the Apple 32 Supermicro System. Products in the family incorporate Lisa Technology, 32-bit microprocessors, high resolution bit-mapped graphics and mouse pointing devices, and all run Macintosh software.

than the Macintosh and also has a five megabyte hard disk drive. The Lisa 2/10 is similar to the Lisa 2 and Lisa 2/5 except it has a ten megabyte hard disk system installed. MacWorks allows these Lisas to run Macintosh software. Apple Computer, Inc.

**LISP** A programming language oriented toward symbols in the way that other languages are oriented toward numbers. The type of object it handles best is information whose structure cannot be completely specified in advance. LISP permits the building of intermediate structures and the discarding of them without causing the user any worries about how to find and later reuse the space necessary for their storage. The syntax of LISP is simple and elegantly defined. The natural method of building programs in LISP by function composition encourages good programming style and facilitates modular programming.

**LIST** A Microsoft BASIC command which displays the program currently in computer memory, on the screen or other specified device. The format is:

LIST [dine1>][-[dine2>]], dilespec>

dine1>dine2> are valid line numbers in the range 0 to 65529. dine1> is the first line to be listed and dine2> is the last. A period (.) in place of either line number indicates the current line number.

(filespec) is a string expression naming the output file. If (filespec) is omitted, the specified lines are listed on the screen.

You may use Command-. to interrupt any listing to the printer. You can list an entire program simply by entering LIST. The program will be displayed in sections in the List window. The contents of this window not currently visible may be viewed by using the scroll bars on the right-hand side or on the bottom of the window. Up to three List windows may be displayed at the same time.

Three options are available when using the dash (-):

1. If you declare only

dine1> -

that line and all higher-numbered lines will be listed.

2. If you declare only

- dine2>

all lines from the beginning of the program through (line2) are listed.

3. If you declare both line numbers

dine1> - dine2>

all lines from dine1> through dine2>, inclusive, are listed.

For example:

LIST 100," SCRN:"

will list line 100 on the screen.

LIST 200-300,"LPT1:"

will list lines 100 through 200, inclusive, on the printer.

Press Command-. to freeze the list for reading while it is being displayed.

When you list to a file on a disk, the specified part of the program is saved in ASCII format. This file may later be used with MERGE.

## List All Files on A Disk See File.

List Window When the LIST command is used in Microsoft BASIC, the program lines are displayed inside of a special window called the "List window." It is similar to the Directory window as it has a title bar used to move the window around the screen display, a close box in the upper left-hand corner, scroll bars on the right-

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hand side and on the bottom and a size box in the lower right-hand corner. When the List window is displayed in Microsoft BASIC, a Command window is also displayed along the bottom of the screen. The List window will display a listing of the program currently in the computer's memory. It can be invoked by typing LIST in the Command window followed by pressing the Return key, or by using the List command from the Control menu on the menu bar. See Title Bar, Menu Bar, Close Box, Scroll Bar, Command Window.

**LLIST** A Microsoft BASIC command which displays all specified parts of the program currently in computer memory on the printer (LPT1:). This format is:

LLIST (line1)(-line2)

(line1)(-line2) refers to the range of line numbers to be listed.

Microsoft BASIC will always return to command level after LLIST is executed.

**LOAD** A Microsoft BASIC command which takes a program from the specified device and places it into computer memory. It can also run the program automatically. The format is:

LOAD [dilespecy][,R]

(filespec) is a string expression for naming the file.

R specifies that the program is to be run automatically, after it has been loaded. The LOAD command must be typed into the Command window at the bottom of the Microsoft BASIC screen display.

LOAD removes all variables and program lines currently in computer memory and closes all open files. If (,R) is omitted, Microsoft BASIC returns to direct mode after the program has been loaded. If the R option is implemented with LOAD, the program is run after it is loaded. In this case all open data files are kept open. In this way LOAD with the R option may be used to chain several programs or segments of the same program. Information may be passed between the programs using data files.

LOAD filespec, R is the same as RUN filespec, R

A program may also be loaded by clicking the program's icon in the Directory window and using the Open command from the menu bar of the Finder. This causes the program to Load and Run. The Open command from the File menu on the menu bar of Microsoft BASIC may also be used but a dialog box will request the name of the program to be loaded. When this method or the method outlined above using the Command window is used, the program is loaded into the computer's memory, but it is not automatically RUN. To RUN it, you must type RUN followed by Return in the Command window or use the Run command from the Control menu on the menu bar. See Directory Window, Menu Bar, Finder, Dialog Box, Run.

Load Module A file containing an object code ready to load into memory.

**Load Time** The point in the processing of a program when all translation and linking are completed and the program is loaded from disk or tape into memory for execution.

**LOC** Microsoft BASIC function which returns the current position in the file. The format is:

#### ‹variable› = LOC((filenum))

(filenum) is the file number used when the file was opened.

When processing random files, LOC returns the record number of the last record read or written to a random file.

When processing sequential files, LOC returns the number of records read from or written to the file since it was opened. A record is a 128-byte block of data. When a file is opened for sequential input, Microsoft BASIC reads the first sector of the file, so LOC will return a 1 even before any input from the file.

For a communications file, LOC will return the number of characters in the input buffer waiting to be read. The default size for the input buffer is 256 characters, but you can change this with the /C: option on the Microsoft BASIC command. If there are more than 255 characters in the buffer, LOC returns 255. Since a string is limited to 255 characters, this practical limit alleviates the need to test for string size before reading data into it. If fewer than 255 characters remain in the buffer, LOC returns the actual count. For example:

#### 400 IF LOC(1)>100 THEN STOP

stops the program if you have gone past the 100th record in the file.

## Location of Cursor See POS.

**Locked-up Keyboard** A situation where the computer does not respond to key presses. There are three methods of recovering from a locked-up keyboard on the Macintosh. One method is to turn off the computer with the power switch and then turn it on again. This method will cause the data in memory to be lost and will not eject a disk that is still in a disk drive. It you wish to eject a disk and recover at the same time, you would press the mouse button, turn the power off and on again. This will clear the memory and eject the disk. The final method of restarting from a locked keyboard is to press the RESET switch you installed on the lower rear portion of the left-hand side of the computer case. See Mouse Button, Reset.

**Locking a Disk** A disk is "locked" when it has been write-protected. This measure ensures that the contents of a disk are preserved from being written over by other data from a computer. Macintosh disks are locked by sliding a tab (located in the upper right-hand corner of a disk) toward the centerline of the disk. When moved in this fashion, a hole is revealed in the corner of the disk. The computer senses the hole and will not write data to such a disk. See Disk, Write-protect.

**Locking a File** Files or documents on a disk may be locked. When a file is locked, it may not be erased or renamed until it is unlocked. Files are locked and unlocked by first selecting the file or document from the Directory display, by placing the pointer on the file icon or the file name and clicking the mouse button once. Next, the Get Info command option must be selected from the File menu on the menu bar, causing a window to be displayed on the screen that contains information about the file. The lower portion of this window contains a data entry rectangle. Just above this rectangle is a box marked "Locked." If there is an "X" in this box, the file is locked. If there is no "X," it is unlocked. A file may be locked or unlocked by placing the mouse pointer on the box and clicking the mouse button. See Directory, File Icon, Get Info Option, Menu Bar.

**LOF** A Microsoft BASIC function which returns the number of bytes made available to a file. The format is:

# 178 • LOG

 $\langle variable \rangle = LOF(\langle filenum \rangle)$ 

(filenum) is the file number used when the file was opened.

LOF will return a multiple of 128 for disk files created by Microsoft BASIC. For example, if the actual data in the file is 129 bytes, the number 256 will be returned. For disk files created outside Microsoft BASIC (for example, using EDLIN), LOF returns the actual number of bytes allocated to the file.

For communications, LOF will return the amount of free space in the input buffer, which is (size)-LOC(filenum), where (size) is the size of the communications buffer (which defaults to 256 but may be changed with the /C: option on the Microsoft BASIC command). LOF may be used to determine when the input buffer is getting full.

**LOG** A Microsoft BASIC function which returns the natural logarithm of  $\infty$  (log to the base (e)). The format is:

 $\langle variable \rangle = LOG(\infty)$ 

« must be a numeric expression which is greater than zero.

**Log of Screen Displays on Printer** Pressing Shift-Command-4 with the Caps Lock key in the down position and the printer on will print whatever is displayed on the screen. This creates an ongoing printed log of everything you do on the Macintosh.

Logo See Macintosh Logo.

Loop Part of a program that is executed many times. See FOR...NEXT, Delay Loop.

**Loop-back** Loop-back (ECHO) is used to test the circuits of an input/output device by "looping" whatever is sent out back into the computer as if it were input. In this way the circuits inside the computer are tested in isolation from the circuits in the external device (and vice-versa) to help isolate a fault.

**Lotus Macintosh Product**<sup>•</sup> A step above the original Lotus 1-2-3 which combined an electronic spreadsheet, a database manager and a business graphics program into an integrated software package. The Lotus Macintosh Product integrates word processing, electronic spreadsheet, information management, graphics and telecommunications. Lotus Development Corporation.

**LPOS** A Microsoft BASIC function which will return the current position of the print head within the printer buffer for LPT1:. The format is:

 $\langle variable \rangle = LPOS(\langle n \rangle)$ 

(n) is a numeric expression which indicates which printer is being tested. The LPOS function does not necessarily give the physical position of the print head on the printer.

**LPRINT** To advance one line on the printer (space up) without carriage return, enter Microsoft BASIC statement:

LPRINT CHR\$(27);CHR\$(102)

or use "line feed" button (LF) on printer.

Entering just LPRINT gives a line feed, both a space up one line (line feed) and a Return to left margin (carriage return).

LPRINT and LPRINT USING Microsoft BASIC statements used to format and print data. The formats are:

LPRINT (dist of expressions)] LPRINT USING (stringvariable); dist of expressions)

dist of expressions is a list of the numeric and/or string expressions to be printed. The expressions have to be separated by commas or semicolons.

stringvariable is a string constant or variable which defines the format to be used for printing. Refer to PRINT USING.

LPRINT and LPRINT USING are similar to PRINT and PRINT USING, except the output goes to the printer.

**LPRINT (Double Comma (,,) Space in Print Line.)** To leave space on the print line between items, put an extra comma (,,) in the print list. Enter Microsoft BASIC statement:

LPRINT A,,B

This would print A in print zone 1, nothing in print zone 2 and put B in print zone 3. Print zones may be defined with the WIDTH statement. See also Print Zones. Also see Print Line (Spacing).

**LPRINT (Normal Size Print)** To return to normal ten character per inch print size, turn off all nonstandard print options. See Control Characters for Printer for complete instructions and examples.

**LPRINT (Page Length)** To set page length (for example) to 55 lines per page, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"C";"55"

**LPRINT (Print Zone)** Each group of fourteen spaces across the print line, as defined by the WIDTH statement, is called a "print zone." A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without even a single space between them. See also Print Line (Spacing).

LPRINT (Set Line Length with WIDTH Command) To set the line length on the printer to 80 characters per line (for example) enter Microsoft BASIC statement: WIDTH "LPT1:",80

**LPRINT (Spacing)** To get one or more spaces between fields printed by your Microsoft BASIC programs, use a literal of spaces like: " ". To get several spaces between the printed values of A\$ and B\$ use:

LPRINT A\$;" ";B\$

See also Print Zones.

# 180 • LPRINT (To Get a Blank Line on Printer)

**LPRINT (To Get a Blank Line on Printer)** An LPRINT statement with no other specifications will print a blank line (feed the paper up one line and return to left margin).

**LPRINT (6 Lines Per Inch)** To set for this line spacing on the printer, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"A"

See Control Characters for Printer for more information and examples.

**LPRINT (8 Lines Per Inch)** To set for this line spacing on the printer, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"B"

See Control Characters for Printer for more information and examples.

LPT1: Stands for printer used for output.

LRC Longitudinal Redundancy Check. See CRC.

LSB Least Significant Bit.

**LSET and RSET** Microsoft BASIC statements which will move data into a random file buffer (in preparation for a PUT (file) statement). The format is:

LSET (stringvariable) =  $\langle x \rangle$ 

RSET (stringvariable) = (x\$)

(stringvariable) is the name of a variable that was defined in a FIELD statement.
 (x\$) is a string expression for the information to be placed into the field identified by (stringvariable).

If x requires fewer bytes than were specified for (stringvariable) in the FIELD statement, LSET left-justifies the string in the field, and RSET right-justifies the string. Spaces are placed in the extra positions. If x is longer than (stringvariable), characters are stripped from the right.

Numeric values must be converted to strings before they are LSET or RSET. Refer also to MKI\$, MKS\$, MKD\$.

LSET or RSET may be used with a string variable not defined in a FIELD statement to left-justify or right-justify a string in a given field. For example:

100 Q\$=SPACE\$(15) 110 RSET Q\$=J\$

right-justifies the string J\$ in a 15-character field. You could make use of this in formatting printed output.



M ASCII 77, HEX 4D. m ASCII 109, HEX 6D.

**MacAnimation**<sup>•</sup> A utility program that assists the user in the animation of Microsoft BASIC programs. The package is inexpensive. It contains a disk and an instruction book. Microsoft BASIC is required to use this program. Integrated Systems. In UK: P+P micro distributors.

**MacBag\*** A bag designed to carry a Macintosh, the keyboard, the mouse, paper, manuals and accessories. There is room for an external disk drive and a modem. It can be carried with a shoulder sling, or like a suitcase. It uses masonite for its strength and structure and high-density foam to absorb shocks. MacPacks. In UK: P+P micro distributors.

**MacBASIC Programmer's Reference Manual\*** A book written by Scott Kamins that provides a detailed reference to Macintosh BASIC (MacBASIC). It discusses each keyword and command set in the language and contains many examples of working MacBASIC programs. Hayden Book Company.

**MacBASIC:** Programming Power<sup>+</sup> A book by Scott Kamins that deals with writing programs for the Macintosh in Macintosh BASIC (MacBASIC). Mr. Kamins leads the reader through setting up and using data files, generating reports, creating windows and a variety of other Macintosh uses. It also provides a great deal of information about accessing the User Interface Toolbox. Hayden Book Company.

**MacBASIC (Macintosh BASIC)\*** The name given to the version of BASIC that is being released for the Macintosh by Apple Computer, Inc. This version of BASIC does not require line numbers. Instead, parts of the program are identified and acted upon as distinctive labels. It is semicompiled. This means that each program line is passed to a B-code generator that compiles the line. It accepts entry and displays listings in both upper case and lower case characters. It does, however, treat both character cases as upper case. More than one program can be run at a time by using Output windows to display each program that is being run. Program listings are also displayed in windows that look very much like the List window in Microsoft BASIC.

Macintosh BASIC relies upon the tools that are available in the User Interface Toolbox. It also makes use of the Clipboard, a full screen editor, and the desk accessories. The menu bar for Macintosh BASIC contains menus called Edit, Search, Program and Operate. It also contains the Apple menu. Macintosh BASIC programs can be saved as source code (ASCII text version) or as compiled B-code versions. Programs saved as B-code may only be executed. They cannot be listed. Source code programs can be listed, edited and executed. Files that are generated by Macintosh BASIC will either be sequential files, stream files or relative files. A sequential file is one where data is accessed one character at a time starting at the beginning of the file and ending at the end of the file. A stream file is a sequential file for binary

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format data. A relative file is a random access file that looks for records instead of characters. See List Window, Output Window, Menu Bar. Apple Computer, Inc.

**MAC Book: Using Your Macintosh Computer, The**\* By William O. Jones, Jr. A user-friendly book, which is attractively presented. It explains computer concepts and terminology, and discusses programming in BASIC and Pascal. CBS Computer Books.

**MACC and MACC-4\*** Power panels that may be used with the Macintosh and other computers. These devices provide additional sockets to plug in power cords from computers and their accessories. They also provide surge protection which insulates a computer and its accessories from rapid rises and drops in electrical power. The MACC can be used to plug in eight devices. The MACC-4 can be used for four devices. Both units are attractive enough to sit on the top of a desk or a computer table. They provide a convenient means of getting electrical power to a computer and its peripherals. Alpha Delta Communications, Inc.

**Maccessories\*** "Maccessories" is the name given to a collection of products sold by Kensington Microware for use with the Macintosh. The products released in this line will consist of a dust cover, a swivel, a surge suppressor, a portable modem, a disk case, a disk pocket, a printer buffer, a printer stand, a cleaning kit and a control center. Kensington Microware.

**Maccessories Disk Case**<sup>•</sup> An attractive plastic case that will hold 36 Macintosh disks. Five dividers are used to separate and classify disks. Kensington Microware. In UK: P+P micro distributors.

**Maccessories Printer Buffer**<sup>+</sup> A memory buffer that may be connected between the Macintosh and the ImageWriter. Kensington Microware. In UK: P+P micro distributors.

**Maccessories Printer Stand**<sup>•</sup> A collapsible stand for the Imagewriter. The printer is placed on top of the stand and paper is stacked underneath to be fed to the printer. Kensington Microware. In UK: P+P micro distributors.

**MacCover**<sup>+</sup> MacCover is a vinyl, cloth-lined dust cover for a Macintosh, the keyboard, the mouse and an ImageWriter printer. MacPacks. In UK: P+P micro distributors.

**Mac Disk**<sup>•</sup> A hard disk data storage system for the Macintosh computer. It can provide from 5 megabytes to 40 megabytes of data storage. Each unit is supplied with connecting cables, adaptors and software required to operate the system. Davong Systems. In UK: P+P micro distributors.

**MacDraw**<sup>•</sup> A drawing program designed for artists, architects, engineers, draftsmen and similar professionals in the graphic arts. The program is similar to MacPaint, but may display rulers, measure the length of lines and display object dimensions, smooth curves, display grid lines that are independent of the objects drawn and provide the serious draftsman with other more powerful tools than those provided by MacPaint. This program allows 90-degree rotation of an object or an image. It uses a vertical pattern menu instead of the horizontal pattern menu used by MacPaint. This menu is only displayed when it is required by the user, is more efficient for the mouse user and provides more space for screen display. Apple Computer, Inc. Apple (UK) Ltd.



File Edit Type Font Layout Arrange Fill Lines Pen

Mac Drive\* Mac Drive is the name given to a 5-megabyte capacity hard disk drive that is sold by Tecmar, Inc. This hard disk system plugs into the modem port on the back panel of the Macintosh. The hard disk plugs into a wall socket and the Macintosh power cord is then plugged into a socket on the back panel of the hard disk drive. The unit itself is about as wide and deep as a Macintosh, and a little less than half as high. It matches the color of the Macintosh case. The media used in this system is a 5-megabyte capacity cartridge that may be removed when the Mac Drive has been ejected and the power has been turned off.

The system includes a system disk with a special system folder and finder, a power cord, a connector cable, the hard disk drive and a 5-megabyte cartridge. Another modem port is provided on the back panel of the hard disk drive to ensure that the user has the capability of using a modem without disconnecting the printer or the hard disk drive from the Macintosh. The Mac Drive is easy to install and use. As the directory for the Mac Drive fills up with programs, documents and applications, the Finder's directory which is in RAM also fills up. As the memory set aside by the Finder for disk icons and directories fills up, the Finder is limited to the number of disk icons that can be displayed on the Desktop at the same time. This situation might be improved by organizing the files, programs and documents in the Mac Drive Desktop into file folders. This practice is also recommended as the Mac Drive Desktop fills up. The same situation exists with other hard disk systems.

Hard disk systems such as the Mac Drive have a particular value to users who use programs that are interactive with disk to write to, and read from, files. Such systems are also valuable to anyone with a large collection of programs, files, documents and applications. Speed of access and capacity are the most important features of hard disk systems. Tecmar Inc. In UK: P+P micro distributors.

Fig. M1 The MacDraw screen display.

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**MacEdge**<sup>•</sup> An educational package to improve children's reading and mathematical skills. It teaches concepts and leads children through a subject, step-by-step. Sound, graphics and game formats are used to make learning an appealing process. The mouse is used extensively in vocabulary programs. Think Educational Software. In UK: Softsel.

**MacForth\*** An interactive development system for Macintosh programs. This development system uses powerful trace and debug functions to assist the developer. It can access most of the Macintosh User Interface Toolbox. The system includes the disk tutorial *Going Forth* as a tutorial to get the user started with Forth. Users may easily define functions and error-handling routines. The system makes use of QuickDraw and is a powerful graphics tool for the Macintosh. Three levels are available to the developer. The first level comes with a CPU and a single license. The second level comes with the CPU, the license, an assembler and advanced graphics tools. The third level comes with a complete developer's kit, trace capabilities, debug capabilities and snapshot capabilities. It also comes with a broader licensing arrangement than level 1 or level 2. Creative Solutions. In UK: P+P micro distributors.-

**MacFreighter\*** A heavy duty cargo case for a Macintosh system. It resembles a footlocker, is lined internally with shipping foam and can be carried like a suitcase. This case can accommodate a Macintosh, the keyboard, the mouse, an external disk drive and a modem. MacPacks.

**Mac Graphics**<sup>•</sup> By Tony Fabbri. A guide to the use of MacPaint and Macintosh graphics. It teaches animation and how to create graphic adventures. Tab Books, Inc.

**MacGraphics**<sup>\*</sup> By Gordon Mann. A complete guide to graphics on the Macintosh and in the use of MacPaint. It deals with the creation of a variety of graphs, freehand sketches and animation. Plume Computers.

**MacGuide\*** By Leslie Smith. A primer for the Macintosh user. It is equally useful to the novice and the advanced user. It delves into the operation of this powerful computer and provides the user with a wealth of tips. Plume Computers.

Machine Language Program See Program, Source or Object.

## Machine Language Program (Subroutine) See CALL.

**Mach 1**<sup>•</sup> A 23 inch video monitor that may be connected to the Macintosh via a manufacturer-installed adapter. The user's Macintosh must be shipped to the manufacturer for this installation. This monitor is available in green phosphor or in black/white. The system consists of the video interface, cable and the monitor. Professional Data Systems.

**Mach 2\*** Mach 2 is a projection system that may be used with the Macintosh. Your Macintosh must be shipped to the manufacturer for installation of a special interface. Projection may be onto a flat or curved screen up to 25 feet in width. The system includes the video interface, the projector, a six foot screen and all necessary cables. Professional Data Systems.

**Macintosh Assembler/Debugger**<sup>•</sup> A program written to assist the serious programmer. It has a full screen editor, a macro assembler for the 68000 chip and a symbolic debugger. The editor and the debugger are mouse-driven. This debugger will require a second Macintosh to operate if the user's Macintosh has only 128K of RAM. The macroassembler allows assembly language programs to be written and edited easily. Assembly language programs use mnemonics to give instructions and information to the computer, rather than long reserved words such as those used in BASIC. These mnemonics are three-letter abbreviations for instructions. See Assembly, Debugger. Apple Computer, Inc. Apple (UK) Ltd.

**Macintosh Assembly Language**<sup>•</sup> By Leo J. Scanlan. A beginning and experienced programmers guide to Macintosh assembly language programming. It introduces the MC68000 microprocessor and explains how to write assembly language programs and routines for use by this chip. The entire MC68000 instruction set is presented and explained. Brady.

Macintosh BASIC See MacBASIC.

**Macintoshl Complete**<sup>•</sup> A book written by Doug Clapp that describes the creation and use of the Macintosh computer. This book provides a sound background in the use of the Macintosh, the selection of hardware and software that may be used with the Macintosh and a good technical description of the Macintosh and the systems that make it work. The book is easy to read and should be a standard work about the Macintosh. Softalk Books. In UK: Softsel.

**Macintosh Computer Graphics\*** By John P. Grillo and J. Douglas Robertson. This book tells the reader how to use the graphics features of the Macintosh. CBS Computer Books.

**Macintosh Connection, The**\* By John Campbell. This book explains the installation of application tools, use of the Profile hard disk system and the system operations behind the applications used on the Macintosh. This is a complete hardware description of the Macintosh. Reston.

**Macintosh Cover\*** A cover for your Macintosh computer, to protect against dust and other contamination. Computer Cover Co.

**Macintosh Data Files**<sup>\*</sup> By David Miller. This book explains, in depth, the creation and manipulation of data files on the Macintosh. This book is useful to the novice and the advanced programmer who wishes to learn about the Macintosh and how it deals with data files. Reston.

**Macintosh Expansion Guide, The**<sup>•</sup> By Gary Phillips and Donald J. Scellato. This book describes the hardware products that may be purchased to expand the Macintosh computer system. Selection criteria, product descriptions, product comparisons and vendor listings are presented to assist the Macintosh user. Tips for using various types of products are also included. Tab Books, Inc.

**Macintosh for College Students**\* By Bryan Pfaffenberger. The power of the Macintosh, for college students, is introduced in this book. It deals with reports, term papers and exam preparation. It also deals with mathematics and notetaking on the Macintosh. Sybex.

**Macintosh Logo**<sup>•</sup> The implementation of the Logo interactive programming language for the Macintosh. It is a graphics language that uses an on-screen pen called a "turtle," whose movement is controlled by the user through a series of very simple commands. It is easily grasped by children and is commonly used to teach programming techniques and logical thinking to children. Apple Computer, Inc. In UK: Apple (UK) Ltd.

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**Macintosh Pascal\*** By Jerry Brecher and George Cherry. This book presents Macintosh Pascal to the reader. It book teaches the programmer the best ways to use Pascal on the Macintosh without getting into trouble. Reston.

**Macintosh Pascal\*** An interpreted version of the Pascal language, popular for business and graphics applications. It has been used to write a variety of database management programs for the Apple II family of computers. It is also the language that was chosen for "Wizardry," one of the more popular games for the Apple II family. Macintosh Pascal uses all of the features of the User Interface Toolbox to allow the user to communicate with the computer and the programs that are written in Pascal. It uses labels for program sections rather than line numbers, and a number of keywords such as PROGRAM, VAR, BEGIN, END and others that are presented to the user in boldface type on the screen when used in a program. Programs may be edited as they are running on the Macintosh with Macintosh Pascal. The structure and keywords used by this programming language are very similar to those used by UCSD Pascal, one of the more popular implementations of this language. The user interface presented by the Macintosh really sets this implementation of Pascal apart from other implementations. Developed by Think Technologies, Inc. as "MacPascal." Apple Computer, Inc. In UK: Apple Computer (UK) Ltd.

**Macintosh Programmer's Handbook\*** By Gary Phillips and Donald J. Scellato. A book that introduces the novice programmer to the basic principles of programming in Microsoft BASIC, MacBASIC, and Macintosh Pascal. Programming rules and terms are discussed in depth, as are reserved words, commands and functions. Brady.

**Macintosh: The Appliance of the Future**<sup>\*</sup> A book about the Macintosh and how to use it by Gerard Lewis. It is spiral-bound and has 288 pages. Banbury Books, Inc.

**Mac the Knife**<sup>•</sup> A collection of Clipboard art for the Macintosh including borders, maps and useful illustrations. Each file has a unique feel and texture to it. Miles Computing, Inc. In UK: Softsel.

**MacManager**<sup>•</sup> A simulation that provides a method to learn management skills, management decision making and financial management skills. It uses a hypothetical company to present the simulation and such variables as plant capacity, pricing strategy and inventory to teach the principles of business management. Harvard Associates. In UK: Softsel.

**MacMath**<sup>•</sup> A collection of mathematics drills on disk for use with the Macintosh. It uses animations to reward the child for successfully completing drills. Microsoft BASIC is required to run these programs. Integrated Systems. In UK: P+P micro distributors.

**Mac Multiplan\*** A book written by Ramsey and LaSelle that deals entirely with using Multiplan and all of its features on the Macintosh. A number of useful applications are presented in this book along with complete discussions of the command functions and features of Mulitplan. Hayden Book Company.

**MacPaint\*** An excellent drawing program that uses a mouse to draw lines and shapes on the screen, select patterns, edit drawings, erase lines, shade drawings, manipulate images, stretch shapes and a variety of other graphics functions. This program displays a portion of a page within a drawing window. It provides a variety of tools from a drawing tool palette that runs along the left-hand side of the screen

display. It also provides a variety of fill patterns in a palette that runs along the bottom of the screen display for backgrounds and for filling shapes. Text may be entered in the grahics display easily by choosing the text icon from the drawing tools. It may be displayed in a variety of fonts, font styles and font sizes. Images may easily be copied to other parts of the screen display or to other MacPaint or MacWrite documents via the Clipboard. Apple Computer, Inc. Apple Computer (UK) Ltd.



Fig. M2 The MacPaint screen display.

**MacPak\*** A carrying pack for a Macintosh system. This pack is shockproof and weatherproof. It uses masonite for its strength and high-density foam to insulate the system from shocks. There are pockets for accessories, paper and manuals and room in the pack for a Macintosh, the keyboard, the mouse, an external disk drive and a modem. It may be carried as a suitcase, a backpack or a hand bag. MacPacks.

MacPascal\* See Macintosh Pascal.

**MacPascal\*** A book written by Chernicoff about how to program in Macintosh Pascal (MacPascal). It covers program construction in Pascal, program testing and debugging as well as describing the keywords and commands used by Pascal. Hayden Book Company.

**MacProject\*** A program written to perform scheduling tasks for those professionals who use PERT charts and Critical Path Methods of scheduling and controlling large projects. It allows the tasks involved in a project to be displayed graphically in a chart that resembles a programmer's flow chart. This chart is more oriented toward the passage of time and the expenditure of funds, rather than to program flow. Task charts may also be generated. These charts list each task in the order in which it will

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be executed. They also provide key information regarding each task. Resources may be identified and listed. Cash flow may be projected, recorded and reported. A Project Table that lists the key information about each task in a project may also be created. This program can meet the needs of planners, engineers, project managers and others who wish to plan and control intricate activities. It may also be used to measure the time required to execute a program if the components are entered as if they are parts of a project. Apple Computer, Inc.



Fig. M3 The MacProject Pert Chart.

**MacPuzzle\*** MacPuzzle uses a MacPaint document to create a jigsaw puzzle that can be reassembled ndustrial Computations.

*Mac Revealed: Programming with the Mac Toolbox*<sup>\*</sup> A book by Chernicoff that explains the use of the Macintosh User Interface Toolbox in programs. It is a readable book in plain English that explains the intricacies of the user interface. Hayden Book Company.

**Mac Sac\*** A padded, water-resistant carrying case to hold the system unit, keyboard, mouse and keypad. Comes with a shoulder strap and an antistatic lining. R. J. Gear.

MacSak\* A small, light carrying bag for the Macintosh. It is foam and masonite lined. MacPacks.

**Mac-Slots\*** A game package with two games for the Macintosh on the same disk. One of these games emulates a coin-operated slot machine like those used in Las Vegas. The other game is Keno, a very popular game at all casinos. Both games are mouse controlled. The odds used in the games are the same as those used against the gambler in Las Vegas. A number of graphics displays are used to present such situations as hitting a jackpot, going to the restroom and buying a drink at the bar. The players bankroll is displayed as stacks of chips in a window on the right-hand side of the screen display. Soft-Life. In UK: Softsel.

Task Name	Days	Early Start	
1 Review Market Areas	5.0	8/10/84	
2 Project Selected	0.0	8/17/84	
3 Basic Agreement	14.0	8/17/84	
4 Prelim. Marketing Plan	15.0	8/17/84	
5 Select Head Engineer	10.0	8/17/84	
6 Select Architect	26.0	9/6/84	
7 Select Land Planner	27.0	9/6/84	-
8 Cash Flow Analysis	15.0	9/7/84	
9 Hire Personnel	30.0	8/31/84	
10 Begin Construction	0.0	10/16/84	
11 Prepare Soil	13.0	10/16/84	3
12 Install Services	15.0	10/16/84	
13 Pour Foundation	12.0	11/2/84	
14 Framing	25.0	11/20/84	

Ś.	File	Edit	Chart	Task	Layout	Dates	Fonts	Style
-								3

Fig. M4 The MacProject Project Table.

**MacSpell\*** A collection of spelling drills for use with the Macintosh. The user may add his own words to the files. Microsoft BASIC is required to run these programs. Integrated Systems.

**MacTelecommunications**\* By Jonathon Erickson and Robert J. Sayre. A complete guide to putting your Macintosh to work with a modem and telecommunications software. It also presents information on banking, electronic mail and database networks such as Compuserve and The Source. Osborne/McGraw-Hill.

**MacTerminal\*** A communications control program written for use by the Macintosh. It allows the user to define the manner in which communications will be carried with other computers and communications devices, such as teletypes. MacTerminal can also emulate the VT100 or an IBM 3270 computer terminal. This program may be used with the Macintosh and a modem for a variety of telecommunications applications. It is easy for the user to master and to use. Apple Computer, Inc. In UK: Apple Computer (UK) Ltd.

**MacTote\*** A carrying case for the Macintosh system that may be used as a tote bag or a shoulder bag. It has pockets for the keyboard, mouse, disks and manuals. Optimum Computer Luggage.

Mac.Transfer\* A program that allows data to be exchanged by the Macintosh and

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Apple II computers. Two disks are included in the package. One disk is for the Macintosh and the other is for the Apple II. Apple Writer files may be converted to MacWrite files and vice-versa. Applesoft programs may be converted to Microsoft BASIC for the Macintosh and vice-versa. Data files may be exchanged in either direction by these computers. Southeastern Software. In UK: P+P micro distributors.

**MACTUTOR, The**<sup>•</sup> A software tutorial for the Macintosh. It uses a screen window to teach the user about his Macintosh. This program uses all of the features of the Macintosh to teach the user about the computer. Harper & Row Electronic and Technical Publishing.

**MacWorks**<sup>•</sup> A software package that brings to the Lisa computer the ability to run Macintosh software. It may be used to run MacPaint, MacWrite, Multiplan and many other Macintosh applications on the Lisa. The Macintosh image, in most applications, is smaller than the Lisa's screen size. Most of the applications use the Macintosh screen size for their display. The Lisa 2, Lisa 2/5 and Lisa 2/10 are equipped with 3-1/2 inch disk drives, which will run MacWorks. Apple Computer, Inc. In UK: Apple Computer (UK) Ltd.

**MacWrite**<sup>•</sup> A word processor written for the Macintosh. It allows a document of twelve pages to be generated, formatted, edited and printed, when a microfloppy disk drive is used. More pages may be generated, formatted, edited and printed when a hard disk is used. MacWrite uses the mouse to select a variety of functions such as tabs, line spacing, justification, fonts, font sizes and font styles. It also uses the mouse to select text insertion and deletion points. Documents and images that are generated by MacPaint and similar programs that use the Clipboard may be included in a MacWrite document. Headers and footers may be created. Fonts, spacing, justification and other functions may be changed within a document to suit the needs of the user. Apple Computer, Inc.

In UK: Apple Computer (UK) Ltd.

**Magazines, Computer-oriented** A number of popular magazines contain useful information concerning the Macintosh and available hardware and software for it. Most computer stores and larger bookstores carry a good assortment of these magazines. *BYTE* is an excellent source for general information on microcomputers, although information specifically relevant to the Macintosh is buried amid voluminous ads and articles on other machines and general topics.

Magazines devoted to the Macintosh and its compatibles include MacWorld and St. Mac. Magazines which specialize in the Macintosh and one or more other microcomputers include Creative Computing and Personal Computing. Magazines that specialize in the Apple computer family including the Macintosh are A+, Apple Orchard, Nibble and InCider. Infoworld is a weekly magazine for microcomputers including the Macintosh. It is interesting if you want to keep up with the new developments on a week-by-week basis.

If you want to subscribe or write for information, here are the addresses:

A + P.O. Box 2964 Boulder, Co 80321

Apple Orchard P.O. Box 6502 Cupertino, Ca 95015 Apple User (UK).



You can read the attached 143-page report at your leisure, but this really gives you everything you need to know:



Memos take on a new look with Apple Computer's Macintosh software. Portions of text or graphics can easily be moved around within one document or "cut" from one document and "pasted" into another one.

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BYTE Subscription Dept. P.O. Box 590 Martinsville, NJ 08836 U.S. = 1 year \$19 12 issues

Creative Computing P.O.Box 789-M Morristown, NJ 07960 U.S. = 1 year \$20 12 issues

InCider Wayne Green Inc. Circulation Dept. POB 911 Farmingdale, NY 11737

InfoWorld Circulation Dept. Box 837 Framingham, MA 91701 U.S. = 1 year \$25 52 issues

MACWORLD Subscription Department P.O. Box 20300 Bergenfield, New Jersey 07621

Nibble PO Box 325 Dalton, Ma 01227-9938 Personal Computer World (UK).

Personal Computing PO Box 2941 Boulder, Co 80321

**MAGICphone**<sup>•</sup> MAGICphone is a telephone that may either be used as a standalone telephone or mounted on the side on the Macintosh case. The Macintosh may be used to dial this telephone. Software is provided to manage lists of phone numbers and to access these lists to dial numbers. Time that the phone is used is logged, as are the numbers that are called. This system is useful to those who wish to track phone use for billing purposes. The system does not include a modem for data communications. It only provides voice communications. Artsci.

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Mail List Software See Megamerge, Habadex.

Main Memory See Memory.

**Main Street Filer**<sup>•</sup> Main Street Filer is a database management program for the Macintosh. It combines the features of a filing system and a report generator. It handles up to 65,000 records, and up to six distinct fields within a file. Up to four of the six fields can be indexed to supply sorted reports. The report generator can provide columnar reports, mailing lists, mailing labels, envelopes and rolodex cards. File design, record access and retrieval and report selection are mouse-driven. Data entry is accomplished from the keyboard. The user can design file formats and data entry screens or can use a name/address format that is supplied with the program. Main Street Software. In UK: Softsel.

Maintenance (Disk) See Disk Maintenance.

**Maintenance of the Macintosh** The Macintosh is sold to the user in a sealed case. It is not expandable internally by the user. Any maintenance required on the Macintosh, its keyboard, the mouse and its disk drives should be carried out by an authorized dealer or maintenance facility. If the Macintosh case is opened by the user, the computer's warranty is void. You may find the address of the nearest authorized maintenance facility by consulting the dealer who sold you the Macintosh by consulting a local user's group or by watching your local newspaper for advertisements.

**Management Edge, The**<sup>•</sup> An interactive program that provides a management strategy for the user. The user enters information about himself and about the management situation he anticipates. A strategy is suggested after the information is analyzed by the program. The Management Edge is also a useful training tool. Human Edge Software Corporation. In UK: Softsel.

**Management of Files** File management or disk maintenance describe keeping track of files on disks. See Disk Maintenance.

**Manual** A process done by hand, not automated or programmed. Also, a reference book, booklet or other document.

**Manual Calculation** Electronic spreadsheet programs such as Microsoft Multiplan offer two modes of calculation to the user, Automatic Calculation and Manual Calculation. The Automatic Calculation mode performs a calculation each time a value is entered in a a spreadsheet. The Manual Calculation mode turns off Automatic Calculation until a Calculate Now instruction is given or until Automatic Calculation is selected. Manual Calculation is a command option that is available from the Calculate menu on the menu bar of the Microsoft Multiplan screen display. See Calculate Menu, Menu Bar, Automatic Calculation Option.

**Margin Markers** Many word processing programs show where margins and tabs have been set. The device used to show this information is often called a "ruler." This might resemble a real ruler, like the ruler displayed by MacWrite, or it might be a series of dashes marked with exclamation points or similar vertical symbols. MacWrite uses distinctive markers under the ruler to indicate the location of the right and left margins of a document. These are black triangles with the point of the triangle marking the location of the margin on the ruler. The location of a margin marker may be changed by placing the mouse pointer on the marker and dragging it to the desired location on the ruler. See Ruler, Dragging, Document.

**Master Menu** A menu is a screen display which lists a number of possible options and asks the user to select one. When a selection is made by keying in an identifying number or letter (or positioning the cursor beside the desired item, using a light pen, mouse click or mouse-driven highlight, etc.), the selected function is performed.

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This may require either a branch or subroutine call to the code for the function, or the program to carry out this function. Master menus may be loaded into memory and executed in a program written by the user or in a commercial program.

Many application packages use a system of multiple menus. A Master menu lists the major functions allowed. Selection of an option on the Master menu causes another menu to display, indicating more detailed options for the selected function. This can be followed by even more detailed menus, and so on. Completion of a function will often cause redisplay of the Master menu. Such a system is called "menu-driven." A Master menu and a Main menu are the same thing.

The Macintosh Finder is similar to a Main menu or Master menu. See Finder, Menu, Menu Bar.



Fig. M5 A MacWrite ruler with the left margin marker next to the mouse pointer.

**MAX** A common function available on an electronic spreadsheet such as Microsoft Mulitplan. This function is used to instruct the program to read a specific range of cells within a column or row and return the maximum value within the specified range. Thus, if you inserted the formula =MAX(R2C5:R2C12) in a cell, the program would return the largest number within that range of cells.

**MBIS Microbuffer\*** A serial interface buffer for the Macintosh. It may be connected between the Macintosh and serial interface devices like printers and modems. It uses RS-232 conventions and will accept data at baud rates ranging from 75 to 19,200 baud. The buffer may be purchased with 32K, 64K, 128K or 256K of memory. This device is extremely useful when long documents are being transmitted or printed as it holds the information while the Macintosh is freed to do other things. Practical Peripherals. In UK: P+P micro distributors.

**MC** Machine Code. Acutal machine language instructions, whether written directly in MC or resulting from translation of a source program.

**McPic\*** A collection of 130 pictures on a disk. They may be used with MacPaint and MacWrite to illustrate documents. They may be customized by the user with FatBits and other tools. Magnum Software. In UK: Softsel.

**Media** Data storage devices for personal computers record information such as programs or data files. The physical substances on which the data is recorded are called "media," and includes cassettes, diskettes, cassettes for hard disks, RAM, ROM and a few other types of devices. Fixed media are permanently lodged in the device that uses it. Removable media, such as most diskette drives, can be removed from the drive and replaced by another one. Removable media have the advantage that large amounts of data can be stored on the media on a shelf and manually placed into the device that reads it. An example of this are diskettes stored in a box and placed one at a time as needed into the disk is permanently mounted in the drive and cannot be removed. The amount of storage possible with such a device is limited to what can be placed on one medium. There are, of course, hard disk drives with removable media which have the large storage capacity of fixed drives along with the ability to store additional disk cartridges with data and place them into the disk drive as needed.

## Media Accessories See Micro-disk Minder.

**MegaFinder**<sup>•</sup> MegaFinder is a database management program that allows form and report design. Forms can be designed for home use and small business use. There are output forms for Checks, Home Inventory and Mailing Lists included with this software. The program will also allow the user to save report formats he has designed and use them with associated files. Megahaus. In UK: Softsel.

**MegaMerge**<sup>•</sup> A mail merge program for the Macintosh. It uses address files generated by MacWrite to create form letters by merging name and address information into letters that were written on MacWrite. It also can generate mailing labels and mailing lists from the name and address files. One particularly useful additional feature is that this program merges a number of MacWrite documents into a single long document. Megahaus. In UK: Softsel.

**Memory** Any device which can store information and allow it to be retrieved when needed. The Macintosh relies primarily on Random Access Memory (RAM), Read-Only Memory (ROM), disks, and hard disks. Memory, by itself, is usually a reference to RAM. This is the general purpose, erasable and reusable memory located inside the Macintosh.

ROM (read-only) memory contains fixed data, usually programs such as the Macintosh's screen programs. The ROM contains the fundamental machine language programs to run the various devices attached to the Macintosh, such as monitor, printer, disks, etc. ROM and RAM together make up the internal memory or main memory of the Macintosh, or any other computer.

Contrast this with external memory, such as disk and hard disk, which involves mechanical motion to retrieve data and is thus hundreds or thousands of times slower than internal memory. Data in internal memory is immediately available to programs for processing. Data in external memory must be copied into internal memory (READ or INPUT), processed, then copied back out to external memory (WRITE or OUTPUT).

If data has been created, it can be written out to external memory without a READ first. And, if data read in from external memory has not been modified, there is no need to write it back out since the original copy is still there.

While external memory is very slow relative to internal memory, it also has

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advantages. It is much cheaper per character of data stored on-line (available for processing without manual intervention). In addition, the ability to store external memory data off-line (such as disks in a box) allows essentially unlimited storage of data. This, of course, requires a manual step of inserting the disk before the data can be loaded into the internal memory for processing. See also Virtual Memory, RAM Disk, Spool, Bank Switching, Memory Map, Memory Address, Memory Segment, Bubble Memory, RAM, Disk.

**Memory Address** A number or variable designating a location in memory. See Address, PEEK, POKE.

Memory, Amount of Free See FRE.

Memory, Enter Values to Equal See POKE.

**Memory Manager** The Memory Manager is a set of routines in the Macintosh ROM that is part of the computer's operating system. Its purpose is the management of the use of zones within the computer's memory circuits and chips. The Memory Manager scans the blocks of memory within the computer's circuits, recognizes how the are being used, whether or not they are in use and only allows unused blocks to be written to. If certain sections of memory are used in a fashion that their contents may be relocated to another address, the Memory Manager keeps track of the location of such data.

The memory of the Macintosh may be set up in nonrelocatable or relocatable blocks by the Memory Manager. Nonrelocatable blocks are somewhat inefficient as they tend to fragment the memory space. Relocatable blocks may be moved around to consolidate data or to make room for additional data. The Memory Manager defines nonrelocatable blocks in terms of absolute memory addresses. It defines relocatable blocks by using pointers stored within a portion of memory called the "master pointer" that is used by the Memory Manager to keep track of relocatable memory locations. See Operating System, Memory, Block.

**Memory Map** A memory map is a simplified diagram of the manner in which the Random Access Memory and Read-Only Memory of a computer are used. The memory map resembles a rectangle broken into several sections with symbols representing memory addresses next to the beginning and end of each section of the rectangle. Descriptive comments are usually shown inside each section of the rectangle. These comments describe the use of each section of the memory. The addresses are usually provided in hexadecimal format.

## Memory, Review Values of See PEEK.

Memory Segment A continuous block of memory addresses, such as 0 to 16K.

**Memory (Storage in Bytes)** Byte is a label for storage to hold one character (letter, digit, etc.) in computer memory, internal or external. Abbreviated B or in thousands, KB or simply K. (Actually, 1K = 1024 bytes, because this number is an even power of 2). Macintosh is currently provided with 128K of RAM memory and 64K of ROM memory. To be precise, the RAM is not really 128,000 bytes of memory. It is 131,072 bytes. The ROM is really 65,536 bytes.

**Menu** A screen display which lists a number of possible options and asks the user to select one. A few Macintosh applications use menus of a conventional form that are carryovers from non-Macintosh programs. These are lists of options displayed

on the screen and require that the user enter a letter or number that designates the action to be taken by the computer, and then press the Return key. Most Macintosh applications rely on pull- down menus displayed by placing the mouse pointer on a menu name on the menu bar displayed across the top of a Macintosh application's screen display. Pull-down menus give the user access to a variety of commands or options related to the menu name on the menu bar. Once a pull-down menu has been selected in the fashion described above, the options available are selected by dragging the pointer down the list of options until the correct option is highlighted. Then the mouse button, which was held down while the pointer was dragged down the menu, is released. Then the highlighted option is executed by the computer.

Many application packages use a system of multiple menus. A Master menu lists the major functions allowed. Selection of an option on the Master menu causes another menu to display, indicating more detailed options for the selected function. This can be followed by even more detailed menus, and so on. Completion of a function will often cause redisplay of the Master menu. Such a system is called "menu-driven."

**Menu Bar** The line of menu names that runs across a Macintosh screen display is called the "menu bar." It is used to select a pull-down menu appropriate to the needs of the user. Once a pull-down menu is displayed, any option that is listed may be selected by the user, unless a menu selection is dimmed. Dimmed selections are not currently available to the user due to the user's current position in a program. See Pull-down Menu, Dimmed Commands, Menu.

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Fig. M6 An illustration of the menu bar from the MacPaint screen display with the pointer resting on the Edit menu designator.

Menu-driven See Menu.

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**Menu Manager** The Menu Manager is a collection of 33 subroutines in the Macintosh User Interface Toolbox. This collection of subroutines is responsible for the creation and the manipulation of the menu bar in an application. It sets up and executes user-defined pull-down menus. This collection of subroutines is available to the serious programmer. It is one of the features that allows a variety of applications written for the Macintosh to present options to the user, and to execute these options in the same fashion as all other applications that access the Menu Manager. See Menu Bar, User Interface Toolbox.

**MERGE** A Microsoft BASIC command used to add lines from an ASCII program file into the program currently in computer memory. The format is:

#### MERGE (filespec)

(filespec) is a string expression naming the file.

The device is searched for the named file. If the file is found, the program lines in the device file are merged with the lines in memory. If any lines in the file being merged have the same line number as a line in the program in memory, the lines from the file will replace the corresponding lines in memory. Following the MERGE command, the merged program is in memory and Microsoft BASIC returns to command level.

If the program being merged was not saved in ASCII format (using the A option on the SAVE command), an error message will be displayed, and the program in memory will remain intact. This error message will read "Bad file mode."

**Message** A statement or code printed out or displayed on the screen by a program to let you know what is happening. Examples include prompts, when the program expects you to input something, error messages, which tell you something about what went wrong, and informational messages, such as "Copy Complete." Many such messages are displayed in alert boxes by Macintosh applications.

**Micro-disk Minder\*** A rectangular molded plastic case holding thirty-six 3-1/2-inch microfloppy disks. It has a hinged lid and comes with plastic dividers. International Datawares, Inc. In UK: P+P micro distributors.

**MicroPlan\*** MicroPlan is a financial modelling program. It uses built-in formulas and a statistical package to assist the user. Its built-in formulas include loan amortization, standard deviation and tax rate schedules. It consists of a spreadsheet made up of 200 rows and 60 columns. A separate report generator is used to format printed output. Chang Labs. In UK: Softsel.

**Microsoft BASIC**<sup>•</sup> The first version of BASIC made available for the Macintosh was Microsoft BASIC. This version of BASIC is very close to the Microsoft BASIC written for the IBM PC. It uses a variety of new commands that allow the user to access informationlbox for file selection, editing and program control. Microsoft BASIC uses three types of windows on the screen: the Output window, the List window and the Command window. The Output window displays any text or graphics generated by a program written in Microsoft BASIC. The List window is displayed any time that the LIST command is used in the Command window or List is selected from the Control menu on the menu bar. Up to three List windows may be opened at the same time. The Command window is used to input program lines and to give direct commands to the computer in Microsoft BASIC.

Microsoft BASIC requires that each line of a program have a line number. It uses Reserved Words to interpret the user's instructions and pass them to the computer. Microsoft BASIC is loaded into the Macintosh's memory from disk when it is used. When loaded, it leaves about 30K of memory space available for program lines and variables. The mouse is used to perform many functions in this version of Microsoft BASIC. It is used to select program lines that are displayed in the List window for editing in the Command window. It is used to mark the insertion or deletion point of characters to be added to or taken out of a program line being edited. It is also used to select commands from the menus on the menu bar. This programming language is recommended for those who already have experience with Microsoft BASIC on other computers. See Command Window, List Window, Output Window, Menu Bar. Microsoft Corporation. In UK: Microsoft (UK) Ltd.

List
<ul> <li>100 DEFINT A-Z</li> <li>110 DIM A(1025)</li> <li>120 GOSUB 220</li> <li>130 GET(0,0)-(127,127),A</li> <li>140 X=0: Y=0</li> <li>150 IF MOUSE(0)=0 THEN 150</li> <li>160 IF ABS(X-MOUSE(1)) &gt; 2 GOTO 180</li> <li>170 IF ABS(Y-MOUSE(2)) &lt; 3 THEN 150</li> <li>180 PUT(X,Y),A</li> <li>190 X=MOUSE(1): Y=MOUSE(2)</li> <li>200 PUT(X,Y),A</li> <li>210 GOTO 150</li> <li>220 REM Draw Picture</li> <li>230 CLS</li> </ul>
Command

Fig. M7 The Microsoft BASIC screen display illustrating the List window, the Command window and the Output window.

**Microsoft Chart\*** A business graphics program. It makes extensive use of the menu bar and pull-down menus to present options to the user. Seven menus are available on the menu bar: the Apple menu, the File menu, the Edit menu, the Data menu, the Gallery menu, the Chart menu and the Format menu. The Apple menu provides access to the Desktop accessories. The File menu is used for file handling and printing. The Edit menu is used to access the Clipboard. The Data menu is used to define the data format to be used by a chart. It is also used to instruct the program to sort, analyze or list data that has been entered into a data series. The Gallery menu is used to present chart formats to the user. It gives the user the choice of Area charts, Bar charts (horizontal bars), Column charts (vertical bars), Line charts, Pie charts, Scatter charts and Combination charts that use combinations of all of the formats that are available. Microsoft Chart can accept data input from the keyboard or from disk. It can also accept data from Multiplan via the Clipboard. See Clipboard, Menu Bar. Microsoft Corporation. In UK: Microsoft (UK) Ltd.

Microsoft File\* A database management program for managing personal files. It is

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billed by Microsoft as a personal filing system, but might meet the needs of a small business. Microsoft File includes a number of predefined input formats, such as a name and address format that may be selected to enter data to the program. The program includes a report generator that produces columnar reports, labels, lists and sorted reports. It can perform basic mathematical functions, such as sums, averages, counts and logical operations and can accept data from other applications. Microsoft Corporation. In UK: Microsoft (UK) Ltd.

**Microsoft Multiplan**<sup>\*</sup> An electronic spreadsheet program that brings to the Macintosh most of the features it had in versions marketed for other computers. It is much easier to use on the Macintosh than it is on conventional computers. This spreadsheet can have up to 63 columns and 255 rows. Text, values, formulas and references are entered into cells (the spaces where columns and rows cross each other). The mouse is used to select active cells for data entry, formatting, text entry, value entry and editing. Portions of rows and columns or blocks of cells may be selected in the same fashion. A portion of the worksheet is made active by dragging the mouse pointer over the cell or cells that are going to be acted upon. The menu bar in Microsoft Multiplan has the Apple menu, the File menu, the Edit menu, the Select menu, the Format menu, the Options menu and the Calculate menu. The mouse is used in the conventional fashion to select options from each of these menus. It is also used to position the pointer to insert a vertical bar cursor for character entry or deletion in any cell that is being edited. Microsoft Multiplan can sort data and it can perfrom iteration. Worksheets may be linked together and data can be moved between worksheets via the Clipboard. The contents of cells, including formulas, may be moved around the worksheet and copied to new locations on the same worksheet. See Mouse Pointer, Menu Bar, Cell, Spreadsheet. Microsoft Corporation. In UK: Microsoft (UK) Ltd.

**Microsoft Word\*** A powerful word processor for the Macintosh. It makes full use of the features of the User Interface Toolbox. It has automatic word wrap, and uses the Clipboard to pass data to and from other applications such as MacPaint and MacWrite. The menu bar in Microsoft Word contains the Apple menu, the File menu, the Search menu, the Character menu, the Paragraph menu and the Document menu. The File menu is similar to the File menu in MacPaint except for an additional command called "Print Merge." The Save As... command allows a backup copy of a file to be saved. The Page Setup option allows gutters (extra margin space on left-hand pages) to be set up.

The Edit menu has three additional features: Show Glossary, Hide Paragraph and Preferences. The Preferences command option allows fine settings to be made to character pitch and line spacing. The Show Glossary option allows a glossary of abbreviations to be set up and used while a document is being written. The Search menu contains an extra command called "Go To." The Paragraph menu is used to format the centering and spacing of paragraphs. It is also used to format paragraphs and to set tabs. The Character menu is used to select the type format and the font to be used. The Document menu allows the entire document to be formatted. Documents that are generated by Microsoft Word may be as large as the user requires. If they exceed the RAM capacity of the Macintosh, they are automatically written to disk. Microsoft Word will automatically number footnotes. Up to four different documents may be displayed at the same time with Microsoft Word. Data can be merged into a document automatically by using the Print Merge option mentioned above. This is an extremely powerful word processor for the Macintosh. Microsoft Corporation. In UK: Microsoft (UK) Ltd. *Microsoft Word Made Easy - Macintosh Edition*\* By Paul Hoffman. A complete description of the use of Microsoft Word on the Macintosh. The book treats this word processor in great detail. Osborne/McGraw-Hill.

**MID** A function available in some electronic spreadsheet programs, and included in Microsoft Multiplan. The function is used to return text characters from a specified cell to the cell that contains the function. The function will also return text characters from a list of characters supplied within the formula for the function. The format is:

=MID("charstring",s,n)

(s) stands for the starting character location in the string from which the text characters are to start.

(n) stands for the number of characters to use. Both numbers must be integers.

**MID\$** A Microsoft BASIC function and statement. When used as a function, returns the requested part of a given string. The format is:

## MID\$(<stringvariable> ,<n>[,<m>])

«stringvariable» may be any string expression.

(n) is an integer expression in the range 1 to 255. It represents the character number in the string that is the starting place for using characters from within the string.

(m) is an integer expression in the range 0 to 255. It represents the number of characters from the stringvariable that are to be used from the starting point (n).

The MID\$ function returns a string of length (m) characters from (stringvariable) starting with the (n)th character. If you leave out (m) or if there are fewer than (m) characters to the right of the (n)th character, all rightmost characters beginning with the (n)th character are returned. If (m) is equal to zero, or if (n) is greater than LEN((stringvariable)), then MID\$ returns a null string.

When used as a statement, MID\$ replaces a portion of one string with another string. The format is:

MID\$(stringvariable,m[,m] = y\$)

«stringvariable» is a string variable or array element that will have its characters replaced.

«n» is an integer expression in the range 1 to 255.

(m) is an integer expression in the range 0 to 255.

vy\$> is any string expression.

The characters in stringvariables, starting at the south position, are replaced by the characters in y. The string optional and refers to the number of characters from y, that will be used in the replacement. If string is left out, all of y is used.

Regardless of whether (m) is omitted or included, the length of (stringvariable) remains the same, as determined by the value given to (n), the starting character. For example, if (stringvariable) is six characters long and (y\$) is seven characters long, then after the replacement (stringvariable) will contain only the first six characters of (y\$).

See also LEFT\$, RIGHT\$.

**Millionaire**<sup>•</sup> An investment simulation game for the Macintosh. The player starts the game with \$10,000 and invests it in the stock market. Time is measured in weeks. The player may buy or sell the stocks he desires. Information is provided about each

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investment that he selects. His buy and sell decisions are based on this information. Up to fifteen stocks are graphed for the player with complete company profiles and regular announcements about each company. This is an extremely realistic simulation of stock market action. Blue Chip Software. In UK: Softsel.

**Mind over Mac\*** A collection of five games. MasterCode requires the player to break a complicated secret code. Destroyer requires the player to find and destroy the computer's ships on a grid. Third Dimension is 3-D Tic, Tac, Toe. On the Contrary is a memory game. Trivial Intrigue is a trivia game. Think Educational Software.

**Mixed Program Lines** To start a new program, select New from the Edit menu on the menu bar or type NEW in the Command window.

This completely erases all lines now in Microsoft BASIC's memory so if it is something you want to keep and have not already stored on disk, SAVE it first. If you do not erase the program in memory before starting on another, you will usually wind up with the unusable combination of mixed lines from your old and new programs.

**MKI\$, MKS\$, MKD\$** Microsoft BASIC functions which convert numeric-type values to string-type values. The formats are:

«stringvariable» = MKI\$(«integer expression»)
«stringvariable» = MKS\$(«single-precision expression»)
«stringvariable» = MKD\$(«double-precision expression»)

When a numeric value is placed in a random file buffer with an LSET or RSET statement, it must be converted to a string. MKI\$ changes an integer to a 2-byte string. MKS\$ changes a single- precision number to a 4-byte string. MKD\$ changes a double- precision number to an 8-byte string.

See also STR\$, CVI, CVS, CVD.

**Mnemonic** A name or abbreviation intended to remind you of what it stands for, such as LAX for Load Accumulator into X register.

**MOD** A function available in a number of electronic spreadsheet programs such as Microsoft Multiplan. This function is used in a cell to instruct the program to display the remainder of a division operation of two numbers shown in parentheses after the function. The format of this command is:

MOD(n1,n2)

(n1) is the number to be divided.

(n2) is the number to divide into the first number.

**Modal Dialog Box** The Macintosh User Interface Toolbox is used by programmers to provide a uniform method of supplying and obtaining information to carry on with the sequence of the program or a command given to the computer. Dialog boxes are used to supply information to the user and to obtain further instructions from the user. A Dialog box that requires a response from the user prior to going forward with the next step of a command is called a "modal dialog box" in the Macintosh technical manuals. Such dialog boxes generally contain rectangles for inputting information or lists of selections that must be used. They also contain buttons for indicating the next action to be taken. Such an action might be to cancel the command just given, or to accept the information just supplied. See Dialog Box, BASIC Statements Cross Referenced by Function, Button.

Paper:	🖲 US Letter	() R4 Letter		OK
	🔿 US Legal	🔷 🔘 International Fa	infold	
Orientat	ion: 🖲 Tall	() Tall Adjusted	() Wide	Cancel

Fig. M8 An example of a modal dialog box.

**Modeless Dialog Box** Two types of dialog boxes are presented to the Macintosh user in situations that require the user be informed about the state of a program or require the user to supply additional information or instructions by those applications that use the Macintosh User Interface Toolbox. The modeless dialog box is one that supplies information and requires only a recognition of a situation but no further information to proceed. See Dialog Box, Modal Dialog Box, User Interface Toolbox.

Type mismatch	ОК

Fig. M9 An example of a modeless dialog box.

**Modem** MOdulator DEModulator. A device to convert the digital voltage level signals of the computer to modulated (frequency or tone) signals for transmission over phone lines. Required at both ends of a phone line for telecommunications. Modems are connected to the Macintosh via one of the serial ports on the back panel of the computer. Under normal circumstances, the last multipin port on the right as you face the back panel would be used. This port is connected to an RS-232/RS-422 circuit within the computer. It is marked with a telephone icon. See Apple Modem 300, Apple Modem 1200, Portable Modem, Promodem 1200, Volksmodem.

**Modula-2**• A programming language integrated with the Macintosh Operating System. It converts text files to code files which may be executed by the Macintosh. This system employs a compiler, a module library and a library manager. The library modules are extensive and include directories for disks, number format conversions, string management, scheduling of tasks and many other useful features. Forty tutorial source programs are included with the system. Volition Systems. In UK: P+P micro distributors.

**Monitor** The software which is in the Macintosh with a program to be tested, which may determine your ability to detect and interpret errors, is the test environment.

Similar features are included in Microsoft BASIC, via TRON, TROFF, and the ability to stop the program at any time and examine the contents of variables with PRINT. This TRACE feature is a fundamental way of following the sequence of instructions executed in a program to ensure that the program's logic is correct.

**Monitor** A CRT or TV-type screen display for presenting computer output. The Macintosh has a built-in monitor. See also CineMac, Mach 1 Projection System, Mach 2 Projection System.

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**Motherboard** The main part of a circuit board in an electronic device. It is usually the largest board. The important characteristic of this board is that it contains the main memory chips and circuits of the computer.

**Mouse** The mouse is a rectangular hand-held pointing device connected to the Macintosh by a flexible electrical cable. It converts motion across a Desktop, table top or any flat surface into motion of a pointer on the Macintosh screen display. It has a single button on top and cavity on the bottom that holds a hard rubber ball. The rubber ball is locked into the black circular disk cavity. The motion of the ball is translated into pointer motion. The mouse is used as a tool to convey the user's needs and requirements to the computer. It is used to select a particular disk icon from the Desktop and to open the icon. Selection is accomplished by clicking the mouse button once. Opening an icon is accomplished by clicking the mouse button twice. Menus are selected by moving the pointer to the name of the desired menu on the line at the top of the screen display and pressing the mouse button. This action causes the entire menu to be displayed with the topmost entry highlighted. A command can be selected from the menu by dragging the mouse down the Desktop with the button still depressed. This drags the highlight down the list of options. When the desired option is highlighted the mouse button is released and the command is executed if it is not a dimmed command (dimmed commands are not currently available).

Insertion and deletion points are selected in text and program lines by moving an I-beam pointer to the point and clicking the mouse button once. This action causes a vertical bar cursor to be displayed at the selected point. Icons may be dragged from one point on the Desktop or from one disk icon or disk directory to another by placing the pointer on the file icon, pressing the mouse button, dragging the icon to the new location and then releasing the mouse button. See Mouse Button, Menu Bar, Clicking, Dragging, Desktop, Icon, Directory, Dimmed Commands.

**MOUSE** A Microsoft BASIC function used in programs in seven different ways. The syntax for this function is:

## MOUSE(«n»)

on represents one of seven integers between 0 and 6 that interpret mouse location or mouse motion and then act upon this information. A table of mouse functions is presented below:

MOUSE FUNCTION	USE/MEANING
MOUSE (0)	This function returns a value lying +3 and -3 that informs the program of the status of the mouse button. This function also remembers the values returned to the program by MOUSE functions (1) through (6). Each status is listed below:
MOUSE (0), 0	Mouse button is not down and has not been down since last action taken.
MOUSE (0), 1	Mouse button is not down, but last selection was a first level selection.
MOUSE (0), 2	Mouse button is not down, but last selection was a second level selection.
MOUSE (0), 3	Mouse button is not down, but last selection was a third level selection.

MOUSE (0), -1	Mouse button is down for a first level selection and has not been released during dragging.
MOUSE (0), -2	Mouse button is down for a second level selection and has not been released during dragging.
MOUSE (0), -3	Mouse button is down for a third level selection and has not been released during dragging.
MOUSE (1)	This function returns the horizontal $(x)$ coordinate of the mouse pointer at the time that the last MOUSE (0) function was invoked whether the mouse button was up or down.
MOUSE (2)	This function returns the vertical (y) coordinate of the mouse pointer at the time that the last MOUSE (0) function was invoked whether the mouse button was up or down.
MOUSE (3)	This function returns the (x) horizontal coordinate of the mouse pointer the last time the mouse button was pressed down. This is normally the starting point of dragging.
MOUSE (4)	This function returns the vertical (y) coordinate of the mouse pointer the last time the mouse button was pressed down. This is normally the starting point of dragging.
MOUSE (5)	This function returns the horizontal (x) coordinate of the mouse pointer the last time that the mouse button was released. This is normally the ending point of dragging.
MOUSE (6)	This function returns the vertical (y) coordinate of the mouse pointer the last time that the mouse button was released. This is normally the ending point of dragging.

**Mouse Button** The mouse button is the button at the top center of the Macintosh mouse. This button is pressed and held down to drag an icon from one place to another or to drag a pointer over several selections on the screen. It is pressed once and released (clicked) to highlight a selection or several selections. It is pressed twice quickly (double-clicked) to open a selection. This mouse button is a key element in the interaction between the Macintosh and its user.

**Mouse Pointer** The mouse pointer is a distinctive symbol similar to a cursor that represents the physical location of the mouse on the Desktop. As the mouse is moved over the Desktop, the pointer moves in the same direction. In the Desktop display for most applications, the mouse pointer is an arrowhead. When the Control Panel, one of the desk accessories from the Apple menu, it changes to a crosshair. In applications where text is being inserted or deleted, it is an 1-beam. The mouse pointer is used to select, highlight and execute.

**Mouse Port** The mouse port is on the back panel of the Macintosh to which the end of the mouse cable with the plug is connected. This port is the first port on the left as you face the back panel, and is identified by a mouse icon located above the port. See Back Panel, Icon.

**MOVE** A common command in electronic spreadsheet programs, used to move a row, a column or a block of cells from one place on the spreadsheet to another. This command is not available as a command in Microsoft Multiplan. Instead, portions of rows, portions of columns, or blocks of cells are moved from one place to another on a worksheet by highlighting the cells to be moved, using the Cut option from the

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Edit menu, placing the pointer in the upper left-hand corner of the new location, pressing the mouse button to highlight this cell and using the Paste option from the Edit Menu. See Edit Menu, Cut Option, Paste Option, Highlight.

**Moving Applications** Applications may be moved from one position on the Desktop display to another by placing the mouse pointer on the application's icon and dragging the icon to the new location. An application is a program that makes use of the Macintosh computer to satisfy the need of a computer user. It could be a word processor, a text editor, an electronic spreadsheet, a graphics tool or any similar useful program. Applications may be moved from one disk to another by opening the disk icon from which the application is to be copied, ejecting the disk if you only have the internal disk drive, inserting the disk to which the application is to be copied, opening the icon of the second disk and dragging the application's icon from the source disk directory display to the destination disk directory display on the Desktop. The system will then prompt you to swap disks back and forth until the application has been copied. When an application is moved from one disk to another with this method, a copy of the application is still present on the source disk. If space is required on this disk and you no longer wish to maintain a copy of the application on the disk, the icon must be moved to the Trash Can and the Trash must be emptied by using the Empty Trash command from the Special menu or by ejecting the disk. See Copying an Application, Eject Disk, Application Software.

## Moving Cells (Multiplan) See MOVE.

**Moving Documents** Documents can be moved from one location to another on the Desktop by placing the mouse pointer on the icon of the document to be moved and dragging the icon to its new location. Documents are files that are generated by an application. A document could be a picture that was drawn on MacPaint, a letter that was written on MacWrite, or any other file generated by an application program. If an icon is moved onto the icon of another disk displayed on the Desktop, the document will be copied to that disk. The system will instruct the user when disks are to be swapped. See Desktop, Icon, Mouse Pointer, Dragging, Moving Applications.

**Moving Folders** When documents are moved into a folder, they are removed from the Desktop display. A folder is the device used to arrange a number of documents into a particular directory. The document names and icons are no longer displayed on the Desktop unless the folder is opened by double-clicking its icon. Folders may be moved around the Desktop in the same fashion as other icons. The pointer must be placed on the folder's icon and the icon must be dragged to the new location by pressing the mouse button, holding it down while the icon is dragged to its new location and releasing the mouse button. Folders may be copied from one disk to another by dragging the folder's icon onto the disk's icon on the screen display. It may also be copied by dragging the icon from one directory display to another on the Desktop. See Icon, Desktop, Dragging, Moving Applications.

**Moving Text** Text may be moved from one place to another in a text file, in the Note Pad or in an application by dragging the mouse pointer over the text to be moved (this action highlights the text), selecting Cut from the Edit menu (this erases the text from its current location), moving the pointer to the new location for the text and clicking the mouse button (this indicates the insertion point to the computer and the program) and selecting Paste from the Edit Menu (this inserts the text at its new location). See Edit Menu, Cut Option, Paste Option, Note Pad.

Moving the Cursor Cursors are symbols that mark the location on the screen where the next action will occur, which could be supplying input to a computer program, entering the next portion of a program line, entering text in a word processor document or deleting characters or text. In many Macintosh screen displays, pointers rather than cursors are used to initiate and locate action. This is the case with the Finder when pointers and highlights are used instead of cursors to indicate to the user what is happening and where it is happening on the screen. Cursors are used in many situations in Macintosh applications. A pointer is used to position a cursor in the correct location on the screen. Pointers are moved from one place to another with the mouse; cursors are moved with key strokes. As a letter or number is typed, the cursor moves across the screen one space at a time to the next space where a character may be entered. The same thing happens in the opposite direction when a character is deleted. When the Return key is pressed, the cursor is moved down one line and moved all the way to the left-hand side of the screen. In such cases, the cursor appears as a flashing vertical bar. It may be returned to the upper left-hand corner of the screen or to any other location on the screen by moving the pointer to a new location and clicking the mouse button once. In those applications where the Tab key is used, the cursor can be moved to the next tab position on a line by pressing the Tab key. MacWrite and Microsoft Word use this feature. The Tab key is used in some database management programs to move the cursor from one entry field to another. See Clicking, Vertical Bar Cursor, Pointer.

**Moving Windows** Windows are used in many Macintosh applications, as well as by the Desktop accessories, to allow more than one thing to be shown on the screen at a time. When a Desktop accessory is opened, it is displayed in a window that overlays the current screen display. Windows may be moved from one place to another on the screen by placing the mouse pointer on the window's title bar, pressing the mouse button, dragging the window to its new location and releasing the mouse button. See Mouse Button, Dragging, Title Bar, Desktop Accessories, Window.

MPU MicroProcessor Unit. The actual chip containing the processor.

MSB Most Significant Bit.

**Multiplan\*** An electronic spreadsheet program first released for microcomputers in 1982. It was a major improvement on earlier spreadsheet releases such as VisiCalc (the first commercially successful electronic spreadsheet program for microcomputers) and SuperCalc (a VisiCalc clone). Multiplan has concentrated on simplifying the user interface (the screen as the user sees it) to make the spreadsheet easier to use and more understandable.

Multiplan divides the computer screen into a grid of rectangular cells like most spreadsheets, with a row of numbers stretching across the top and another down the side of the screen to give the coordinates for each cell. Unlike VisiCalc, which uses letters of the alphabet across the top of the screen, Multiplan uses numbers for both row and column coordinates. Thus, the first cell in the upper left-corner is referenced as "R1C1," for Row 1 Column 1. Multiplan's numbering scheme simplifies moving about the spreadsheet by using coordinates that are easy to remember.

Multiplan, as implemented for the Macintosh, uses the mouse, the mouse pointer, highlighting, a menu bar and many other features of the Macintosh User Interface Toolbox.

Creating a spreadsheet involves placing numeric values in the different cells and then relating them to other cells, using mathematical formulas. For example, the cells R1C1, R1C2 and R1C3 each represent a value and might be added together in the formula R1C1+R1C2+R1C3; the total of this formula appears in a fourth cell somewhere on the spreadsheet.

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Creating a formula by adding three cells together may seem simple, but in more complicated arithmetic, trying to keep cell coordinates straight can be awkward. One of the outstanding features of Multiplan is its ability to give individual cells meaningful names. For example, the value in R1C1 can be given the name SALES if the value the cell holds is a sales statistic. The value in another cell can be named COSTS. Multiplan enables you to use the names of cells in your math to create a formula of SALES-COSTS with the new value appearing in a cell named PROFITS. This ability to name cells and use them in spreadsheet mathematics simplifies the logic required to create complicated spreadsheets. This feature alone represents a significant enhancement in the user interface over Multiplan's predecessors. See Microsoft Multiplan, Spreadsheet, Menu Bar, User Interface Toolbox. Microsoft Corporation.



Fig. M10 The Control Panel window displayed on a Multiplan screen display with the mouse pointer on the title bar. This window may be dragged to a new location by pressing the mouse button, holding it down and moving the mouse until the window is where you want it. Then the mouse button is released.

**Multiplan Made Easy - Macintosh Edition\*** By Walter A. Ettlin. This book helps you get the most out of Multiplan on the Macintosh. It deals with basic commands, building worksheets, data entry, advanced mathematical operations and using BASIC to deal with worksheets. Osborne/McGraw-Hill.

**Multiple Microsoft BASIC Statements on One Line** You can put a colon (:) at the end of one statement and continue entering another statement on the same line, without giving a new line number. The line number at the left refers to all statements on the line. An apostrophe (') allows a comment or remark to be added after a statement, with or without a separating colon.
**Multiplex** Use the same component for several distinct functions, either sequentially or simultaneously. For example, the address lines of an MPU are often used as the data lines at another point in time.

**Multitasking** Running two or more tasks concurrently on a single computer. The MPU actually works on only one task at a time, but it switches back and forth so rapidly it creates the impression that all tasks are being processed concurrently.

**Murder by the Dozen**<sup>•</sup> presents twelve murder cases for the players to solve. A crime computer plays a large part in the game, supplying information about the victim and analyzing physical evidence. Up to four people can play at the same time. Two reference manuals are supplied with the game and worksheets are provided to assist in solving the mystery. CBS Software. In UK: Softsel.

Music Software See Professional Composer.

# N

N ASCII 78, HEX 4E. n ASCII 110, HEX 6E.

NAME (Microsoft BASIC) Used to change the name of a file on a disk. It is used in the Command window by typing:

NAME (oldname) AS (newname)

(oldname) is the name of an existing file on a disk. (newname) is the new name this file is to be given.

When this direct command is used, the designated disk drive will rewrite the name of the file in its directory. Only an existing file on an active volume (disk drive) can be renamed in this fashion. The file that is renamed may be any file or document on the disk.

**Name Command (Microsoft Multiplan)** One of the features of Microsoft Multiplan is the program's acceptance of names for designated cells, designated portions of rows, designated portions of columns and designated blocks of cells. Names can be used in formulas instead of cell references. Thus, if you named the contents of a cell SALES, representing the total sales done by a company in a month, this name could be used in a formula elsewhere on the spreadsheet. This cell could contain a formula that totalled the contents of ten cells above the cell. These cells could contain the sales results of ten different salesmen. Another cell could be named COSTS, representing the total of a number of cells above it containing product and production costs for the month. A third cell could be named GROSS PROFIT, and could contain the formula = SALES – COSTS.

A cell or range of cells is named in Multiplan by highlighting the cell or cells (holding down the mouse button) while the plus sign pointer is dragged across the cell or cells. When the cell or cells have been highlighted, the Define Name command option must be selected from the Select menu on the menu bar. This will cause a dialog box to be displayed requesting the name. The name is then typed into the Name: rectangle on the bottom of the dialog box and the OK button is clicked to supply the name to the program. See Mouse Button, Dialog Box, Button.

Names In Microsoft BASIC. See BASIC, Variable Names.

Naming Disks When a Macintosh disk is initialized, the Operating System asks the user to name the disk. This request appears on the screen in the form of a window called a dialog box. The name of the disk is entered in a rectangle within that dialog box directly under the words "Please name this disk." Once the name has been entered, the OK button may be clicked or the Return key pressed. Disk names may be up to 27 characters in length. A disk name may not contain a colon and may not start with a period. All other characters from the keyboard may be used within a name or to start a name. See Dialog Box, Button, Disk, Initialize a Disk.



Fig. N1 A Microsoft Multiplan screen display while the name command is in use. Note the dialog box and the Name rectangle.



Fig. N2 The dialog box that is presented when a disk has been initialized and must be named.

Naming Documents Documents are files generated by an applications program such as MacPaint, MacWrite and Microsoft Multiplan. Documents are named when the Save or Save As... command is selected from the File menu on the menu bar. When the command is selected, a dialog box is displayed on the screen requesting the name of the document be typed into the input rectangle located under the words "Save current document as" or "Save document as." Once the name has been entered in the rectangle, the Save button may be clicked or the Return key may be pressed. Document names may be up to 63 characters in length and may not contain a colon or start with a period. Any other keyboard characters may be used in document names. See Button, Document, Dialog Box.

**Naming Folders** Special directory files used to organize files on a disk are called "folders" and are created by selecting the Empty Folder icon from the Desktop and using the Duplicate command option from the File menu on the menu bar. This process creates a second empty folder named Copy of Empty Folder. This copy may be given any name the user desires by moving the pointer to the extreme right-hand side of the words "Copy of Empty Folder." As the pointer nears the words, it changes from an arrow head pointer to an I-beam pointer. Make sure that it looks like the I-beam when it rests on the extreme right-hand side of the words, and then click the mouse button. This will change the I-beam to a vertical bar cursor. Backspace this cursor over all of the letters until just the cursor remains on the line of words. Then

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type in the name you wish to give the folder. Move the pointer to anyplace on the Desktop and click the mouse button. The new name will then be recorded for the folder. See Mouse Button, Menu Bar, I-beam.



Fig. N3 A MacPaint screen display illustrating the dialog box used when the Save as command option is selected from the File menu on the menu bar.

NAND NOT-AND Logical. See AND.

**Negotiation Edge, The\*** A program that analyzes a negotiation situation based on data about the parties involved. It then suggests a strategy to follow as the negotiations proceed. This program is also useful as a training aid and in evaluating employee performance in negotiations. Human Edge Software Corporation.

**Nested Subroutine** A subroutine within another subroutine. The nested subroutine is completed first, and the outer subroutine is completed after the nested subroutine has finished.

**Network** An interconnected system of computers. AppleLine and the AppleBus may be used in the networking process with the Macintosh. See AppleLine, AppleBus.

**NEW** A Microsoft BASIC command which deletes the program currently in computer memory and clears all variables. The format is:

NEW

NEW is generally used to clear all memory before entering a new program. Microsoft BASIC will always return to command level after NEW is executed. NEW causes all files to be closed and turns TRACE off, if it was on. See also TROFF/TRON. NEW is not implemented in Compiler Microsoft BASIC.

The NEW command may be used in Microsoft BASIC on the Macintosh in two different ways: typed in the Command window when Microsoft BASIC is being used or selected from the File menu on the menu bar at the top of the screen display. See Menu Bar, File Menu.

**New York** New York is one of the fonts available to the user of MacPaint and MacWrite. This font is selected by using the pull-down Font menu on the menu bar. A sample is presented below. See Menu Bar, Fonts, Pull-down Menu.

## This is an example of New York 9 point plain text. This is an example of New York 10 point plain text. This is an example of New York 12 point plain text. This is an example of New York 12 point bold. This is an example of New York 14 point bold. This is an example of New York 18 point bold. This is an example of New York 18 point outling. This is a 24 point shelow.

Fig. N4 A sample of the text generated by the New York font from MacWrite.

**NEXT** In Microsoft BASIC the end of the FOR...NEXT loop. This statement tells the program to perform a series of instructions a specific number of times. It is used with the FOR statement in a combination of statements called a FOR...NEXT loop. See FOR...NEXT.

Nibble Half a byte or 4 bits.

**No Decimal Command** Allows whole numbers to be displayed. Electronic spreadsheet programs allow the user to format numbers in a variety of ways. Most provide various decimal and currency options. Some provide commas at the '000 points in numbers. All have an integer or "no decimal" format. Microsoft Multiplan uses the No Decimal command option on the Format menu to set this format, which may be used on any cell, range of cells or block of cells that has been highlighted with the mouse pointer prior to exercising the command. See Mouse Pointer, Format Menu.

Noise Interference on a system communications line; random unknown signals.

**Nondestructive Readout** This occurs when the memory contents are not erased or displaced when other data is read.

**Nonstartup Disk** A startup disk loads the Disk Operating System into RAM when the disk is booted. The System Folder must be present on a Macintosh disk for the disk to be considered a startup disk. A nonstartup disk may be used to store files but requires a startup disk be booted prior to using the nonstartup disk. See RAM, Startup Disk, System Folder, Disk Operating System.

Nontext File Editors A text editor is an editor program specialized for text files and manipulates ASCII characters such as letters, punctuation marks, etc. EDLIN (the

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Microsoft BASIC editor for versions of Microsoft BASIC for computers other than the Macintosh) and word processing programs are text editors. Their basic function is to create and change text data such as a letter, report, program or book.

Nontext editors usually display and modify a byte of storage as either two hexadecimal digits or a three-digit numeric ASCII value. See Editor, Edit.

**NOT** Negative operation which changes every 1 in a byte to 0 and every 0 in a byte to 1. Also used as a logical operator to reverse the outcome of a conditional test in many languages (If x NOT = 1).

**Note Pad** The Note Pad is one of the Macintosh desk accessories available from the Apple menu on the menu bar. It can be used to keep notes while you are working on a document. Text can be moved into the Note Pad by using the Cut option or the Copy option from the Edit menu while the document is being displayed and then the Paste option from the Edit menu while the Note Pad is being displayed. Once text has been moved to the Note Pad, it can be edited and returned to the document by cutting it or copying it from the Note Pad and pasting it into the document. The Note Pad has eight pages that may be turned by placing the mouse pointer on the turned-back corner at the lower left-hand side of the Note Pad and clicking the mouse button. Notes may be removed from the Note Pad by cutting them. This involves highlighting them and using the Cut option from the Edit menu. If notes are left on the Note Pad when you close an application and eject a disk, these notes are saved in the Note Pad file in the System Folder of a startup disk. When the application is used again, the notes are moved back into the Note Pad. See Desk Accessories, Menu Bar, Apple Menu, Edit Menu, Cut Option, Copy Option, Paste Option.



#### File Edit Goodles Fant FantSize Style

Fig. N5 The MacPaint Note Pad.

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**Note Pad File** Any time that notes are left on the Note Pad in a Macintosh application which is closed, these notes are saved in a Note Pad file that is reloaded into memory when the application is rebooted from the same disk. See Note Pad.

**NPL Information Management System**<sup>•</sup> This a database manager and a report generator, that uses simple English language sentences to request data input from the user, to allow the user to make queries and to generate reports. Records may be merged, sorted, selected and printed. Each record may consist of 4000 bytes in 100 fields. Desktop Software Corporation.

NSEC NanoSECond. One nanoSECond is equal to one-billionth of a second.

Null String or File A string or file with no contents at present.

Number, Convert from String See CVI, CVS, CVD.

Number, Convert to String See MKI\$, MKS\$, MKD\$.

Number Crunching The performance of complex arithmetic operations and computations.

**Number, Largest Line** In Microsoft BASIC, the largest possible line number is 65529. Each program line can contain up to 255 characters.

**Number of Decimals Command** If an electronic spreadsheet program allows the user to fix the number of decimals in the numeric format of a cell, range of cells or block of cells, there is a method available on one of the menus of the program to set the number of decimal spaces. Microsoft Multiplan uses a Number of Decimals option from the Format menu. This option is exercised after the Decimal option on the same menu. It is still available if the Commas option is used. When this option is selected, a dialog box is displayed requesting that the number of decimals number from 1 to 15 be entered in the Input rectangle in the dialog box. See Dialog Box, Format Menu, Decimal Command.

Number of Files on Disk See Disk Capacity.

**Numbering Pages** Word processors usually paginate documents automatically for the user. MacWrite will automatically number pages in a Header or in a Footer as directed by the user. Both the header window and the footer window contain a small icon with a number sign on it. This icon is in the upper left-hand corner of the window. When this icon is dragged to a location in the Footer window or Header window, the page number is printed in this location on each page. The starting page number for a document is provided by using the Set Page # option from the Format menu.

**Numeric Keypad** An accessory is available for the Macintosh upon which numeric operations and data can be entered. The numeric keypad connects to the Macintosh via the keyboard socket on the lower right-hand side of the front of the Macintosh. The keyboard is then connected to a similar socket on the back of the keypad. For the person who has been using a calculator or adding machine, the numeric keypad is much easier than using the numbers that run across the top of the Macintosh keyboard. There are keys for each of the numerals between 0 and 9, a Clear key, an Enter key, a decimal or period key, a minus sign key and four keys that use the shift key. One of these keys has a left arrow and a plus sign. Another has a right arrow and

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the multiplication sign (\*). Another has the up arrow and the division sign (/). The last has a down arrow and decimal point. The keypad has its own microprocessor and can be used alone with the Macintosh or hooked up with the keyboard. Apple Computer, Inc.

Numeric Precision on Microsoft BASIC Conversions Microsoft BASIC can be used to convert constants from one numeric format to another. If a numeric constant of one type is set to equal a different type of numeric variable, the constant will be stored in memory as the type of variable to which it was set. Variable types are integers, single-precision and double-precision. Each type is declared by using a special character after the variable name. The percent sign (%) or the DEFINT expression is used to declare an integer variable type. The exclamation point (!) or the DEFSNG expression is used to declare a single-precision variable. The number/pound sign (#) or the DEFDBL expression is used to declare a double-precision variable. Thus if the following program was entered using Microsoft BASIC, it would produce these conversions:

10 REM THIS SECTION CONVERTS A VARIABLE TO AN INTEGER 20 A% = 19.999 30 PRINT A% 40 REM THIS SECTION CONVERTS A VARIABLE TO A 41 SINGLE-PRECISION VARIABLE 50 A! = 10/3 60 PRINT A! 70 REM THIS SECTION CONVERTS A VARIABLE TO A 71 DOUBLE-PRECISION NUMBER 80 A# = 10/3 90 PRINT A# 95 END

If this program was run, it would produce the following output:

```
20
33.33
33.333333333333333333333
```

#### Numeric Value of String See VAL.

Numeric Variable (Double-precision Floating Point) In Microsoft BASIC, numeric double-precision floating point variable names (numbers with decimal fraction up to sixteen digits) end in # or start with a series of letters specified in a DEFDBL statement, and are the default for all variables not otherwise specified.

Numeric variables must start with a letter, can have up to 40 characters, must not be any reserved words (IF, ON, THEN, GOTO, etc.) or a reserved word followed by a type declaration character (\$,%,!,#). See Reserved Words for complete list. See also Variable Names.

**Numeric Variable (Integer)** In Microsoft BASIC, numeric whole numbers (integers) from -32768 to + 32767 end in % or start with a series of letters specified in a DEFINT statement.

Integer numeric variable names must start with a letter, can have up to 40 characters, and must not be any reserved words, such as (IF, ON, THEN, GOTO, etc.) or a reserved word followed by a type declaration character (\$,%,!,#). See Reserved Words for complete list. See Variable Names.

**Numeric Variable (Single-precision Floating Point)** In Microsoft BASIC, numeric single-precision floating point variable names (numbers with decimal fraction up to six digits) end in # or start with a series of letters specified in a DEFSNG statement.

Single-precision floating point numeric variable names must start with a letter, can have up to 40 characters, and must not be any reserved words (IF, ON, THEN, GOTO, etc.), or a reserved word followed by a type declaration character (,,,!,#). See Reserved Words for complete list. See Variable Names.

# 0

O ASCII 79, HEX 4F. o ASCII 111, HEX 6F.

**Object Code** The code produced by a compiler or assembler program. The object code is either directly executed by the computer or needs further translation through a linkage before it can be executed.

**Object File** A file containing the MC68000 machine language version of a program. In most cases the object file is a translation of a source program stored in a text file.

**Object Program** Machine language program resulting from translation of a source program. See Programs, Source and Object.

**OCT\$** A Microsoft BASIC function which returns a string representing the octal value of the decimal argument. The format is:

 $\langle stringvariable \rangle = OCT(\langle n \rangle)$ 

«n» is a numeric expression in the range -32768 to 65535.

If (n) is negative, OCT\$(-n) equals OCT\$(65536-(n)) (two's complement form). See HEX\$

Octal String See OCT\$.

**Odd Parity** A byte is said to have odd parity when an odd number of bits are set to 1.

**Off-line** When a device or medium is outside of, or disconnected from, the computer system, in contrast with on-line, which means that a device or medium is inside, or connected.

A disk is off-line when it is in a box, and on-line when it is in a working disk drive. A printer is on-line if it is attached, powered on and ready to print and off-line if it is disconnected, powered off or switched to its "off-line" state by an on- line/off-line switch. See Memory, Input, Output.

**Offset Address** The smaller part of a base register/offset pair. The data to be processed is located at:

«effective address»=«contents of base register»+«offset».

**OK Button** Dialog boxes are presented by the Macintosh User Interface Toolbox to notify the user of a condition that exists with the computer or with the program in use. They are also used to obtain further information from the user prior to proceeding further with a program or a command. Many dialog boxes display an OK button, resembling a rectangle with rounded corners with "OK" inside. This button is used by moving the mouse pointer inside the rectangle and clicking the mouse button.

This action OK's whatever action is recommended in the dialog box. See Dialog Box, Button, Mouse Button, Mouse Pointer, User Interface Toolbox.

**Omnis 1--The File Manager\*** An entry-level database manager for the Macintosh. It allows 120 fields per record and up to 3000 characters per record. One file may be open at a time. It has mailmerge and letter-writing capabilities, and also contains a comprehensive report generator and full calculation capability. Organizational Software Corporation. In UK: Blythe Computers

**Omnis 2--The Information Manager\*** A sophisicated database manager with all of the capabilities of Omnis 1, plus multiple update capability, multiple delete capability and advanced error checking features. See Omnis 1. Organizational Software Corporation. In UK: Blythe Computers

**Omnis 3–The Database Manager**<sup>•</sup> A complete database management system. Up to 12 files may be open at one time. It supports both hierarchical and relational data structures. The user may write custom messages and can generate complete turnkey systems. Organizational Software Corporation. In UK: Blythe Computers

**One Line, Advancing on the Printer** To advance one line on the printer (space up) without carriage return, enter:

LPRINT CHR\$(10)

or use the "line feed" button (LF) on the printer.

Entering just LPRINT gives both a space up one line (line feed) and a return to left margin (carriage return).

**ON ERROR GOTO** In Microsoft BASIC this statement allows the user to set up error handling routines within a program. The syntax of this statement is:

ON ERROR GOTO dinenumber

dinenumber is the line in the program that starts error handling activity. The RESUME statement is required after the end of the error-handling routine to enable the program to continue its execution.

If the program line states ON ERROR GOTO 0, the computer will print an error message for the first error encountered indicating BREAK IN LINE ---.

**ON GOSUB and ON GOTO** These are Microsoft BASIC statements that tell the program to branch to a specified line number depending upon the value of an expression. The formats are:

ON (n) GOTO (line)[,(line)...] ON (n) GOSUB (line)[,(line)...]

(n) is a numeric expression which is rounded to an integer, if necessary, and must be in the range 0 to 255, or an "Illegal function call" error is displayed.

(line) is the line number you wish to branch to.

The value of  $\langle n \rangle$  determines which line number in the list will be used for branching. If the value is 4, the fourth line number in the list will be the destination of the branch.

In the ON...GOSUB statement, each line number in the list must be the first line number of a subroutine. This means that it will be necessary to have a RETURN

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statement to bring you back to the line following the ON...GOSUB.

If the value of m is zero or greater than the number of items in the list (but less than or equal to 255), Microsoft BASIC will continue with the next executable statement.

**On-line** This means that a device or media is inside or connected, opposed to off-line, which means that a device or medium is outside of or disconnected from the computer system.

A disk is off-line when it is in a box, and on-line when it is in a working disk drive. A printer is on-line if it is attached, powered on and ready to print. The printer is off-line if it is disconnected, powered off or switched to its "off-line" state by an on-line/off-line switch. See Memory, Input, Output.

**OPEN** A Microsoft BASIC statement which allows I/O to a file or device. The formats are:

OPEN (filespec: [FOR (mode1)] AS [#](filenum) [LEN=(recb)] OPEN (mode), [#](filenum), (filespec: [, (recb)]

(mode1) in the first form may be one of the following:

OUTPUT, which specifies sequential output mode.

INPUT, which specifies sequential input mode.

APPEND, which specifies sequential output mode where the file pointer is positioned to the end of data on the file when it is opened.

(mode1) must be a string expression not enclosed in quotations marks. If mode is left out, random access is assumed.

<mode2> in the second form is a string expression whose first character is one of the following:

O, which specifies sequential output mode.

I, which specifies sequential input mode.

R, which specifies random input/output mode.

A, which specifies sequential output mode and places the file pointer at the end of the file.

The following are true for both formats:

(filenum) is an integer expression whose value is between one and the maximum number of files allowed. The default maximum in Microsoft BASIC is three, but you can change this with the /F: option on the Microsoft BASIC command.

(filespec) is a string expression for naming the file.

(rec) is an integer expression. If it is included, it sets the record length for random files. It may be in the the range 1 to 32767. (recl) is not valid for sequential files. The default record length is 128 bytes. (recl) cannot exceed the value set by the /S: option on the Microsoft BASIC command.

OPEN makes a buffer (for I/O) available to the file or device and determines the mode of access used with the buffer. (filenum) is the number that is associated with the file for as long as it is open and is used by other I/O statements to refer to the file or device.

An OPEN must be executed before any I/O may be done to a device or file by any statement or function requiring a file number, including the following:

PRINT# PRINT# USING WRITE# INPUT\$ \$\$\$FL

GET and PUT can be used for random files or communication files. A disk file may be either random or sequential, and a printer may be opened in either random or sequential mode. All other devices may be opened only for sequential operations.

**INPUT #** 

PUT\$FL

GET

LINE INPUT#

Microsoft BASIC normally adds a line feed after each carriage return (CHR\$(13)) sent to a printer. However, if you open a printer (LPT1:, LPT2: or LPT3:) as a random file with width 255, this line feed is suppressed.

APPEND can only be used for disk files. The file pointer is initially set to the end of the file and the record number is set to the last record of the file. PRINT# or WRITE# will extend the file.

You can have a particular file open, at any one time, under different file numbers. Different modes can then be used for different purposes. You may also use different file numbers for different access. Be careful when writing or using one file number and when reading using another file number (each file has a different buffer). A file cannot be opened for sequential output or appended if the file is already open.

Three files is the default maximum for Microsoft BASIC. You can override this value by using the /F: option on the Microsoft BASIC command.

A nonexistent file opened for input will cause a "File not found" error to be displayed. If a file does not exist, and is opened for output, append or random access, a file is created.

Attempting to enter parameters outside the given range will cause an "Illegal function call" error to be displayed, and the file will not be opened.

**Open** In order for a program to be run, the files with necessary data must first be opened so that the data contained is available to the running program. A file, document or application may be opened by typing Open in the Command window followed by the name of the file, document or application, or by selecting Open from the File menu on the menu bar. See Menu Bar, File Menu.

**Opening a Document** Documents may be opened directly from the Desktop or from within an application. Using the Desktop, you would move the mouse pointer onto the document icon and click the mouse button twice. This action causes the application on which the document was written to be opened first if that application is also on the same disk. If it is not on the disk, an alarm box indicating that there is no application available to use will be displayed. If you wish to open a document from within an application, use the Open command option from the File menu. When this command is selected, a dialog box listing all of the documents on the disk is displayed. To open one of these documents, press the mouse button, move the highlight down the list until the desired document is highlighted and release the mouse button. See Menu Bar, File Menu, Desktop, Icon, Dialog Box.

**Opening an Application** To open an application such as MacWrite, first open the disk icon for the disk that contained the application, by making sure the disk is in the disk drive, and then by moving the mouse pointer onto the disk icon and clicking the mouse button twice. Then the directory window for that disk is opened and displayed on the screen. Next, the pointer is moved onto the MacWrite icon and the mouse button is double-clicked. This causes the application to be opened. The same

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process can be accomplished by highlighting the MacWrite icon by placing the mouse pointer on the icon and clicking the mouse button once. The application can then be opened by using the Open command option from the menu bar. See Mouse Button, Disk Icon, Icon, Directory.

**Opening an Icon** Icons represent disks, folders, applications, documents, BASIC programs and other files in the Desktop display on the Macintosh. Any of these icons and the thing they represent may be opened in two ways from the Desktop. First, an icon may be double-clicked. This means that the mouse pointer must rest on top of the icon to be opened and the mouse button must be clicked twice. The second method requires the use of the Open command option from the File menu. Place the mouse pointer on the icon to be opened, click the mouse button once to highlight the icon, move the mouse pointer to the File menu, press the mouse button, drag the highlight on the pull-down menu to the word Open and release the mouse button. See File Menu, Icon, Menu Bar, Mouse Button, Mouse Pointer.

**Opening a Window** Windows are used to represent a number of the features of the Macintosh, including the directory of files on a disk. They are also used to display the Desktop accessories accessed from the Apple menu. Windows are usually opened from the menu bar. The List window in Microsoft BASIC is opened by selecting List from the Control menu. It may also be opened by entering LIST in the Command window at the bottom of the screen. Folders are diplayed as windows when they are opened by double- clicking them. Disk icons are displayed as Directory windows when they are opened by double-clicking the disk icon. Windows overlay the rest of the screen display. They may be moved around the screen by placing the mouse pointer on the title bar and dragging them to a new location. Window sizes may be altered by contracting or stretching the window with the size box in the lower right-hand corner of the window. The contents of a window may be scrolled by using the scroll bars on the right-hand side of the window and along the bottom of the window, Disk Icon.

**Operand** Operations are performed upon entities called the operands. For example, LET A=B+C specifies that addition be performed on the operands B and C.

**Operating System** The software which manages the hardware and the logical reasoning of the computer. The Macintosh Operating System is located in Read-Only Memory, the permanent memory that is not lost when the computer is turned off. It consists of machine language routines that handle interrupts, manage memory use, manage interpretation of events from the mouse and the keyboard, manage Input and Output functions, manage files, manage interfacing with serial devices, provide for sound generation and manage interfacing with serial devices.

**Operation** Action of a program resulting in a defined instruction being executed and carried out.

**Operator** Person using the program (user). For programs you write, the operator will often be you. But if others will ever use your program, you need to give some thought to giving clear prompts for every item of input data, freezing the screen long enough for them to read or act on the information displayed, providing clear error messages if anything is entered incorrectly or error situations arise, etc. This is often referred to as "human engineering," making the program easy to use as well as technically correct. Another term for this side of programming is making the program "user friendly."

Several other guidelines exist for writing user-friendly programs. If a complex series of data items has been typed in but some entries turn out to be invalid, the user should be able to reenter only the bad items. Error messages should indicate not only that an entry is invalid, but also in just what way it is invalid and, if at all possible, some hints as to how to correct it (such as a list of possible correct values).

**Operators** Symbols within a program, such as \* for multiply, - to subtract or + to add, which specify what operation is to be performed.

**Optimization** Changing either the software or the hardware of a computer system so that it operates faster or more efficiently.

**OPTION BASE** A Microsoft BASIC statement that declares the minimum value for subscripts for an array. Subscripts are integer values that indicate the minimum number of items that will be used in an array. The minimum value is the lowest value that a subscript may have. The most common minimum values are 0 and 1. OPTION BASE sets this value. If OPTION BASE 0 is declared, the lowest possible value of the subscript is 0 and either positive or negative numbers may be used in the array. If no value is given to OPTION BASE, the default value is 0. If OPTION BASE 1 is declared, the lowest possible value of the subscript would be 1. The syntax for this statement is:

OPTION BASE (III)

(n) is the integer used to declare the minimum value for the array subscript. The OPTION BASE must be declared before any arrays are defined and used in a program. See DIM.

**Option Key** The Option keys are in the lower left-hand and right-hand corners of the Macintosh keyboard. This key is generally used to supply optional character sets to the user. The Option key supplies the following accent marks:

Option ' provides a grave accent (').

Option e provides an acute accent ( ').

Option i provides a circumflex ().

Option u provides an umlaut (").

Option n provides a tilde ().

The Option key is used with the key combinations listed above by typing the Option key and the other key together followed by the key that will need the accent mark. If the accent mark is needed alone, the Option key combination is pressed twice in succession.

The Option Key is also used in MacPaint to make copies of shapes and images, which must first be selected with the dotted rectangle tool or the lasso. Then the pointer is moved onto the shape and the Option key and mouse button are pressed and held down while a copy of the shape or image within the rectangle or lasso is moved off of the original. The Option key and mouse button are held down until the copy has been moved to the location where it belongs. Then they are released. If the Option key and Command key are held down together, repeating copies are made of the selected image or object. See Mouse Button, Command Key, Lasso.

**Options from Menu** A menu is a screen display which lists a number of possible options and asks the user to select one. When a selection is made by positioning the highlight on the menu by dragging the mouse pointer down the list and releasing the mouse button at the desired option, the highlighted function is performed. This may

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require either a branch or subroutine call to the code for the function, or the program to carry out this function may be loaded into memory and executed. If further information or instruction is required by the program, a dialog box will be displayed.

**Options Menu** The Options menu in Multiplan contains ten command options. These options are Freeze Titles, Unfreeze Titles, Set Page Break, Remove Page Break, Show Formulas, Show Values, Protect Document, Unprotect Document, Remove Cell Protection and Restore Cell Protection. Freeze Titles is used to lock titles (labels) in place vertically and horizontally to assist in reading and entering data into the spreadsheet by allowing cells below or beside locked titles to be scrolled under the titles rather than over them. Unfreeze Titles reverses the Freeze Titles command. Set Page Break forces a page break at a point on the worksheet selected by the user. When a page preak is encountered, the printer advances the paper to the top of the next page before continuing to print. Remove Page Break reverses Set Page Break. Show Formulas is an option that tells Multiplan to display the formulas within each cell rather than displaying numbers. The Show Values option tells Multiplan to display the values in each cell containing a formula rather than displaying the formulas. Protect Document prevents data from being written to a document and prevents a document (worksheet) from being altered. Unprotect Document reverses Protect Document. Remove Cell Protection is used to allow protected cells to be written to or altered. Restore Cell Protection reverses Remove Cell Protection.

**Options, Program or Device** Values which determine the functioning of a device or program. For example, the screen can be set to 40 columns wide or 80 columns wide, the screen-width option.

**OR (Logical Operator)** One of the six logical operators available to the user of Microsoft BASIC. If either of two conditions separated by OR is true, the complex condition is true. If both conditions are false the complex condition is false. In tabular form:

A	В	A OR B
т	т	т
Т	F	т
F	т	т
F	F	F

**OS** Operating System.

**Output** Information coming out of a program, going to a screen, printer, disk, speaker, etc.

**Output** WRITE data from memory. Memory is any device which can store information and allow it to be retrieved when needed. The Macintosh relies primarily on Random Access Memory (RAM), Read-Only Memory (ROM), disks and hard disks. ROM and RAM together make up the internal memory or main memory of the Macintosh, or any other computer.

Contrast this with external memory such as disk and hard disk, which involve mechanical motion to retrieve data and are hundreds or thousands of times slower than internal memory. Data in internal memory is immediately available to programs for processing. Data in external memory must be copied into internal memory (READ or INPUT), processed, then copied back out to external memory (WRITE or OUTPUT).

If data has been created, it can be written out to external memory without a READ first. If data read in from external memory has not been modified, there is no need to write it back out since the original copy is still there.

**Output Window** Microsoft BASIC employs three windows. These windows are the Command window, the List window and the Output Window. The Output Window is used to display output from a program. This includes menus, mathematical results, graphics, and whatever other material is generated by a Microsoft BASIC porgram.

**OV** OVerflow occurs when the number of digits that result from a mathematical operation exceeds the amount of storage available to hold the result. The response depends on the language in which the program was written.

**Overlay** Different routines within a program which occupy the same memory location. They are loaded as needed during the operation of a program. Conflict can occur if two routines with different overlays try to use the same location at the same time.

**Overstriking** The printer returns to a position where a previous character was struck and strikes a new character on top of it producing a combination character. Also called "boldfacing."

**Overvoltage Protection** The computer's circuitry is protected from undesirable increases in the AC power line voltage.

# P

P ASCII 80, HEX 50. p ASCII 112, HEX 70.

P Parity. See Parity.

**Package, Software** A group of computer programs, possibly including data files and documentation, used to perform a function or group of related functions on the computer. Applications software are devoted to an end-user task. Examples would be a word processing package, an accounting package, etc. Systems software packages facilitate the use of the machinery, such as a database management package, a disk operating system or a program development package.

**Packet** A short set of data with the length of the data stored in the first few bytes. The set is then transferred in a network of devices.

**Pad** The rectangular base where the wire of a computer chip is connected. Also, to fill a data field with blanks.

**Page Break** Word processors are capable of inserting page breaks where required, using special command sequences to instruct the program to insert page breaks. To insert a page break at a particular point in a MacWrite document, you would move the I-Beam pointer to the line where you wish a page break and click the mouse button once. Then, move the mouse pointer to the Format menu on the menu bar and press the mouse button. This displays the Format menu. Then drag the pointer and the highlight down the menu until Set Page Break is highlighted. Release the mouse button. This will force a page break at the insertion point.

Page Length on Printer To set page length (for example) to 55 lines per page, enter Microsoft BASIC statement:

LPRINT CHR\$(27);"C";"55"

See Control Characters for Printer.

**Page Numbering** Word processors are capable of numbering successive pages automatically by selecting the top or bottom of the page and the line in the header or footer where the page number will appear. MacWrite will automatically number pages starting with a designated page number using the Show Header or Show Footer option from the Format command menu on the menu bar. If you want the page number at the top of the page, use the header, or at the bottom of the page use the footer. Once the header or footer ruler to the location in the header or footer where you want the page number to be printed. Once the page number icon has been placed, the Set Page # command option may be selected from the Format

menu to specify the page number from which all numbering starts. See Menu Bar, Header, Footer, Format Menu, Show Header Option, Show Footer Option, Icon.



Fig. P1 The Footer window with the page number icon in place to number pages. The mouse pointer is just below this icon.

**Page Setup** Most Macintosh applications allow the printed page to be set up by the user from the File menu on the menu bar. When this command option is selected, a dialog box is presented that allows paper size and page orientation to be specified. The choices for page size are US Letter (standard 8-1/2 by 11 inches), US Legal (standard 8-1/4 by 14 inches), A4 Letter (standard European 8-1/4 by 11-2/3 inches), and A4 Fanfold (standard International 8-1/4 by 12 inches). The choices for page orientation are Tall (text upright on page with first line at top of the page), Tall Adjust (same as Tall but pictures are printed proportionately) and Wide (text printed sideways on page with top line running down the right-hand side of page). Selections are made by placing the mouse pointer on the circle to the left of the desired choice and clicking the mouse button. See File Menu, Dialog Box.

Paper:	<b>OUS</b> Letter	O A4 Letter		OK
	O US Legal	O International Fe	anfold	
Orientat	ion: 🔘 Tall	() Tall Adjusted	() Wide	Cancel

Fig. P2 The page setup dialog box.

**Paging** To switch from one full screen of information to another, especially in a word processing program, you can page either backwards or forwards.

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Paging is accomplished on the Macintosh by using the scroll bar on the right-hand side of a window, which contains a scroll arrow and a scroll box. The scroll box is sometimes called an "elevator." Text may be scrolled up or down by placing the mouse pointer on the arrow, on the scroll box, just above the scroll box or below the scroll box. Clicking the scroll arrow at the top of the scroll bar moves the text in the document down one line. The arrow on the bottom of the scroll bar is used to move the text up one line. If the pointer is placed in the gray area above the scroll box, the text is scrolled down one full window height. If it is placed in the gray area below the scroll box, it is scrolled up one full window height. The scroll box itself is used to scroll to any place in the document. This is accomplished by placing the pointer on the scroll box and dragging it up or down the scroll bar until the desired portion of the text is displayed in the window.

In memory, a page is a logical set of storage used for the management of memory; in a paging system, the memory location is designated by a page number or address and an address within the page. See Mouse Pointer, Dragging, Window, Scroll Bar, Scroll Box, Scroll Arrows, Document.

**Paintbrush** One of the tools available from the drawing tool palette of MacPaint. This tool provides the user with a variety of brush shapes and access to the brush mirrors. It is used to draw a line the shape and thickness of the brush shape selected from the Goodies menu on the menu bar. The paint brush is selected by moving the mouse pointer onto the paintbrush icon on the drawing tool palette and clicking the mouse button once. Brush shapes are selected by using the Brush Shape command option from the Goodies menu. Brush mirrors are selected from the same menu. See Goodies Menu, Menu Bar, Drawing Tool Palette, Brush Shape, Brush Mirrors.



File Edit Goodies Font FontSize Style

Fig. P3 The brush shape window from the Goodies menu.

**Paint Can** A tool available from the drawing tool palette on the left-hand side of the MacPaint screen display, which is used to fill shapes in the drawing window with the

active pattern from the pattern palette located on the bottom of the MacPaint screen display. This tool is selected by placing the mouse pointer on the paint can icon and clicking the mouse button once. It is used by moving the paint can over the screen display until the bottom of the paint that is being poured is inside the boundaries of the shape to be filled. The pattern palette on the bottom of the screen should be checked to ensure that the desired pattern is in the leftmost box of the palette. If not, the desired pattern may be selected by placing the mouse pointer on the pattern and clicking the mouse button once. Once the paint can is in the proper position and the desired pattern selected, the area or shape may be filled by clicking the mouse button once. This action can be undone by using the the Undo command option from the Edit menu on the menu bar at the top of the screen display. If the mouse button has been clicked at any time after the shape has been filled and the Undo option is selected, the action cannot be undone. See Mouse Button, Menu Bar, Drawing Tool Palette, Pattern Palette.



File Edit Goodies Font FontSize Style

Fig. P4 Using the paint can to fill a shape drawn on MacPaint.

**Paintmover\*** An inexpensive program for the Macintosh that converts MacPaint files into a format acceptable to Microsoft BASIC. This program may be used to create action games, menus and forms. Macinsoft. In UK: Softsel.

**Panes** The Macintosh User Interface Toolbox produces windows that divide into two windows called "panes." The contents of one pane may be scrolled independently of the contents of the other pane. Microsoft Multiplan uses this feature when the Freeze Titles command is selected from the Options menu on the menu bar. This feature locks a portion of the screen into an upper and lower window. It allows the upper window to scroll horizontally with the lower portion of the screen, but does not allow vertical scrolling of the upper window. See Options Menu.

#### 230 • Parallel

**Parallel** Simultaneous handling of processes, transmissions or storage of data. In most microcomputers, parallel I/O connections have eight wires to carry eight bits of a byte simultaneously (or in parallel). Contrast this with a Serial interface, where only one data wire is available. The eight bits of a byte are transmitted one after another (or serially). The I/O device must collect all eight bits and reconstruct them into one eight-bit byte.

**Parameter** Another name for a definable variable in a program or system which can be used to send information to and from a subroutine or procedure. A parameter may take on various values which are used in subsequent processing by a program.

**Parity** An error detection technique that uses a one-bit indicator at the end of a word. Odd parity sets the parity bit to make the total number of 1 bits odd. Even parity sets the parity bit to make an even number of 1 bits.

**Pascal** A structured computer language, descended from ALGOL 60, a computer language created when FORTRAN became too cumbersome. ALGOL is an excellent language for defining algorithms, but it is very complex and hard to learn. Pascal was created by Niklaus Wirth from ALGOL and PL/I and is a language that is easy to use and learn. It is useful for defining algorithms and data structures. Pascal is an extremely compact, compiled language. Its compiler occupies only a small amount of memory space. It is suitable for a wide variety of chores, from systems to application programming, and is both explicit and verbose, making it easy for relatively naive readers and those other than the original programmer to understand.

It is structured, and all structured languages represent a major improvement for programmers who want to predict the behavior of a program. It is much easier to understand the function of an IF ... THEN ... ELSE structure than to trace GOTOs and statement labels to remote, unpredictable places in a program. Pascal has most of the structures necessary to write a completely structured program (without GOTOs). Some of the dialects of Pascal implement all the necessary structures. In any case, it allows for more complete structuring than even FORTRAN 77 or the semistructured dialects of COBOL.

Pascal is strongly typed. The "type" (floating point, integer, set, record) of a variable is traced even through procedure calls, where a language like FORTRAN only checks the type through the current local routine. This helps to point out a major class of programming errors. Pascal, like other recent languages, requires the explicit definition of all variables as a guard against introducing a misspelled variable, otherwise difficult to spot.

The Pascal standard includes an input/output package. This is important for a language intended to be used in textbooks, but fixes the style of I/O that can be done from Pascal.

Pointers and records give the high-level language programmer access to powerful techniques formerly only available to assembly language programmers for handling complicated data structures like linked lists and trees. You can handle these structures explicitly in Pascal. In a language like FORTRAN these structures would have to be "simulated" inside an array with the structure diagrammed only in documentation or the inside of the programmer's head.

Currently, there are many implementations of Pascal. There are several standalone compilers that run under various operating systems. There is also an operating system written primarily in Pascal, called the P-System, available on a wide range of computers, contributing to the portability of programs written in Pascal. See UCSD P-System, Macintosh Pascal, MacPascal.

Pass To make information from one process or program available to another

process or program, similar to a football pass, except that one or more bytes of data replaces the football (and the receiver is a program). The sender may be a program or a person typing the data onto a command line to be "passed" to a program. The most common example would be a Microsoft BASIC program passing variables to a subroutine.

**Password** Used for identification and security purposes on a computer system. Each user is assigned a specific set of alphanumeric characters to gain entrance to the entire computer system or to parts of the system. Microsoft Multiplan asks for a password when a worksheet is protected by using the Protect Document command option from the Options menu on the menu bar. This password is requested when the protection is removed. If the user forgets the password, the protection will not be removed from the document and the user will be unable to write data to the document. See Menu Bar, Options Menu.

**Paste and Link Option** Microsoft Multiplan is one of a very few spreadsheet programs that allows portions of one worksheet to be permanently linked and copied to another worksheet. To use this command, the portion of the worksheet to be linked must first be highlighted by dragging the mouse pointer over the cells to be linked, and held down until all of the desired cells are highlighted. Then this highlighted area must be copied to the Clipboard. After this has been done, the source worksheet may be saved, and the worksheet to which the information is to be linked may be opened. Place the pointer in the upper left-hand corner of the cells that will use the linked information and drag it down over the entire range of cells that will accept the linked information. If a single cell is being linked, then the pointer must be placed in the cell to use the linked information and the mouse button clicked to highlight the cell. Then the Paste and Link command must be selected from the Edit menu to paste the contents of the Clipboard into the worksheet at the insertion point and link the destination worksheet to the origin worksheet until an Unlink command is used. See Clipboard, Insertion Point, Edit Menu.

**Paste Name Option** A number of electronic spreadsheet programs such as Multiplan allow the contents of a cell to be given a specific name to be used in formulas. In Multiplan, the Paste Name command from the Edit menu is used to insert the contents of a named cell into a formula.

**Paste Option** Available from the Edit menu on most Macintosh applications, and used to copy the contents of the Clipboard to a designated insertion point in a document. A picture from a MacPaint document can be inserted into a MacWrite document, or part of a spreadsheet can be inserted in a MacWrite document from Multiplan by using this command. Text from the Note Pad can be cut or copied to the Clipboard and pasted into a document. The result of a calculation done on the Calculator can be cut or copied to the Clipboard and pasted into the Scrapbook from the Clipboard by cutting or copying them. They can be transferred to the Clipboard and into another document in the same fashion. See Clipboard, Cut Option, Copy Option, Paste Option, Edit Menu, Scrapbook, Document.

**Patch** For debugging or alteration of a software program, a section of code, a patch, is inserted into the program which changes the control functions of the program.

**Pattern Palette** The two rows of blocks containing patterns that run along the bottom of the MacPaint screen display are called the pattern palette. This palette contains a variety of different patterns that can be used to fill shapes with the paint

#### 232 • Pause

can drawing tool, to shade pictures with the spray can drawing tool, and to draw lines of different textures with the paintbrush drawing tool. These patterns are also used with the filled shape icons to fill the shapes that are drawn when these icons are selected. The leftmost box on the palette is the current active pattern. This pattern may be changed by placing the mouse pointer on the block containing another pattern and clicking the mouse button. These patterns may be edited by using the Edit Pattern command option from the Goodies menu on the menu bar at the top of the screen display. See Menu Bar, Goodies Menu, Edit Pattern, Mouse Button, Drawing Tools.



Fig. P5 The pattern palette from MacPaint with the mouse pointer on the current pattern box.

**Pause** To pause and freeze the screen briefly while the operator using your program reads a message, just write a delay loop after you print the message:

1000 FOR Y = 1 TO 2000 1010 NEXT Y

To freeze the screen until the operator is done with it, enter a dummy input statement and instruct the operator to press Return to proceed. The input variable need not be used in your program:

1000 INPUT "Press Return to continue";A\$

PC Program Counter, Printed Circuit or Personal Computer.

**PC-BASIC Developer's Compiler\*** This converts IBM PC programs written in BASIC for transfer by cable to a Macintosh or Lisa and then recompiles these programs to allow them to run on these computers. This Compiler is called PC-BASIC and

includes a communications package and an RS-232 cable. It is packaged as a developer's compiler which allows sale of the code generated by the compiler, as a user's compiler for use with a single machine, and a PC to Lisa/Mac communications package. Pterodactyl Software. In UK: P+P micro distributors.

**PEEK** A Microsoft BASIC function which returns the byte read from the indicated memory position. The format is:

‹variable› = PEEK(‹n›)

(n) is an integer in the range 0 to 16777215. The variable that is returned will fall in the range from 0 to 255. See POKE.

**Pensate\*** A game that closely resembles chess. The computer pits ten types of pieces against the player's single piece. Penguin Software.

**Period (.)** A file extension delimiter. In a file name, the . (period) is used to specify an extension to a file name. An example is EDIT.BAS. This indicates a program called EDIT written in BASIC.

Peripheral Any external device connected to a computer and controlled by it.

**Personal Computer** Generally, an inexpensive, single-user computer system which fits on a desktop.

**Personal Management Software** See Calender, Dollars and Sense, Home Accountant, Personal Tax Planner.

**Personal Tax Planner\*** A program used to predict federal income tax liability for the individual, and used to compute short-term or long-term capital gains and losses. It automatically calculates the individual's tax liability, his capital gain deduction, any capital losses, income averaging and alternative minimum tax, if they apply. Aardvark/McGraw-Hill.

**PFS File\*** A database management program that allows the user to design input screens to suit his needs. This program can be used to store data, update data and sort data. Entry and sort procedures are simplified. This program can be used to generate invoices, mailing lists, inventories, bibliographies and similar applications. The program uses the mouse, the menu bar and pull-down menus. Software Publishing Company. In UK: Softsel.

**PFS Graph\*** A business graphics program. It accepts data from the keyboard or from other programs, such as PFS File, and plots the information in a variety of graph formats for the user. Ease of use and learning are characteristic of this program. The graphics quality is quite good. Software Publishing Company. In UK: Softsel.

**PFS Report**<sup>\*</sup> A companion program for PFS File, which generates tabular reports from data stored using PFS File. It can sort data both alphabetically and numerically, and be used to calculate averages, counts, and totals in the reports generated. This program uses the mouse, menu bars and pull-down menus. Software Publishing Company. In UK: Softsel.

**PFS Write\*** A word processor and applications integrator for the PFS series of programs. It allows the combination of graphics and database information to be

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used in the word processor. This program is easy to use and learn. Software Publishing Company. In UK: Softsel.

**Picture Disk, The\*** An inexpensive disk containing more than 200 pictures for viewing and using on the Macintosh. These pictures include cartoons, digitized photographs, drawings and seasonal figures. The manufacturer can also reproduce onto a Macintosh disk any photograph sent to them. Digi-Graphics. In UK: Softsel.

**Pin-compatible** A computer system whose circuits have leads or pins with identical functions.

**Pixel** The smallest addressable unit in a video graphics display.

**Planetfall\*** Planetfall is a text adventure game that is science-fiction oriented. One of its central characters is a robot. Infocom. In UK: Softsel.

**Plotter** A computer-controlled mechanical device which draws images upon a screen or a piece of paper with pens, instead of with a daisy-wheel or dot-matrix print head.

**Plug-compatible** Devices or components which use the same plugs and, therefore, can be used interchangeably without modification within the computer system.

**Plus Sign Pointer** Microsoft Multiplan employs a large plus sign as a pointer on a worksheet. This pointer is used to select cells or groups of cells for taking an action such as copying, cutting, pasting or whatever. When this pointer is placed on a cell and clicked, the cell is highlighted. When it is dragged over a number of cells with the mouse button held down, those cells are highlighted. It is also used to select the next cell for data entry or formula entry.

**POINT** A Microsoft BASIC function which returns the color of the specified point on the screen. The format is:

 $\langle variable \rangle = POINT(\alpha, y)$ 

(x,y) are the coordinates of the point to be used and must be in absolute form. If the point given is out of the range, -1 is returned. The horizontal elements on the Macintosh screen are numbered from 0 to 511. The vertical elements are numbered from 0 to 341.

Pointer A data item. Its contents is the address of another data item.

Also describes a variety of Maintosh tools (pointers) associated with the location and movement of the mouse on a physical Desktop. The most common pointer is an arrowhead, used in the Desktop to highlight, drag and click icons. When the arrowhead is placed on a disk, folder or icon name, it changes to an I-beam. The I-beam is the pointer used in text applications and in editing. When this pointer is placed within text on the screen and the mouse button is clicked, it changes to a vertical bar cursor. The location of the vertical bar cursor is the insertion point. Microsoft Multiplan uses a plus sign as a pointer to highlight or activate cells on a worksheet. When the pointer is used on the Control Panel it changes to a crosshair. See I-beam, Vertical Bar Cursor.

**POKE** A Microsoft BASIC statement which allows the user to enter specific values or data into a particular memory location. POKE places a byte into a memory location.

#### The format is:

#### POKE (n),(m)

 $\langle n \rangle$  must be in the range 0 to 16777215. It indicates the address of the memory location where the data is to be written.

 $\langle m \rangle$  is the data to be written to the specified location. It must be in the range 0 to 255.

The complementary function to POKE is PEEK. POKE and PEEK are useful for efficiently storing data, loading machine language programs and passing arguments and results to and from machine language subroutines. Microsoft BASIC does no address checking, so use caution when assigning address locations. You do not want to POKE data in Microsoft BASIC's stack, its variable area or your Microsoft BASIC program.

**Polling** A technique inquiring into the status of each device according to a schedule.

Port A physical I/O connection and an address providing a connection between the computer's internal processor and an external device. Ports are used to attach input and output devices. Some devices require several ports to function. The Macintosh is equipped with six ports. These are the mouse port, the disk drive port. two serial interface ports (one for a printer and the other for a modem), an audio-output port and a keyboard port. The mouse port may be used to attach the mouse or other pointing devices that operate in a fashion similar to the mouse. The disk drive port is an input/output port which can handle data at a rate of 62,500 baud per second and is designed to support an external disk drive. The serial ports are designed to handle the RS-422 protocol which defines the manner in which communications are carried out to and from an attached device. Although these ports are designed for RS-422 protocol, most RS-232C devices can operate through these ports. These ports handle both input and output. The keyboard port is located on the lower right-hand side in the front of the Macintosh and resembles a telephone connection. It is an input/output port that can handle up to eight devices such as the keyboard, the numeric keypad, musical keyboards and similar devices that transmit and receive data slowly. The audio-output port allows the user to connect his Macintosh to an external amplifier or a tape recorder.

**Portable Modem (Maccessories)\*** A product sold for use with the Macintosh Computer. This is a compact, battery-powered modem. It has a baud rate of 300 baud. It is equipped with a carrying case and will connect directly with the Macintosh RS-422/RS-232 modem port on the back panel. Keningston Microware Ltd.

**POS** A Microsoft BASIC function which returns the current cursor column position. The format is:

 $\langle variable \rangle = POS(\langle n \rangle)$ 

(n) is a dummy argument.
 The current horizontal (column) position of the cursor is returned. See LPOS.

#### Position of Printer Carriage See LPOS.

**Postfix** A notation system where the operator follows the manipulation symbols used in the program.

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**Power Down** The steps a computer may take to preserve the state of the processor and to prevent damage to it or to connected peripherals when the power fails or is shut off.

**Power On** Turn the power switch to the ON position or otherwise supply electric current to a device.

**Power Supplies/Protectors** See Datasaver, Kleen-Line Conditioners, MACC, MACC-4, Maccessories Surge Protector.

**Power Supply** The unit that converts the voltage from the electrical supply to the voltages which the computer elements use.

**Power Up** The steps taken by a computer processor when the power is turned on, or restored after a power failure. The processor and peripherals are initialized so that program execution may be started.

**Preprocessor** A program or mechanical device which prepares data for further processing.

**Presentation Graphics on the Apple Macintosh**<sup>•</sup> A book by Steve Lambert that teaches the use of Microsoft Chart on the Macintosh. This book deals with the intricacies of this very powerful business graphics program. Microsoft Press.

**Presenting the Macintosh**<sup>•</sup> A brief book that introduces the Macintosh and its use. It was written by Merl K. Miller and Mary A. Myers. dilithium Press.

#### PRESET See PSET.

**Prevent Accidental Loss of Programs or Data** A disk is write-protected if the write-protect square is open. The lock square could be missing altogether (as on some original software disk) or present, but in the open or locked position. See Write-protect.

**PRINT** A Microsoft BASIC statement which displays data on the screen. The format is: PRINT [dist of expressions>][;] or ? [dist of expressions>][;]

dist of expressions is a list of numeric and/or string expressions, separated by commas, blanks, or semicolons. Any string constants in the list must be enclosed in quotation marks.

A PRINT statement alone will display a blank line. The question mark (?) may be used for PRINT only when you are entering Microsoft BASIC program lines in the Command window.

The punctuation in the dist of expressions> determines the spacing of the printed items. Microsoft BASIC divides the screen line into zones with as many spaces each as has been set by the WIDTH statement. In the dist of expressions>, a comma will cause the next item to be printed starting in the first space of the next zone. A semicolon (;) causes the next value to be printed immediately after the last value. Placing one or more spaces between expressions is the same as typing a semicolon between them.

If a comma or semicolon ends the dist of expressions, the following PRINT statement begins printing on the same line, spacing accordingly. If the dist of expressions, ends without a comma or semicolon, a carriage return is performed at the end of the line and the cursor is moved to the beginning of the next line.

If the length of the value to be printed is more than the number of character positions remaining on the current line, then the value will be printed at the beginning of the next line. If the value to be printed is longer than the defined WIDTH, Microsoft BASIC prints as much as possible on the current line and continues to print the remaining values on the next physical line.

Printed numbers are followed by a space, positive numbers have a space in front of them and negative numbers have a minus sign in front of them. Single-precision numbers that can be represented with seven or fewer digits in fixed-point format (no less accurately than they can be represented in the floating- point format) are output using fixed point or integer format. For example, 10<sup>(-7)</sup> is output as .0000001 and '10<sup>(-8)</sup> is output as 1E-8.

LPRINT statement uses the same format techniques but displays the values on the printer. See LPRINT.

**Print a Blank Line on Printer** An LPRINT statement with no other specifications will print a blank line (that is, feed the paper up one line and return to left margin) so you can space your printout format neatly.

**Print Current Screen on Line Printer** Press Command-Shift-4 together with the caps lock down to print the current contents of the screen on line printer 1. This is valid in any program and all applications at any time. See Control Key.

**Print Lines, Spacing** In Microsoft BASIC, to get one or more spaces between fields printed in your programs, use a literal of spaces: " ". To get several spaces between the printed values of A\$ and B\$ use Microsoft BASIC statement:

LPRINT A\$;" ";B\$

See also Print Zones.

Print Microsoft BASIC Program Line on Printer See LLIST.

Print on Printer from Microsoft BASIC See LPRINT.

**Print Pak\*** A carrying case specifically designed for the ImageWriter printer. It can be carried by a shoulder sling, as a suitcase or as a backpack. Macpacks.

**PRINT USING** A Microsoft BASIC statement that is used to print strings or numbers in a specific format. The syntax of this statement is:

PRINT USING (string exp);(expression list)

string exp> is a string variable made up of formatting characters which define the field and the format of the strings and numbers to be printed.

expression lists is made up of the strings or numbers that are to be printed.

Three formatting characters are used for string fields: the exclamation point (!), the ampersand (&) and two backslashes with spaces in between them (n spcs). The exclamation point is used to instruct the computer to print just the first character of each string. The ampersand specifies a variable field length for strings allowing the entire string to be printed. The backslashes with spaces between them are used to print a number of characters equal to two characters, plus a character for each space between the backslashes.

Numeric fields are defined by using the number sign (#). One number sign is used to specify each number's position. Each number position is filled even if there are not enough digits to fill the amount of number signs used. A decimal point may be used in any position in the field defined by the number signs. The number signs must

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be enclosed in quotation marks. If a plus sign is used before a format string the sign of the number (plus or minus) will be printed before the string. If the plus sign follows the string, the plus or minus sign will follow the string. If a minus sign is placed at the end of a format field, all negative numbers will be printed with a trailing minus sign. If a double asterisk (\*\*) is used before the format string, all spaces that precede numbers in the string will be filled with asterisks. If two dollar signs (\$\$) are used before a string format, all numbers that are printed will be preceded by a dollar sign. If two asterisks and a dollar sign (\*\*\$) are used before a format string, a dollar sign will precede each number and all spaces before the dollar sign will be filled with asterisks. If a comma is used before the decimal point in a numeric string, a comma is printed automatically before each third digit that precedes the decimal point. If four carets (\*\*\*\*) are placed after the last number position in the string format, space is allowed in the output for E+nn to be printed where nn equals the number of characters to follow the E symbol. If an underscore (\_\_) is inserted before any character in the string format, the character after the underscore is treated as a literal character and is printed. Thus, "###.## -?"; 99.99 would print as 99.99?. If the percent sign (%) is used prior to the first number sign in the format string, any number that is larger than that allowed by the format string will be printed with a percent sign preceding the number of digits allowed by the format string.

**Print Zone, To Skip Over** To leave space on the print line between items, put an extra comma (,,) in the print listing. Enter Microsoft BASIC statement:

LPRINT A,,B

This would print A in print zone 1, nothing in print zone 2, and put B in print zone 3.

See also Print Lines (Spacing).

**Print Zones, On Printer Line (LPRINT)** Each group of spaces as set by the WIDTH statement across the print line is called a print zone. A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without even a single space between. The print zones begin in columns as determined by the WIDTH statement. See also Print Line (Spacing), WIDTH.

**PRINT # and PRINT # USING** Microsoft BASIC statements. PRINT # is used to write data sequentially to a file. PRINT # USING is also used to write to a file, but the USING option allows control of the format of the file. The format is:

PRINT # (filenum),[USING (v\$);](list of expressions)

(filenum) is the number used when the file was opened for output.

«v\$» is a string expression made up of formatting characters.

dist of expressions is a list of the numeric and/or string expressions that will be copied to the file.

PRINT # writes data to the file just as it would appear on the screen with no compression. For this reason, your data should be edited carefully for file input, exactly the way it should appear on the screen. Numeric expressions should be delimited by semicolons. If commas are used as delimiters, the extra blanks inserted between print fields are also written to the file. String expressions must be separated by semicolons in the list. To format the string expressions correctly on the file, use

explicit delimiters in the dist of expressions». See PRINT USING, WRITE #.

**Printer, Advancing One Line** To advance or space up one line on the printer without a carriage return, enter Microsoft BASIC statement:

#### LPRINT CHR\$(10)

Or use the line feed button (LF) on printer.

Entering just LPRINT gives a line feed, both a space up one line (line feed) and a return to left margin (carriage return).

**Printer, Blank Line** An LPRINT statement with no other specifications will print a blank line (that is, feed the paper up one line and return to left margin).

**Printer Buffer** An external accessory to most computer systems. A printer accepts data more slowly than a computer can send the data to the printer. This means that the memory of the computer is occupied with the data being sent to the printer and is not available to the user unless a spooler program is employed. This is a printer with a large built-in buffer or a printer buffer. Printer buffers are really extra external memory devices that generally make 2K, 8K, 16K, 32K, 48K, 96K and 128K available to the user. They are connected to the computer via the printer port on the back panel and then connected to the printer.

Most buffers require external electrical power and can accept data as quickly as the computer can send it. They then hold the data and transmit it to the printer in the same fashion that a computer sends the data. As soon as the data has been transferred to the buffer, the computer's memory is available to the user for other purposes. The buffer continues to send data to the printer, independently of the computer, until all of the data stored in the buffer has been printed. Anyone who prints long documents or is involved in large writing projects, mass mailings, mass label printing projects and the like, would find a printer buffer well worth the financial investment. In considering a printer buffer for the Macintosh, make sure it is plug-compatible and is capable of handling serial data instead of parallel data. See Kearsarge SX-70 Switcher/Spooler, Maccessories Printer Buffer, MBIS Microbuffer, Printer Optimizer.

**Printer Buffer, Maccessories\*** A printer buffer designed for the Macintosh. Kensington Microware Ltd. In UK: P+P micro distributors.

#### Printer, Carriage Position See LPOS.

**Printer Driver** A printer driver is a utility program that is used to move data from a computer's memory to a printer. It would contain all of the routines required to access the printer. It could also contain control codes to set print size, margins, etc. on the printer.

**Printer, Line Length** To set to 80 characters per line (for example), enter Microsoft BASIC statement:

#### WIDTH ''LPT1:'',80

**Printer Optimizer, The**<sup>•</sup> A printer controller that is both Macintosh and Lisa compatible. It will allow the Macintosh to operate a letter quality printer. It can handle up to three printers at once and can make multiple copies of documents. Applied Creative Technologies. In UK: P+P micro distributors.

#### 240 • Printers

**Printers** Printers are devices used by computers to produce hard copy of output from the computer or from an application used on the computer. Printers may be thermal devices that use heat- sensitive paper to produce output. They may be dot-matrix if small needles are used to strike a ribbon to form letters on paper. They may be daisy-wheel devices if a flower-like wheel is used to produce characters by striking a ribbon before striking the paper. Printers may be serial interface or parallel interface devices. If they are serial interface like the ImageWriter, data is transmitted to them in a stream over a single wire one bit at a time. If they are parallel devices, data is transmitted to them over eight parallel wires at the same time. See ImageWriter.

**Printer Stand** A small stand built to hold a printer on its top shelf. It generally has legs on either side and places the printer high enough that paper can be stacked underneath the stand and fed directly to the printer. A printer stand is an easy project for a handyman. Many are made from plastic or various types of wood.

**Printer Stand, Maccessories\*** A printer stand available commercially for the Macintosh, it is set up to hold the ImageWriter printer or other printers of a similar size and allows the stacking of paper under the stand. Kensington Microware Ltd.

**Printer, Top of Page** To form feed or advance to the top of the page enter Microsoft BASIC statement:

#### LPRINT CHR\$(12)

Or use the top of form or form feed manual control button (FF) on the printer. You may need to adjust the paper in the printer so it actually is at the top of a page as defined by the perforations. In a program, you may want to provide instructions to the operator and a pause to allow for adjustment of the paper.

**Printing a Document** A document may be printed from the Desktop directory display by placing the mouse pointer on the document's icon and clicking the mouse button once to select the document. The document will then be printed when you select the Print command option from the File menu on the menu bar. See Menu Bar, Mouse Button, Document Icon.

### 🕯 File Edit View Special



Fig. P6 The Macintosh Desktop display with the mouse pointer beside a selected icon. This icon appears in inverse shading to the rest of the documents on the display.

**Printing a Group of Documents** If you have several documents on a single disk that you wish to print, you may select all of these documents at once by holding down the mouse button and dragging the pointer over each of the icons for the documents to be printed. They will all be highlighted when you release the mouse button. After highlighting, the Print command option is selected from the File menu on the menu bar. An application such as MacPaint or MacWrite must be present on the same disk to enable the documents to be printed, they are MacPaint or MacWrite documents. See Menu Bar, File Menu, Icon.

## 🕯 File Edit View Special



Fig. P7 A group of highlighted documents from the Desktop directory display.

**Printing the Active Window** If a number of windows are being displayed on the Macintosh screen, the last window clicked is the frontmost or top window, called the "active window." To print this window on the ImageWriter printer first make sure the Caps Lock key is in the up position, then hold down the Command key, the Shift key and the 4 key together.

**Printing the Entire Screen Display** The entire screen display of the Macintosh may be printed at any time by first ensuring that the Caps Lock key is in the down position, then pressing the Command key, Shift key and 4 key together.

**Procedure** A separate function of the program which could be incorporated into a subroutine and which helps the program's structure, readability or reliability.

**Processor-bound** When the speed of the processor limits the processing speed of the program.

**Professional Composer\*** A program for the Macintosh that lets the user compose and create music, score music, edit music and print it. The mouse is used with this program to enter clefs, notes, rests, time signatures, chords, ties, beams, slurs and note ornaments. Virtually all of the tools are needed to write sheet music are available. As music is being composed, it can be played or when a compositon is complete, it can be played and printed out using the ImageWriter. Mark Of The Unicorn. In UK: P+P micro distributors.

**Program** A sequence of instructions which specifies a process for manipulating data. Programs can be written in many languages of different "levels." The level

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reflects how much additional work the processor must do before the program can be executed. BASIC is a high-level language which requires that all programs be run through a compiler or interpreter. A midrange language is assembler or assembly language which is closer to the binary code of the computer, but still needs some processing through an assembler before executing.

The lowest level are programs written in binary or hexadecimal code, directly executable by the microprocessor. Before assembler language programs were developed, all programs were written in binary code--a tedious, time-consuming task. For listings of programs available for the Macintosh, see Software.

**Program Disk** A disk which is primarily used to store programs used to process data. Likewise, data disks are used primarily to store data rather than programs. To save space a data disk will not usually contain most or all of the system files. A system start-up disk is one used to principally store system files and related utility-type programs. Often a disk will contain both data and the programs needed to process the data.

**Program File** A file containing some type of program instructions specifying how data is to be processed. If you write a Microsoft BASIC program called SAMPLE.BAS, it is a source program. If you submit it to the compiler to produce a fast- object program, the compiler will treat SAMPLE.BAS as its input data rather than as a program to be executed. The Microsoft BASIC Compiler will produce an object file which contains a translation of your source program into the MC68000 machine language.

Program Generators See RGS Softmaker II.

**Program, How to Start** In Microsoft BASIC, if the desired program is in memory, use RUN to execute the program. If the program is on a disk, use LOAD file name, R or RUN file name, R in the Command window. If a program is already in memory, it can be started by selecting RUN from the Control menu.

**Program Integrity** Ensuring that programs (or data) cannot be altered improperly. For example, in a payroll system, steps must be taken to ensure that employees cannot improperly alter their pay rates or hours worked. Data security consists of guaranteeing both data integrity and data secrecy or privacy.

**Program Line** A program line is a unit of instruction given to a computer from within a program. It could be a sequentially numbered line as is used by Microsoft BASIC. It could be an unnumbered line of instruction if the language in which the program was written does not require numbering.

Program Lines, Deletion See DELETE.

Program Lines, List See LIST.

Program Lines, New In Microsoft BASIC programs to start a new program type:

NEW

**Program, LOAD** Use LOAD to load a Microsoft BASIC program that was SAVEd on disk back into the Macintosh's memory. For a program named "SAMPLE," on the default disk, enter:

•

#### LOAD ''SAMPLE''

If SAMPLE is on the disk in the external drive, enter:

LOAD ''SAMPLE''

All LOAD instructions erase any program lines you have in memory before the LOAD. If you want to combine a SAVEd program with the one you are writing, see MERGE.

To run the program, use LOAD SAMPLE, R or its synonym, RUN SAMPLE, R. If you use , R any files that are open stay open for the next program. Unless this is specifically needed, it is safer to use RUN SAMPLE, which first closes any files now open, then loads SAMPLE into memory and runs it. See also SAVE, RUN.

**Program, Object** The machine language instructions which result from the translation of a source program by a compiler or assembler. See Program, Source or Object.

**Program or Data Concatenation** Adding one item on at the end of the others to produce one longer data or program item.

Program, Run or Execute See RUN, LOAD.

Program, SAVE To SAVE a Microsoft BASIC program named "SAMPLE":

On disk (the default drive) the format is:

SAVE ''SAMPLE''

On disk (external drive) the format is:

SAVE ''diskname:SAMPLE''

The SAVE command must be used in the Command window to accomplish these things. The Save command option may also be selected from the File menu to save a program from memory to disk. A dialog box that requests the name of the program and the disk to which the program is to be saved will be displayed when this option is used.

To run the program at a later time, use the LOAD command to copy it from the disk you saved it on, back into the Macintosh's memory. See LOAD. If you want to save the program in ASCII format, which allows you to MERGE two programs together, put ,A after the close quote of the program name:

SAVE ''SAMPLE'', A

See MERGE.

To SAVE the program as a protected file in encoded binary form use ,P instead of ,A. Then it cannot be listed, saved, edited (or unprotected). While a clever programmer can get around this, it will at least prevent a quick and casual or accidental modification to your program.

The SAVE instruction does not alter your program in memory. It is important to remember that if you write a Microsoft BASIC program, it will be lost (erased) unless you SAVE it before you 1) turn off the Macintosh; 2) go to the Desktop (System Command); or 3) use the NEW command. See also EDIT.

#### 244 • Program, Source or Object

**Program, Source or Object** All programs that run directly on the Macintosh are machine language programs in the actual numeric instruction code of the Macintosh's MC68000 microcomputer chip. Most were orginally written by a programmer as text files known as source programs, which contained relatively readable statements in a language such as FORTRAN, COBOL or Microsoft BASIC. These were then translated by a compiler program, producing an object program.

The object program contains the machine language instructions for the Macintosh's MC68000 which corresponds to the instructions of the original source program. Microsoft BASIC programs work in this way with a Microsoft BASIC Compiler.

Regular Microsoft BASIC works in a slightly different way. It is a program (in machine language) which uses your Microsoft BASIC program as a guide to what it should do. It is therefore an interpreter, processing each line of your source program and interpreting what should be done. Since it must reinterpret your source program each time you run it, interpreted Microsoft BASIC can be as much as 100 times slower than compiled Microsoft BASIC.

When you write a Microsoft BASIC program, you have produced a source program in text form. The Microsoft BASIC interpreter, itself a machine language program, uses your source program as data, a source of instructions or commands to control its execution.

To speed up a Microsoft BASIC source program by compiling it into a faster machine language program, you will need a Microsoft BASIC Compiler, a program not supplied with the Macintosh, but available from other software houses. Run your Microsoft BASIC Compiler, using as input the source program that you wrote. The Microsoft BASIC Compiler will translate your source program into an executable machine language program.

**Program, Version or Release** Programs and software packages are changed from time to time to correct errors or add new capabilities. To keep programs from being in a constant state of flux, and to simplify distributing modified programs to users, a number of changes are made, tested and packaged as a new version or release of the program.

Versions or releases are typically numbered: 1.0 for the first version, 1.1 for the first minor revision, 1.2 for the second minor revision, etc. When a major change or large number of minor changes have been made, a new number may be assigned, as Version 2.0. Version numbers help programmers support a program by advising them on which version the user has encountered problems. Numbering also helps users know which changes are effective in the version they possess.

Programmer's Switch See Interrupt Reset Switch.

**Programming Language** A language that can be translated into machine language to direct the computer to carry out functions.

**Programming Languages** See ADA, BASIC, C for the Macintosh, MacBASIC, MacForth, Macintosh Assembler/Debugger, Macintosh BASIC, Macintosh Logo, Macintosh Pascal, Microsoft BASIC, MacPascal, Modula-2, Pascal, PC BASIC Compiler, Utilities.

**Programming the MC68000\*** By Steve Williams. A guide to assembly language programming for the MC68000 programmer. It explains microprocessor operation, writing programs and I/O programming. This book is useful to both Macintosh and Lisa programmers. Sybex.

Programming Utilities See Utilities.

Project Management Software See MacProject.
**PROM** Programmable Read-Only Memory. A ROM which can be modified by the user.

**Promodem 1200\*** This 1200 baud modem may be connected to the Macintosh via the modem port on the back panel. Its features include autoanswer, autodial, tone dialing, pulse dialing, an RS- 232 interface, intelligent dialing, an internal power supply and a built-in speaker with volume control. Prometheus Products.

**PROM Programmer** An external device or module used to write user-modified ROMs. The programmer may input data through a hex keyboard, binary paper tape or directly through the microprocessing unit.

**Prompt** A visual signal from a program to "prompt" the operator to do something and hopefully, gives some clue as to what the program requires (or allows) the operator to do in response to the prompt.

Propagate To go from one component in the computer system to another.

**Propagation Delay** The time the processor takes to pass a signal through one device on the system to another.

**Proportional Spacing** Where the printer allocates horizontal space according to a character's width, rather than having standard width space for all characters. Proportional spacing is more readable than fixed-width type and resembles typeset.

**PRO Series Hard Disk Drives\*** Micro-Design offers two hard disk drives for the Macintosh. One has 10 megabyte capacity and the other has 20 megabyte capacity. Both have automatic locking heads and an internal power supply. Micro-Design.

**Protected Field** Reserved areas that cannot be modified by the user with keyboard entry.

**Protected Format** To SAVE a Microsoft BASIC program named "SAMPLE" as a protected file in encoded binary form use ,P instead of ,A. Then it cannot be listed, saved, edited (or unprotected). While a clever programmer can get around this, it will at least prevent a quick and casual or accidental modification to your program. See SAVE.

**Protocol** The rules governing the exchange of information between two computer systems.

**PSET and PRESET** PSET and PRESET are Microsoft BASIC statements used to draw a point at a specified position on the screen. The formats are:

PSET (x,y>[,colon]) PRESET [STEP]x,y>[,colon]

(x, y) are the coordinates of the point to be set. They may be in absolute or relative form.

(color) specifies the color to be used. White has a value of 30. All other values produce black.

STEP is an option that allows the user to specify that all x and y coordinates used for plotting are relative coordinates rather than absolute coordinates. The syntax for the STEP option is:

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PSET STEP («xoffset», «yoffset»)

The coeffset refers to the value of x in relation to the current x position. The cyoffset refers to the value of the y coordinate relative to the current y position.

PRESET differs from PSET only in that if no «color» is specified in PRESET, the foreground color becomes the default color. If «color» is included, PRESET is identical to PSET. An out-of-range coordinate in PSET or PRESET will give no error message and no action will be taken.

The Macintosh screen is divided into 512 vertical columns of pixels that are numbered from 0 to 511. It is also divided into 342 rows of horizontal pixels that are numbered from 0 to 341. Coordinate values may exceed these values in Microsoft BASIC. If, however, these values are outside the allowable range of integer numbers (-32768 to 32767), an "Overflow" error message will be displayed.

**PSW** Program Status Word. Contains the zero flag, carry flag and other information relevant to the processor.

**PTAB** A Microsoft BASIC statement that moves the print position on the screen to pixel  $\infty$ . The syntax for this statement is:

PTAB(xx)

consist the designated pixel. If the present print position is more than x, then the print position is moved to x on the same line. Pixel 0 is the leftmost pixel on a line. PTAB may only be used in PRINT statements. See PRINT.

Publications See Books, Magazines.

**Public Domain** A term that describes products that has been released to the public by the author without a copyright notice. The author is usually recognized somewhere in the program listing. Many times these are prototypes of commercial products. They often lack detailed documentation or any documentation that has been provided is included in the program. Public domain software is available from user groups and from a number of commercial outlets that call themselves clubs. This software ranges from good and useful to terrible and useless. It can be copied and distributed freely. It can also be modified as required by the user.

**Pull-down Menu** Command options available on the Desktop or in applications from the menu bar are accessed from pull-down menus, displayed when the mouse pointer is positioned on the menu name on the menu bar and the mouse button is pressed. Selections may be made by holding down the mouse button, dragging the pointer and the highlight that accompanies the pointer down the menu until the desired selection is highlighted and releasing the mouse button. See Menu Bar, Mouse Pointer, Mouse Button.

**PUT (File)** A Microsoft BASIC statement which allows you to write a record from a random buffer to a random file. The format is:

PUT [#]/filenum>[,<number>]

(filenum) is the number under which the file was opened.

number is the record number for the record to be written, in the range 1 to 16777215.

If number is left out, the record has the next available record number (after the last PUT statement).

PRINT #, PRINT # USING, WRITE #, LSET and RSET may be used to put characters in the random file buffer before a PUT statement. In the WRITE # statement, Microsoft BASIC pads the buffer with spaces up to the carriage return. If you try to read or write past the end of the buffer, a "Field overflow" error will occur.



Fig. P8 A typical pull-down menu.

**PUT (Graphics)** A Microsoft BASIC statement used to draw a graphics image on the screen. This form of PUT is used in graphics mode only. The format is:

PUT (x1,y1)[-(x2,y2)], (array)[, (action)]

(x1,y1) are the coordinates of the top left corner of the image to be transferred.
(x2,y2) are the coordinates of the lower right hand corner of the image to be transferred.

(array) is graphics information contained in a numeric array to be transferred. This array holds the graphics image that is to be transferred.

(action) is one of the following:

PSET PRESET XOR OR AND

The default is XOR.

PUT is different from GET in that it takes data out of the array and displays it onto the screen. See GET. It also provides the option of interacting with data already on the screen by use of (action).

PSET stores the data from the array onto the screen (just the opposite of GET). PRESET is identical to PSET except it produces a negative image, black on white. Using AND you can transfer an image. It must exist under the transferred image.

You may superimpose an image onto an existing image using OR. XOR is a mode that may be used for animation which causes the points on the

screen to be inverted where a point exists in the array image. When an image is PUT against a complex background twice, the background is restored unchanged. This allows you to move an object around without erasing the background.

AND				
	array	_		
screen	0	1	2	3
0	0	0	0	0
1	0	1	0	1
2	0	0	2	2
3	0	1	2	3
OR				
_	array	value		
screen	0	1	2	3
0	0	1	2	3
1	1	1	3	3
2	2	3	2	3
3	3	3	3	3
XOR				
	array	value		
screen	0	1	2	3
0	0	1	2	3
1	1	0	3	2
2	2	3	0	1
3	3	2	1	0

Animation of an object can be done as follows:

1. PUT the object on the screen with the XOR option.

2. Recalculate the new position of the object.

3. PUT the object on the screen, using XOR, again at the old location to remove the old image.

4. Go to step 1, this time putting the object at the new location.

Movement done this way leaves the background unchanged. Flickering can be reduced by minimizing time between steps 4 and 1, and making sure there is enough time delay between steps 1 and 3. If more than one object is being animated, every object should be processed at once, one step at a time.

If it is not important to save the background, animation can be performed using the PSET action verb, but you should remember to have an image area that will contain the before and after images of the object. This way the extra area will effectively erase the old image. This is faster than the method using XOR described above, since only one PUT is needed to move an object. You must, however, PUT a larger image.

If the image to be transferred is too large to fit on the screen, an "Illegal function call" error occurs.

**Puzzle** One of the Macintosh desk accessories which can be used to learn how to use the mouse or just as relief from too much work with the computer. The puzzle is the same as the old dime store puzzle with numbered squares in a case. The numbers must be arranged in the proper order from a random distribution to solve the puzzle. The puzzle may be selected from the Apple menu in the upper left-hand corner of the screen display. See Apple Menu, Desktop Accessories.

#### 🔹 File Edit View Special



Fig. P9 The puzzle from the Desktop accessories.

# Q

Q ASCII 81, HEX 51. q ASCII 113, HEX 71.

Quad Involving four entities, or a multiple of four.

**Quad Density Disk Format** Specifies storage density of a disk medium. Quad density stores four times the amount of information per disk as single density.

Quadruple Density Disk format. See Quad Density Disk Format.

**Quest, The**<sup>•</sup> The Quest is an adventure game that combines text, graphics and animation on the Macintosh. The ultimate mission of the game is dragon-slaying. Penguin Software.

Queue A data structure which contains data or tasks waiting to be processed.

**Quickdraw** A set of graphics procedures, functions and data types in the Macintosh ROM that draws complex graphics images on the computer's screen display. This routine is in the User Interface Toolbox and performs all of the on-screen graphics operations on the Macintosh. These procedures are accessed by Pascal or assembly language calls. Quickdraw is a programmer's tool, not a user's tool. It allows the programmer to generate the rapid, high-quality graphics that appear on the Macintosh screen display. See User Interface Toolbox, Pascal, Assembly.

**Quit Option** The Quit command option is available from the File menu on the menu bar and is used to quit the use of a particular application such as MacPaint or MacWrite. When this command is selected, the current document is saved, the application is closed and the user is returned to the Desktop directory display. If changes have been made to the current document, a dialog box asks the user if the changes should be saved. The user instructs the computer to save the changes by clicking the OK button in the dialog box. See Dialog Box, OK Button, Menu Bar, File Menu.

**QWERTY** The traditional typewriter keyboard layout, named after the first six letters in the top letter row. This is the most common keyboard layout for computers, and is the standard keyboard for the Macintosh.

## R

R ASCII 82, HEX 52. r ASCII 114, HEX 72.

**R** Reset, Register, Request, Ring Indicator.

**RAM** Random Access Memory. Memory is any device which can store information and allow it to be retrieved when needed. The Macintosh relies primarily on Random Access Memory (RAM), Read- Only Memory (ROM), disks and hard disks. Memory, which by itself is usually a reference to RAM, is the general purpose, erasable and reusable memory located inside the Macintosh. RAM is the memory to which external programs and data are loaded. The Macintosh RAM is controlled by the Memory Manager which is a part of the Macintosh operating system. The Macintosh RAM can hold 128K bytes of data and programs. This memory capacity is actually 131,072 bytes as 1K = 1024 bytes.

**RAM Disk** A block of RAM memory used by a program to simulate a disk drive. The program must modify or intercept all I/O to the fictitious drive and redirect it to the RAM memory. The RAM disk will have its own drive designator (a letter, number or name) and appear in every way like a real disk, except it is much faster.

**Random Access** An access method where each data item can be retrieved directly by an address computed from the data.

Random Number See RND.

**RANDOMIZE** A Microsoft BASIC statement used to reseed the random number generator. The format is:

#### RANDOMIZE [(expn)]

(expr) is an optional expression consisting of an integer number between -32768 and 32767. It may also be the word TIMER which inserts the number of seconds that have passed since midnight. If no expression is provided, the program stops and requests that a number be provided by the user to reseed the random number generator.

If the random number generator is not reseeded by the program or by the user, it repeats the same sequence of numbers every time the program is run. See RND.

**Raster Scan (CRT Display)** The most common technique of TV display: an image is created from groups of dots of varying brightness. Contrast this with Vector graphics.

**R:base 2000\*** R:base 2000 is a database management program that may be used on the Macintosh. It includes search, sort and computation abilities. The user designs his own databases by building input screens. The program prompts the user as

#### 252 • READ

screens are designed. Customized reports may also be designed by the user. Microrim, Inc.

**READ** A Microsoft BASIC statement which reads values from a DATA statement and assigns them to variables. The format is:

READ <variable>[,<variable>...]

«variable» is a numeric or string variable or an array element which is to receive the value read from the DATA table.

A READ statement must always be used in conjunction with a DATA statement. The READ statement will take values read from the data statement and assign them to READ variables on a one-to-one basis. The variable types must agree with the data being stored in them or a "Syntax error" will occur.

One READ statement may access several data statements or several read statements may access the same data statement. If the amount of data available is less than the number of variables allocated for the data, an "Out of data" error occurs. If the number of variables in the READ statements is less than the amount of data items, subsequent READ statements may be used and reading will begin at the first unread element. If there are no subsequent READ statements, the extra data is ignored. Data can be reread using the RESTORE statement. See RESTORE.

**READ (Input Data into Memory)** Data in internal RAM is immediately available to programs for processing. Data in external memory must be copied into internal memory (READ or INPUT), processed, then copied back out to external memory (WRITE or OUTPUT).

If data has been created, it can be written out to external memory without a READ first. And, if data read in from external memory has not been modified, there is no need to write it back out since the original copy is still there.

Read Character from Keyboard See INKEY\$, INPUT.

Read Data from File See GET Files.

**Read-Only Memory (ROM)** Storage which can be written only once. The Macintosh relies primarily on Random Access Memory (RAM), Read-Only Memory (ROM), disks and hard disks. Memory, by itself, is usually a reference to RAM, the general purpose, erasable and reuseable memory located inside the Macintosh.

ROM (Read-Only Memory) contains fixed data, usually programs such as the Macintosh's screen programs. The ROM also contains the fundamental machine language programs to run the various devices attached to the Macintosh such as monitor, printer, disks, etc., as well as the routines for interpreting keyboard and mouse input. Thus, the Macintosh ROM contains the computer's Operating System, Quickdraw and the User Interface Toolbox. ROM and RAM together make up the internal memory or main memory of the Macintosh, or any other computer. See Memory, ROM, User Interface Toolbox, Quickdraw.

**Read/Write** Describes the nature of an operation, i.e., the direction of data flow. If a device is a Read Only device, it may only pass data to the computer. It will not accept data from the computer. If it is Write Only, it will only accept data from the computer but will pass signals indicating that it is ready to receive or has received data. A Read/Write device such as the Read/Write head in a disk drive can both receive and send data to the computer as well as read and write data to the device itself. **Read/Write Head** Disk drives and hard disk drive are equipped with read/write heads. These heads read data from a disk and record data on a disk. They are very much like the record and play heads on a tape recorder. A single-sided disk drive uses a single read/write head. A double-sided disk drive has read/write heads on both sides of the plane through which the rotating disk passes.

**Read/Write Slot** Floppy disks, minifloppy disks, and microfloppy disks are protected with a sheath or casing. A slot is cut in this sheath or casing to allow the disk drive to write data to a disk and to read data from the disk. This slot is called the "read/write slot." This slot is protected on Macintosh 3-1/2 inch disks by a sliding cover.

**Real-time** An action, or system capable of action, at a speed that keeps pace with the occurrence of an actual process.

**Reboot the System** The process of turning the computer off and then back on again. When this is done, everything in RAM is lost. The Macintosh system may be rebooted by turning the power switch off then on again. It may also be done by pressing the RESET switch which is the forwardmost switch of the two switches on the Macintosh programmer's switch (Interrupt Reset Switch). This switch is either installed by the user in the fashion described in the entry called Interrupt Reset Switch or is installed by the dealer when you purchase your Macintosh. The switch is located in the lower rear portion of the left-hand side of the computer case. The first method is called a "cold boot" as the computer is actually started from the off-line state. The second method is called a "warm boot" as the computer is only fooled into thinking it was turned off. Instead, power was left on. See Interrupt Reset Switch, Programmer's Switch, Reset, Interrupt.

**Recalculation** There are two methods of calculation available on electronic spreadsheet programs such as Microsoft Multiplan: automatic or manual. Electronic spreadsheet programs such as Microsoft Multiplan will recalculate the results of all of the entries made in a worksheet automatically unless the recalculation method is set on manual. The automatic method should only be used after all data has been entered on a worksheet for calculation. If it is left on automatic, each time a number or label is entered on the worksheet, the entire worksheet will be recalculated. This is a very time-consuming process on large worksheets.

**Record** A unit of information, either read, written or stored, such as a punched card, a disk sector or a line of characters.

**Recovering Disk Files** Disk files may occasionally be lost to the user when a Finder is damaged or if the directory file in the Finder is damaged. These files cannot be recovered by conventional file-handling methods available from the Macintosh Finder. Instead, a variety of utility programs that can read the contents of each disk sector and write to each sector may be required. Anyone who uses these utilities must have a thorough understanding of disk files and ASCII code. If this occurs, ask your software dealer if he has any programs available that are easy to understand and use. If not, seek assistance from your local user's group or computer club as there is generally someone in the membership who is capable of dealing with these problems.

**Recovering Removed Items** Items such as file folders, document files and even applications may be removed from the Desktop and thrown away (erased) by dragging the item's icon into the Trash Can on the Desktop. These items will remain in the Trash Can and may be recovered as long as the Empty Trash command option

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has not been selected from the Special menu, and as long as the disk has not been ejected prior to emptying the trash. To recover an item, click the Trash Can icon twice. This will display a window showing the contents of the Trash Can. Then drag the icon of the item to be recovered from the Trash Can window to the Desktop or to the Directory window on the Desktop. See Trash Can, Icon, Dragging, Window, Special Menu.

**Recursive** Refers to a function, routine or procedure which calls itself.

**Redo Option** The Edit menu on the menu bar in MacWrite contains an option called "Undo Typing." When this option is selected from the menu, all information, including backspacing since the last time the mouse button was clicked, is erased from the screen. As soon as the Undo Typing option is used, it is replaced on the menu with a Redo Typing option, which allows the user to recover from an Undo Typing command. See Edit Menu, Undo Option.

**Redundancy** The use of more than one of the same item to increase reliability or performance.

**Register** One word of memory, usually implemented in fast flip-flops, directly accessible to a processor. Most CPUs include a set of internal registers which can be accessed much faster than the main memory. The Macintosh's MC68000 has sixteen general registers that are each 32-bits wide. These registers are divided into eight data registers and eight address registers. See R F.

**Relative Reference** Electronic spreadsheet programs use references to specific cells within formulas to make the results of calculations in one cell dependent upon data entered in other cells. If a formula depends upon the contents of a specific cell, regardless of the location of the cell containing the formula that references the other cell, the reference is an absolute reference. If the formula refers to a cell or range of cells in the same relative position to the cell containing the formula, regardless of the location of this cell on the worksheet, the reference is a relative reference.

**Release** An edition of a software package. Programs and software packages are changed from time to time to correct errors or add new capabilities. To keep programs from being in a constant state of flux and to simplify distributing modified programs to users, a number of changes are made, tested and packaged as a new version or release of the program.

Versions or releases are typically numbered: 1.0 for the first version, 1.1 for the first minor revision, 1.2 for the second minor revision, etc. When a major change or large number of minor changes have been made, a new number may be assigned e.g., Version 2.0.

Version numbers help programmers support a program by letting them know the version with which the user has encountered problems. Numbering also helps users know which changes are effective in the version they possess.

**Relocatable** Describes the load module or object form of a program (or routine) which does not contain fixed addresses or which is structured so that it can be executed anywhere in the memory.

**REM** REMarks or explanatory comments in a Microsoft BASIC program. The apostrophe (') may be used as a synonym for REM. The apostrophe can be used without a colon to indicate that the rest of the line is a remark. Examples:

20 REM Just a comment 30 ' Just a comment 40 LET X = 1: REM Just a comment 50 LET X = 1: ' Just a comment 60 LET X = 1' Just a comment

The colon (:) allows multiple Microsoft BASIC statements on one line. The format is:

#### **REM remark**

(remark) can be any string of characters.

REM statements are nonexecutable but are output exactly as entered when the program is listed. However, they do take up extra memory space and slow execution time. REM statements may be branched into by using GOTO or GOSUB statements. Execution continues with the first executable statement after the REM statement.

Remarks may also be added to the end of a line by preceding the remark with a single quotation mark instead of :REM. The remark, if placed at the end of a statement, must be the last entry on that line.

**Removable Media** Diskettes, hard disk cartridges or cassettes which can be removed from the device which reads or writes data to them. See Media.

**Renaming** Disks, folders, applications and documents may be renamed on the Macintosh as long as the icon for the item to be renamed is visible on the Desktop display. The disk that contains the item must also be in a Macintosh disk drive. The item's icon must first be selected by placing the mouse pointer on the icon and clicking the mouse button once. This will highlight the icon. Then, move the pointer to the right-hand side of the icon's name, or to the insertion point within the name, and click the mouse button once again. As the pointer nears the icon's name, it will change from an arrow to an I-beam. When the mouse button is clicked, a vertical bar cursor will appear at the insertion point you selected. The Backspace key may be used to erase any unwanted characters. New characters may be inserted by typing them from the keyboard. When the item has been renamed, the Return key may be pressed or the pointer can be moved to any blank space on the Desktop and clicked. Document names can be 63 characters long. Disk names can be 27 characters long. Neither name may contain a colon (:). Any other keyboard characters are allowed. See Clicking, Icon, Document, Folder.

**RENUM** A Microsoft BASIC command which renumbers lines in a program and changes all line number references following GOTO, GOSUB, THEN, ELSE, ON GOTO, ON GOSUB, RESTORE, RESUME and ERL test statements to point to the new line number. The format is:

RENUM [[<newnumber>][,[<0ldnumber>][,<increment>]]]

«oldnumber» is the line in the current program where renumbering is to begin. The default is the first program line.

kincrement is the increment to be used in the new sequence. The default is 10. If a nonexistent line number appears in one of the branching statements to be renumbered, the error message "Undefined line number xxxxx in yyyyy" is printed where xxxxx is the referenced line number and yyyyy is the line where the error

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occurred. The referenced line, xxxxx, will not be changed, but the line of occurrence, yyyyy, may be renumbered.

RENUM cannot be used to change the order of program lines or to create line numbers greater than 65529.

**Repair of the Macintosh** The Macintosh may only be repaired at an authorized repair facility. If it is opened by any other person, facility or individual, the computer's warranty is void. Your dealer may be an authorized repair center. If not, he can tell you where the nearest such center is located.

Repeat a Character (n) Times See STRING\$.

Repeat Program Lines See FOR and NEXT.

**Reserved Word or Name** A specific value which serves a special purpose and may therefore not be used for other purposes. In Microsoft BASIC, for example, TRON is a reserved word because it is reserved to turn the TRace function ON. See Reserved Words, Uses and Restrictions.

Reserved Words, Uses and Restrictions See BASIC, Reserved Words.

**RESET** A Microsoft BASIC statement used to close all open files on all active volumes. The syntax for this statement is:

#### RESET

This must be typed in the Command window and must be followed by pressing the Return key. The command closes all open files and updates volume directories.

**Reset** To return to zero, or to some arbitrarily selected beginning point. Reset by turning on the Macintosh or pressing the Reset key on the Interrupt Reset Switch on the left-hand side of the Maicntosh.

**Reside** Be recorded in. A program may reside on a disk, or in memory (RAM or ROM).

Resident Software A program which resides in the main memory of the system.

**Resizing a Picture** A picture that has been transferred from MacPaint to MacWrite may be resized within MacWrite, by placing the mouse pointer anywhere on the picture and clicking the mouse button once. This will cause a black border to be displayed around the picture. There are three black boxes along the bottom edge of the border. The middle box is used to stretch the picture vertically. Place the mouse pointer on the middle box, press the mouse button and drag the box down or up vertically until the picture is the correct vertical size. The left-hand box is used to stretch the left-hand side of the picture. The right-hand box is used for the right side of the picture. If you wish to move the picture horizontally, you would place the mouse pointer along the right- or left-side border, press the mouse button and drag the picture to its new location. See Mouse Button, Clicking.

**Resource Files** Files created by Macintosh programmers to hold special fonts or special alert messages. These files are used by the Resource Manager.

Resource Manager One of the parts of the User Interface Toolbox on the Macintosh.

It is a collection of about 34 routines that make use of data structures stored in resource files. It searches for and prints the proper messages for alert boxes and dialog boxes. See User Interface Toolbox.

**Restart a Program after a Pause** Press any character key on the keyboard to continue a paused program. Press Command-S to pause in any program at any time.



Fig. R1 The MacWrite display with a picture enclosed inside the black border used for resizing pictures.

**RESTORE** A Microsoft BASIC statement which lets you reread DATA statements from specified lines. The format is:

RESTORE [dine>]

dines is the line number of a DATA statement in the program.

Following the execution of the RESTORE statement, the next READ statement reads the first item in the first DATA statement in the program. If dine is specified, the READ statement will read the first item in the DATA statement line specified.

**RESUME** A Microsoft BASIC statement which will continue program execution after an error recovery procedure has been performed. The format is:

RESUME RESUME(0) RESUME NEXT RESUME (line)

> The format used depends upon where execution is to resume. RESUME or RESUME 0 Execution resumes at the statement causing the error.

#### 258 • Resume a Program after a Pause

Attempting to renumber a program containing a RESUME 0 statement will cause an "Undefined line number" error to occur.

RESUME NEXT Execution resumes at the statement immediately after the one causing the error.

RESUME (line) The line number specified indicates where execution is to resume.

A RESUME statement that is not in an error trap routine will cause a "RESUME without error" message to occur.

**Resume a Program after a Pause** Press any character key on the keyboard to continue a paused program. Press Command-C to pause in any program at any time.

**RETURN** A Microsoft BASIC statement which will bring you back from a subroutine. It is used in conjunction with the GOSUB statement. See GOSUB and RETURN. The formats are:

RETURN or RETURN (line)

(line) is the line number of the program line to which you want to return.

RETURN (line) allows nonlocal returns from the event-trapping routines to a fixed line number while still eliminating the GOSUB entry the trap created. Be careful when using this nonlocal RETURN since any other GOSUBs, WHILEs or FORs that were active at the time of the trap will still be active.

**Return Key** The Return key is the key on the extreme right- hand side of the middle row of keys on the Macintosh keyboard. This key is used in programming and in text entry to move the cursor down one line and return it to the left-hand margin. It is also used to send an entry to the computer or to confirm a command.

**Return to Finder** The Macintosh user can return to the Finder (Macintosh Desktop directory display) at any time by selecting the Save option or the Quit option from the File menu on the menu bar. See File Menu, Menu Bar.

**Reverse Video** The ability of some CRT terminals to display dark characters on a light background as opposed to the standard light on dark. Also called Inverse Video.

**RGS Softmaker II\*** A database and report generator that requires Microsoft BASIC to run. It can calculate up to fourteen digits of precision and can sort and search files. The maximum record length in this program is 32,767 characters. Rio Grande Software.

**RIGHT\$** A Microsoft BASIC function which returns the rightmost <a href="https://www.characters.org">https://www.characters.org</a> string x\$. The format is:

stringvariable = RIGHT(x\$,n)

x\$> may be any string expression.

(n) is an integer expression specifying the number of characters to appear in the result.

If (n) is greater than or equal to LEN((x\$), then (x\$) is returned. If (n) is zero, the null string (length zero) is returned. (n) may have a value from 0 to 32767.

Refer also to MID\$, LEFT\$

**Right Alignment Box** The Right Alignment box is one of the four text-justification boxes in the lower right portion of a MacWrite ruler. It is the second box from the right. When this box is clicked, the right margin of the text below the ruler is aligned and the left margin is ragged. This justification is maintained unless it is changed by clicking another justification box or until another ruler with another justification box is inserted into the MacWrite document.

Right Justify See Justify.

#### Right Justify String See RSET, LSET.

**RND** A Microsoft BASIC function which returns a random number between 0 and 1. The format is:

variable =  $RND[(\infty)]$ 

 $\infty$  is a numeric expression which affects the returned value as follows:

The same sequence of random numbers is generated each time the program is run unless the random number generator is reseeded. You can reseed by using the RANDOMIZE statement (see RANDOMIZE). You may also perform reseeding by calling the RND function using  $\infty$  where  $\infty$  is negative. This always generates the particular sequence for the given  $\infty$ . This sequence is not affected by RANDOMIZE, so if you want to generate a different sequence each time you run the program, you must use a different value for  $\infty$  each time.

If  $\infty$  is positive or not included, RND( $\infty$ ) generates the next random number in the sequence. RND(0) repeats the last number generated.

To generate random numbers in the range zero through n, use the formula:

INT(RND \* (n+1))

**ROM** Read-Only Memory. Memory is any device which can store information and allow it to be retrieved when needed. The Macintosh relies primarily on Random Access Memory (RAM), Read- Only Memory (ROM), disks and hard disks. Memory, by itself, is usually a reference to RAM, the general purpose, erasable and reusable memory located inside the Macintosh.

ROM (Read-Only Memory) contains fixed data, usually programs such as the Macintosh's screen programs. The ROM contains the fundamental machine language programs to run the various devices attached to the Macintosh such as monitor, printer, disks, etc. The Macintosh ROM also contains the routines for interpreting keyboard and mouse input. Thus, the Macintosh ROM contains the computer's Operatiing System, Quickdraw and the User Interface Toolbox. ROM and RAM together make up the internal memory or main memory of the Macintosh, or any other computer. See Memory, ROM, User Interface ToolBox, Quickdraw.

**Rotate Option** A command option available from the Edit menu on the menu bar of MacPaint. This command turns an image 90 degrees if that image was selected by using the dotted rectangle. See Drawing Tools, Menu Bar, Edit Menu.

**Routine** A section of code written to perform an action, such as an input character routine or a disk write routine.

RSET See LSET.

**RS-232C** The widely used standard for connecting computer system components, especially for serial communication of control and data between computers and

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serial input/output peripheral devices. Standard for connecting data terminal equipment, such as modems or network data concentrators. It allows for substantial variation as to what signals are passed. RS-232 connections will usually handle only 19,200 characters per second. The Macintosh has two serial ports on the back panel, designed to handle both RS-232 and RS-422 communications protocols and maximum baud rates. See EIA RS-232C.

**RS-422** A set of protocols and standards for data communications that is an improvement over the RS-232C standard. This standard can handle up to 920,000 characters per second. It can generally transmit and receive data over longer cables than the RS-232C standard.

**Ruler** MacWrite uses a ruler which runs along the top of the MacWrite screen display to indicate the location of the cursor, the paragraph indentation tab, the right margin and left margin, the justification of the text between the ruler being displayed and the next ruler. and the line spacing of the text between rulers. Additional rulers may be inserted in a MacWrite document to vary line spacing or justification. The ruler is a formatting device in MacWrite. All of the rulers in a document may be hidden from the screen display by selecting Hide Rulers Option from the Format menu. This command changes to Show Rulers after a Hide Rulers command has been given.

**RUN** A Microsoft BASIC command which causes a program to begin execution. The formats are:

RUN (dine>) RUN (filespec>(,R)

dine» is the line number of the program in memory where you wish execution to begin.

(filespec) is a string expression used to name the file.

RUN executes the program currently in memory at the lowest line number.

RUN (line) will begin to execute the program at the specified line number.

RUN (filespec) loads a file from disk into memory and runs it. It closes all open files and erases from memory any contents before loading the designated program. However, with the R option, all data files remain open.

Executing a RUN command will turn off the sound that is running and reset to Music Foreground. PEN and STRIG will be RESET to OFF.

The RUN statement must be entered in the Command window on the Macintosh's Microsoft BASIC screen display, or may be selected from the Control menu on the menu bar.

**RUN** To cause a program or batch file to start functioning or to execute. In Microsoft BASIC, entering RUN will cause any program in memory to execute. If the program is on a disk, use:

LOAD file name,R or RUN file name,R.

These command sequences must be typed in the Command window in the Microsoft BASIC screen display. The RUN command is also available from the Control menu on the menu bar of the Microsoft BASIC screen display.

**Run for the Money\*** Run for the Money is an educational game for the Macintosh. Players are left on a strange planet with little money. The object of the game is for the player to start a business and to make enough money to repair a damaged spaceship. Scarborough Systems.

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**R/W** Read/Write.

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S ASCII 83, HEX 53. s ASCII 115, HEX 73.

**Sales Edge, The**<sup>•</sup> A training tool and a sales strategy tool. This interactive program asks for data about the salesman and the client, and uses this information to supply a strategy for the salesman. Human Edge Software Corporation. In UK: Softsel.

**San Francisco** One of the fonts introduced with the Macintosh on the earlier versions of MacWrite and MacPaint. This was moved to the font file in later releases of these two programs to make space for new fonts and to create more space for documents and files on the MacWrite/MacPaint disk. This font may be moved back into MacPaint and MacWrite by using the font mover from the Finder on the System disk. Once it has been restored to the applications, it may be selected from the Font menu on the menu bar. See Finder, Font Mover.

### This is an example of Ban Francisco speint plain text. This is an example of the Ban Francisco 18 point plain tex This is an example of the Ban Francisco 18 point bold This is an example of Ban Francisco 14 point bold That's is Ban Francisco 18 point out fin That's is Ban Francisco 18 point out fin

Fig. S1 A sample of the San Francisco font from MacWrite.

**Sargon III**\* An interactive chess game for the Macintosh. The player challenges the computer in this game. His pieces are moved around the board with the mouse. Pull-down menus are used to select various features of the game. There are nine levels of difficulty to this game. Games can be saved to disk and the screen display can be printed. The board is displyed on one side of the screen display and a list of moves is displayed on the other side. The user can also examine 100 great games of chess or 45 great chess problems in detail. Hayden Software. In UK: Softsel.

**SAVE a Program on Disk** To SAVE a Microsoft BASIC program named "SAMPLE" on disk (the default drive) enter:

SAVE ''SAMPLE''

On disk (external drive) enter:

SAVE ''diskname:SAMPLE''

To RUN the program at a later time, use the LOAD command to copy it from the disk you saved it on back into the Macintosh's memory. See LOAD. If you want to save the program in ASCII format, which allows you to MERGE two programs together, put ,A after the close quote of the program name thus:

SAVE ''SAMPLE'',A

See MERGE.

To SAVE the program as a protected file in encoded binary form, use ,P instead of ,A so it cannot be listed, saved, edited (or unprotected). While a clever programmer could probably get around this, it will at least prevent a quick and casual or accidental modification to your program.

The SAVE instruction does not alter your program in memory. It is important to remember that if you write a Microsoft BASIC program, it will be lost (erased) unless you SAVE it before you either: turn off the Macintosh; go to the Desktop (System Command); or use the NEW command. When the SAVE command is used in this manner, it must be entered in the Command window on the Microsoft BASIC screen display. It is followed by pressing the Return key.

The Save command may also be exercised from the File menu on the menu bar. It is selected by placing the mouse pointer on the word File on the menu bar, pressing the mouse button to reveal the pull-down menu, dragging the pointer and highlight down this menu until Save is highlighted, and releasing the mouse button. This will cause the program currently in memory to be saved onto the default disk drive. See SAVE.

**Save As... Option** Available from the File menu on the menu bar in Macintosh applications. This command is used to save a changed document, file or program while the original document, file or program remains unchanged on disk. When the Save As...Command is selected from the File menu, a dialog box is displayed requesting the name to be given to the changed version. It also selects the disk drive to which the document is to be saved. This is done by clicking the Drive button in the dialog box. Each time the Drive button is clicked, another of the disk drives connected to the Macintosh is displayed. See Drive Button, Dialog Box, Menu Bar, File Menu.



Fig. S2 The dialog box displayed with the Save As... option.

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**Save Button** Whenever the Save option or the Save As option is selected from the File Menu in an application, a button called "Save" is displayed in the dialog box asking for the name of the file, document or program to be saved. This button is clicked or the Return key is be pressed, after the name of the item has been entered and the drive has been selected, to save the desired item. See Button.

**Save Option** One of the command options available from the File menu on the menu bar of a Macintosh application. This command saves the current version of the file, document or program currently in memory to disk. If the file, document or program has not been named yet, a dialog box is displayed to request the name of the document and the disk drive to which it is to be saved. The Save button is dimmed until a name is entered in the Save As...box in the dialog box. See Dialog Box, File Menu, Menu Bar, Button, Save Button.



Fig. S3 The dialog box that is displayed with the Save command.

**Saving** Documents, files and programs currently in the Macintosh's memory may be saved to mass storage devices, such as disk drives and hard disk systems, by using the Save command or the Save As... command from the File menu on the menu bar of the application. The Save command writes the item in its current state over any earlier version of the item that was stored. It is also used to save an item for the first time. The Save As command is used to save an altered version of an item while the original is still stored in an unchanged form. This command gives the user the opportunity to change the name of the item, thereby preserving the original item. See SAVE, Save As...Option, File Menu, Menu Bar.

**Saving, Problems with** There will be occasions when the Macintosh user will be unable to save a document, file or program to disk from an application. These occasions will arise when a disk is too full to accept more data, when the disk to which the data is to be saved is not initialized, when the disk is write-protected, when the disk is damaged, when the Finder on the disk is damaged or when the disk drive is not working properly. If any of these conditions is encountered when data is being saved, an alert box will be displayed. If the disk is too full, the user will be given an opportunity to eject that disk and replace it with another disk that is not full. The SAVE can then be retried. If the disk has not been initialized, the user will be given the opportunity to initialize the disk. The save operation can then be tried again. If the disk is write-protected, it must be ejected and unlocked before reinserting it into the disk drive and trying again. If the disk or its Finder have been damaged, the disk should be ejected if possible and replaced with an undamaged disk. If the

disk drive is working improperly, all cables and connections should be checked on external drives that are malfunctioning. This requires that the entire computer be taken to an authorized service center for repair. In the latter case, the file, program or document will be lost.

**Scheduling** Allocating a nonshareable resource such as CPU time or an I/O device to a particular task for a period of time.

**Scottie Mac Case, The**<sup>\*</sup> A carrying case, that holds the Macintosh, the keyboard, the numeric keypad, an external disk drive, two boxes of disks and the power cord. It is foam insulated to protect the system. The Casemaker.

**Scrap** Another term used in Macintosh technical manuals for the contents of the Clipboard, a portion of the Macintosh RAM used to store text, program lines, numbers from a spreadsheet program or graphics images until they can be pasted into a document from the same application or from another application. The Clipboard's contents remain there until something new is cut or copied from a document and thereby is transferred to the Clipboard. See Clipboard, Document, Cut Option, Copy Option, Paste Option.

**Scrapbook** One of the Desktop accessories available to the Macintosh user from the Apple menu on the menu bar. It makes five pages available to the user for storing text or graphics cut or copied from a document to the Clipboard and from the Clipboard to the scrapbook. Any text or graphics in the Scrapbook may be cut or copied to the Clipboard and from the Clipboard to a document by using the Cut and Copy commands from the Edit menu. The Scrapbook is opened by selecting Scrapbook from the Apple menu. Its pages are turned by using the scroll bar at the bottom of the scrapbook window. It is closed by placing the mouse pointer on the close box in the upper left-hand corner of the window. Text or graphics may be removed from the Scrapbook by cutting the page that contains them onto the Clipboard and then placing something else on the Clipboard or quitting the application. Either step will clear the Clipboard. New material may be saved into the scrapbook as long as there is a page available. Just cut or copy whatever is on the Clipboard into any page of the Scrapbook. It will fit the material into the available page. The contents of the Scrapbook are saved onto disk in a file called the Scrapbook file. They are not lost like the contents of the Clipboard when the application is no longer in use. See Clipboard, Cut Option, Copy Option, Paste Option, Edit Menu, Apple Menu.

**Scratchpad** A group of general purpose registers without specific function that serve as a high-speed workspace for some operations. Usually, it is an internal RAM faster than the main system RAM.

Screen The surface of a monitor or TV set on which characters are displayed.

**Screen (Current) Printed** Press Command-Shift-4 together with the Caps Lock key in the down position to print the current contents of the screen on the ImageWriter. This is valid in any program and all applications at any time.

**Screen Dump** A program or routine that allows the user to print the current contents of any screen to a printer. See Screen (Current) Printed.

**Screen, ECHO Function on** Sends characters from the keyboard to the screen for visual confirmation of what has been typed. There is no hard-wired connection between the keyboard and the screen. The keyboard simply enters characters into

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memory. The ROM programs of the Macintosh then copy the characters from memory to the screen, creating a duplication or "echo" of what was keyed.



Fig. S4 The Scrapbook window with a graphics page.

**Screen Generator** A program which helps define CRT screen forms, consisting of text and symbols on the CRT data entry and display. Screen forms are often displayed in protected fields and consist of prompts to guide the data entry operator.

**Screen Size** A measure of the amount of information that a CRT screen can display. Screens may be measured diagonally, as TV sets, or by the number of vertical and horizontal dot or character positions.

**Scroll Arrows** The windows used on Macintosh displays have a scroll bar on the right-hand side to allow the contents of the window to be scrolled up or down. They also have a scroll bar along the bottom of the window to allow the contents of the window to be scrolled from right to left or left to right. There is an arrow at the top and bottom of the right-hand scroll bar, and an arrow at the right and left ends of the bottom scroll bar. These arrows are called "scroll arrows." When a scroll arrow is clicked, the contents of the window are scrolled line by line. See Scroll Bar, Window.

Scroll Bar The windows used on Macintosh displays have a scroll bar on the right-hand side to allow the contents of the window to be scrolled up or down. They

also have a scroll bar along the bottom of the window to allow the contents of the window to be scrolled from right to left or left to right. There are arrows at each end of each scroll bar, called "scroll arrows" used to scroll the contents of the window line by line. There are boxes in each scroll bar called "scroll boxes" used to signify the relative position of the current contents of a window in relation to the entire window. They may also be dragged from one position to another in the scroll bar to move rapidly from one part of a window to another. If the mouse pointer is placed within the limits of a scroll bar above the scroll box and clicked, the contents of the window are scrolled down one screen. If it is clicked below the scroll box, the contents are scrolled up one screen. See Scroll Box, Window, Scroll Arrows.

	List	
10	CLS	仑
30	REM Home Budgeting/Cashflow Analysis	
40	DEFDBL A-Y:DEFINT Z	
50	DIM D(12), IO(3,2), CO(3,3), C1(5,5), C1\$(5), EO(25,2)	
60	PU\$= <b>"\$\$**</b> * ### <b>*</b> #"	
70	REM D()Day Offset Factors	
80	REM IO()Salaried Income	
90	REM C1()Credit Instruments	
100	REM EO()Expenses	
110	REM C1\$()Descriptions of credit cards	
120	REM CO()Fixed-Term Loans	
130	DATA "Mortgage","Car Loan","Other Loan"	
140	REM expenses	$\overline{\mathbf{v}}$

Fig. S5 A Macintosh window display with the scroll bars on the right-hand side and bottom, the scroll arrows at both ends of each scroll bar and the scroll box in each scroll bar.

**Scroll Box** The square shapes within the scroll bars on a Macintosh window display. One scroll bar runs down the right-hand side of the window, and another runs along the bottom of the window. The scroll boxes are used to denote the position of the current window display in relation to the entire contents of the window. They are also used to scroll the contents of the window one screen at a time by clicking in the scroll bar above or below the scroll box. They may also be used to move quickly from one part of the window to another by placing the mouse pointer on the scroll box and dragging it up or down the scroll bar until the proper portion of the window is being displayed. See Scroll Bar, Window, Mouse Pointer, Dragging.

**Scrolling** Moving the contents of the CRT screen or window up or down by one or more lines. Some applications such as electronic spreadsheets and word processors allow scrolling a screen at a time as well as a line at a time. Smaller movements, performed one dot at a time, are called "microscrolling."

**SEACAS\*** An automated auditing tool, which helps save time during the progress of \_ an audit. It also documents audits completely. Peat, Marwick, Mitchell, & Co.

Search Menu Word processors and database managers often allow the user to

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search for a particular word or phrase. This is usually accomplished by invoking a Search Command and instructing the program as to the word or phrase to be found. MacWrite uses the Find command from the Search menu to find a particular word or phrase in text in a document. This menu also has a Change command used to replace occurrences of a particular word or phrase with another word or phrase. The Search menu is located on the menu bar at the top of the MacWrite screen display. See Change, Find Command, Menu Bar.

Seastalker\* An interactive adventure game that combines text and graphics in an undersea adventure game. Infocom, Inc. In UK: Softsel.

**Second Disk Drive** The Macintosh is equipped with an internal disk drive to allow the loading and saving of data onto 3-1/2-inch microfloppy disks. A second disk drive, an external disk drive, may be connected to the Macintosh via the disk drive port located on the back panel of the computer. The disk drive socket is a 19-pin socket and is the second port from the left facing the back of the Macintosh. When saving and loading programs in Microsoft BASIC, the internal disk drive is assumed to be the default drive unless it was not the last drive used. To be sure of accessing the proper drive use the name of the disk in the drive, a colon and the file or program name after the command SAVE or LOAD. See SAVE, LOAD.

**Sector** A contiguous section of a disk track. A block of data on a disk is addressed by its track and sector numbers. Typical disk sector sizes are 128, 256 or 512 bytes of data. Consecutively numbered sectors may or may not be physically adjacent within a track. The Macintosh Disk Operating System uses 512-byte sectors to store information on disk. Each disk is divided into 80 tracks numbered from 0 to 79 from the outermost track to the innermost track. The outermost set of sixteen tracks are divided into twelve 512-byte sectors. The second set of sixteen tracks are divided into eleven sectors. The third set of sixteen tracks has ten sectors per track. The fourth set of sixteen tracks has nine sectors per track. The fifth and final set of sixteen tracks has eight sectors per track. There are a total of 800 sectors on a Macintosh disk initialized by the Macintosh Operating System.

**Sector, Bad** Refers to a sector on the disk which will not read/write data correctly, usually due to a minor physical flaw in the disk. One or two bad sectors will not seriously affect the disk's use. Macintosh will mark them as bad and avoid using them. More than a few bad sectors indicates the disk should be trashed after all of the files that can be recovered are copied from the bad disk to a good disk.

**Security Accessory Kit\*** Since the Macintosh is an extremely compact and portable computer, Apple Computer, Inc. decided to offer a special security kit to Macintosh buyers. Security eyelets are provided as a part of this kit. One eyelet locks into place on the back of the Macintosh on the left-hand side. The second locks into the back of the keyboard. Once these eyelets are in place, they cannot be removed. The security kit also includes a cable that may be wrapped around some permanent object, threaded through the eyelets and secured with a cowling ring and a lock. Apple Computer, Inc. In UK: Apple Computer (UK) Ltd.

Security Kits See Anchor Pad, Security Accessory Kit.

**Seek Time** The time needed to position the read/write head in a drive over the specified track of the disk.

Segment A continuous block of memory addresses, such as 0 to 64k.

**Select All Option** Available from the Edit menu, it selects all of the icons in the current window for some subsequent action such as duplicating, getting info or whatever. Each of the icons in the window is highlighted as if it had been clicked. If the Get Info option is selected from the Edit Menu on the menu bar all of the icons on the screen will be opened. The Finder can only handle seven items at a time in this situation, so no more than seven info windows will be opened. The items can be unselected by placing the mouse pointer anywhere on the Desktop and clicking the mouse button. See Edit Menu, Menu Bar, Clicking, Finder.

**Selecting** Disk icons, folder icons, applications icons, document icons, blocks of text in Macwrite, pictures in Macpaint and cells in Microsoft Multiplan are all selected for some subsequent action by placing the mouse pointer on the item to be selected and clicking the mouse button one time. This causes the selected item to be highlighted by displaying it in inverse and on the screen. Groups of items may be selected by dragging the mouse pointer over all of the items to be selected and releasing the mouse button when all of the desired items are highlighted. When this is done in the Finder's Directory window, a dotted rectangle appears. This rectangle should include all of the desired items if you wish to select more than one item.

You may have to move icons around inside the window by dragging them from place to place to get the icons of all of the desired items to a location where they can fit within the rectangle. When a picture is selected on the MacPaint screen display, it briefly shows in inverse then it is surrounded by a black rectangular border with three small squares on the bottom line. The selection process can be extended in a different fashion by holding down the Shift key while the mouse button is held down to make the first selection. A second selection can be made from a location some distance away on the display by releasing the mouse button and continuing to hold down the shift key, moving the pointer to the next selection, and pressing the mouse button again. This process is called "shift-clicking." See Icon, Mouse Button, Window, Finder, Directory.

**Select Menu** The Select menu is one of the pull-down menus that is available in Microsoft Multiplan. The options in this menu are All Cells, Last Cell, Name, Link, Show Active Cell, Define Name and Delete Name. This menu is used to select either all cells in a spreadsheet or just the last cell for a command or action. It is also used to name a cell, a range of cells or a block of cells. It is used to link a portion of one spreadsheet to another. The Show Active Cell option is used to return the screen display to the last active cell when the user has scrolled the screen display to another portion of the spreadsheet. The Define Name command is used to name a cell, range of cells or block of cells. The Name command is used to scroll the worksheet display to a point where the named cell is displayed on the screen.

**Semicolon (;)** For use in LPRINT on printer line. Each group of spaces as set by the WIDTH statement across the print line is called a "print zone." A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without even a single space between. See also Print Line (Spacing).

**Send a Line to Requesting Program** Pressing the Enter key sends the displayed line to the requesting program for processing.

**Sensor** A device which translates a physical stimulus into an electronic signal which may, for example, be input into a computer.

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**Sequential Access** An access method in which items may be accessed in a fixed order only. The standard example of a sequentially accessed medium is magnetic tape. Here, in order to access a particular record, all records before it must be scanned first.

**Sequential File** A file whose elements may only be accessed in ascending order. In order to read an element of a sequential file, all of the preceding elements must be accessed.

**Serial** Simultaneous handling of processes, transmissions or storage of data. In most microcomputers, parallel I/O connections have eight wires to carry eight bits of a byte simultaneously (or in parallel). Contrast this with a serial interface, where only one data wire is available. The eight bits of a byte are transmitted one after another (or serially). The I/O device must collect all eight bits through time back into one eight-bit byte.

Serial Data Data transmitted sequentially, one bit at a time.

**Serial Port** An I/O port through which data is transmitted and received serially. Serial ports are often used for communicating with terminals or other computers.

**Servomechanism** A device which can respond to an electrical (or other) signal by producing a physical change, such as moving a part, rather than producing another electrical signal. Servomechanisms range from a simple relay to robots. Examples of servomechanisms are disk drives, printers and automated TV antennas. In each case the device responds to certain electrical signals by moving a part such as the disk read/write head, the paper feed of the printer or the antenna.

**Set Date** The current date in the Macintosh clock can be set by selecting the Control Panel from the Apple menu. Once displayed, the month, day and year may be changed by placing the crosshair pointer on the portion of the date to be changed and clicking the mouse button. This will cause an up arrow and a down arrow to be displayed between the date and the time fields. The up arrow advances the selected portion of the date. The down arrow decrements the selected portion of the date. Once the date has been set properly, the crosshair pointer can be moved elsewhere in the Control Panel or the Control Panel may be closed by placing the mouse pointer on the close box of the Control Panel window and clicking the mouse button. See Control Panel, Mouse Pointer, Clicking.

**Set Page # Option** One of the command options available from the Format menu on the menu bar in MacWrite. This command is used to set the number for the current page. This will set up the numbering for subsequent pages. This command causes a dialog box that requests the OK of the currently displayed page number or allows the page number to be changed by moving the mouse pointer into the New page number? box. This causes a vertical bar cursor to be displayed in this box. The current number can be deleted with the Backspace key and the new page number may be entered. Once this has been done, the OK button should be clicked. See Format Menu, Menu Bar, Clicking.

**Set the Time** The time on the Macintosh's internal clock may be set in in the same manner as the date. First, the Control Panel is selected from the Apple menu. Then the crosshair pointer is moved onto the hours, minutes or seconds on the time display and the mouse button is clicked. This causes the selected time setting to be highlighted. An up arrow and a down arrow are displayed between the time setting

and the date setting. The selected time setting is advanced by clicking the up arrow and retarded by clicking the down arrow. See Control Panel, Mouse Pointer, Clicking.



Fig. S6 The Control Panel with the day set section highlighted.

**SGN** A Microsoft BASIC function which gives the sign, positive or negative, of  $\infty$ . The format is:

variable =  $SGN(\infty)$ 

 $\infty$  may be any numeric expression. If  $\infty$  is positive, SGN( $\infty$ ) will return 1. If  $\infty$  is zero, SGN( $\infty$ ) will return 0. If  $\infty$  is negative, SGN( $\infty$ ) will return -1.

**Shapes 'N Shots\*** A graphics utility program and graphics tutor. Versions are available in Microsoft BASIC, MacBASIC and Macintosh Pascal. Shapes works much like fat bits in MacPaint, allowing the user to build graphic images on disk files. Shots allows the user to animate images. These programs are useful to game players, programmers and educators. Macro Micro Software.

**Shift-clicking** The process of holding down the Shift key while clicking the mouse button. This allows the selection process to be extended to allow the user to select more than one item regardless of how far apart they are on the Directory window in the case of making a selection from a directory. Therefore the first item can be selected and the mouse button can be released as long as the Shift key is held down. The pointer can be moved elsewhere on the Desktop to make a second selection and the mouse button clicked again. The same process can be used in MacWrite to select different portions of text in a document for changing to a particular font style, font size or font.

**Shift Key** The Shift key on the Macintosh keyboard gives the user upper case in text applications. It may also be used in combination with the Command key and other keys to carry out tasks such as printing the entire screen or the active window. The Shift key is used along with the mouse button to extend the process of making selections in what is called "shift-clicking." See Command Key, Active Window.

#### 272 • Shok Stop

**Shok Stop\*** A foam-lined, polyethylene carrying case. This case is designed for long-distance transportation of the Macintosh system. Thermodyne International.

**Shortcuts** A quicker way of getting things done on the Macintosh with a Macintosh application. Shortcuts which are available on the Finder are double-clicking, which opens the item double-clicked; shift-clicking, which extends the selection process; pressing the Return key or the Enter key while a dialog box is being displayed, which confirms the command in the outlined button in the dialog box; pressing the Tab key while a dialog box is being displayed, which causes the next logical place for information entry in a dialog box to be selected; and using the Command key in conjunction with other keys, which causes selected actions to take place. See Command key for these shortcuts. There are a number of shortcuts available in MacPaint, which also involve the use of double-clicking and special keys.

**Show Clipboard Option** The contents of the Clipboard may be displayed in a window at any time while using an application or from the Finder by selecting the Show Clipboard command option from the Edit menu on the menu bar. See Clipboard, Edit Menu, Menu Bar, Window.

**Show Footer Option** Once a footer has been opened in MacWrite with the Open Footer command option from the Format menu on the menu bar, the footer will be shown on each page on the screen display of a MacWrite document. Footers may be hidden by using the Hide Footer option on the same menu. This option replaces the Show Footer option at any time that footers are being displayed. See Footer, Format Menu, Menu Bar.

**Show Header Option** When a header has been opened in MacWrite with the Open Header command option from the Format menu on the menu bar, then the Show Header command option replaces the Open Header option on the menu. As long as this option is active, the header is shown on the screen display at the top of each page. Headers may also be hidden by choosing the Hide Header option which replaces the Show Header option when headers are being displayed. See Format Menu, Menu Bar.

**Show Page Option** An option available in MacPaint from the Goodies menu on the menu bar. This option causes a reduced version of an 8-1/2 by 11 page to be displayed on the screen. This gives the user a chance to see a MacPaint document before it is printed. While the page is being displayed, the screen window, which is represented within a dotted rectangle, can be dragged to another part of the page to be displayed when Show Page is deselected by clicking the OK button. See Goodies Menu.

**Show Rulers Option** Rulers are used in MacWrite to format all or part of a document. All of the rulers used in a document will be displayed on the MacWrite screen display of the document as long as the Show Rulers option has been selected from the Format menu on the menu bar. Rulers will be hidden if the Hide Rulers option is selected. This option replaces the Show Rulers option as long as rulers are being displayed in a document. See Ruler, Hide Rulers Option, Format Menu.

**Silicon Valley** The area around Sunnyvale, in the Santa Clara Valley south of San Francisco, California, where many semiconductor manufacturers are located. More generally, it contains the greatest concentration of electronics industries in the U.S. When you refer to this geographical area, please do not call it Silicone Valley.



Fig. S7 A screen dump of the MacPaint Show Page option.

**Simulator** A program which models a device by having the same input/output behavior as the device simulated. A CPU is easily simulated but I/O cannot be precisely simulated because of timing considerations, so only the logic of a program can be tested with a simulator.

**SIN** A Microsoft BASIC function which calculates and returns the trigonometric sine function. The format is:

variable =  $SIN(\infty)$ 

 $\infty$  is the angle in radians.

To convert degrees to radians, multiply by PI/180; PI=3.141593. SIN( $\infty$ ) is calculated in single precision.

**Single-precision Arithmetic** Regular arithmetic, e.g., arithmetic on single-word integers, by contrast to double or multiprecision arithmetic.

**Single-precision Floating Point Variables** Single-precision floating point numbers (numbers with decimal fractions with up to six digits) can be declared by ending their variable names with an exclamation point (!). DEFSNG signifies that all following variables which start with the specified letters are single- precision floating point numbers. See also Variable Names, DEFSNG.

**Single-sided** A method of disk storage using only one side of the disk as used in the Macintosh 400K drive.

#### 274 • Size Box

**Size Box** The size of windows displayed on the Macintosh screen may be adjusted by using the size box located in the lower right-hand corner of each window. A window may be made smaller by dragging the size box diagonally toward the upper left-hand corner of the window, or larger by dragging the size box away from the upper right-left corner of the window. See Window, Dragging.

**Skip Over Print Zones** To leave space on the print line between items, put an extra comma (,,) in the print list. Enter Microsoft BASIC statement:

#### LPRINT A,,B

This would print A in print zone 1, nothing in print zone 2, and put B in print zone 3.

See Print Zones, Print (Line Spacing).

Skip to Top of Page Enter Microsoft BASIC statement:

#### LPRINT CHR\$(140)

Or use the top of form or form feed manual control button (FF) on the printer. You may then need to adjust the paper in the printer so it actually is at the top of a page as defined by the perforations.

In a program, you may want to provide instructions to the operator and a pause to allow for adjustment of the paper.

**Smalltalk** A language and software system developed by the Learning Research Group at the Xerox Palo Alto Research Center (PARC) during the years 1971-1980. It was released in 1981. Smalltalk is organized around two fundamental concepts: objects and messages. Smalltalk systems are characterized by a high degree of pictorial interaction.

**Snapshot of a Screen display** Any Macintosh screen display can be converted to a MacPaint snapshot by pressing the Command key, the Shift key, and the 3 key together. The Caps Lock key should be in the up position when this is being done. Up to ten snapshots can be taken and each one will be numbered consecutively from 0 to 9. Each one is named Screen 0, etc. when it is saved to disk. MacPaint can be used to print and edit each of these snapshots. See Command Key, Shift Key.

**Soft-sectored** A disk format where the beginning of every sector is detected by reading magnetic marks on the disk (used by the Macintosh). This is in contrast to hard-sectored, where each sector's origin is marked by a physical hole.

**Software** Computer programs of all kinds. Usually software is contrasted to hardware, the actual chips, wires, boards, etc. which make up the computer. A special case is Read-Only Memory (ROM), which is hardware containing a permanent copy of software. Shorthand terminology here could be confusing. A Microsoft BASIC ROM, means a ROM (hardware) containing a copy of a Microsoft BASIC interpreter program (software). Such ROMs are often called "firmware" to distinguish them from nonprogram hardware and from software in changeable media (RAM, disk, etc.). For software available for the Macintosh, see Agriculture, Business Software, Communications, Databases, Educational Software, Games, Graphics Software, Integrated Software, Music Software, Personal Management Software, Programming Languages, Spreadsheets, Utility Programs, Word Processors. **Software, Applications** A group of computer programs, possibly including data files and documentation, which performs a function or group of related functions on the computer. Applications software are devoted to an end-user task (e.g., a word processing package, an accounting package, etc.). Systems software packages facilitate the use of the machinery (e.g., a database management package, a disk operating system or a program development package).

**Software Package** A prewritten group of commercially available programs designed to serve a specific need, such as word processing, inventory control, database management, etc.

**Software-compatible** Describes CPUs which execute the same instructions (i.e., have the same machine language).

**Sorcerer**<sup>+</sup> An interactive text adventure game that takes the user into realms of magic. Infocom, Inc.

**Sort** To arrange items according to defined criteria, such as in alphabetical or numerical order.

Source The emitter of a transistor.

Source Code A synonym for source program.

**Source Drive** The disk drive from which information/data comes. Target drive is the disk drive to which information/data goes.

**Source Language** The original language used by the programmer, on which a translator program operates to produce a version in machine language.

**Source Program** A file which contains data to be processed by a language processor or interpreter. For example, a Microsoft BASIC program called SAMPLE.BAS is a source program. If you submit it to the Microsoft BASIC Compiler to produce a fastobject program, the Microsoft BASIC Compiler will treat SAMPLE.BAS as its input data rather than as a program to be executed. The Microsoft BASIC Compiler will produce an object file with extension .OBJ which contains a translation of your source program into the MC68000 machine language. See Programs, Source or Object.

SP Stack Pointer.

**SPACES** A Microsoft BASIC function which returns a string containing (n) spaces. The format is:

stringvariable = SPACE\$(<n>)

(n) is in the range 0 to 255. See SPC.

**Space** Binary 0 (zero). ASCII 32. In the RS-232C standard, negative voltage; in a current loop, no circuit flow; and in modems, the lower frequency of the pair. Also commonly used as a synonym for the blank character.

Space Bar The space bar on a computer keyboard serves much the same function as

#### 276 • Space, How to

a space bar on a typewriter. It is used to insert a space or a null string into text, numbers or program lines. The space bar generates an ASCII 32 character for the computer. The space bar is located in the center of the bottom row of keys on the Macintosh keyboard. It is the longest key on the keyboard.

**Space, How to** An LPRINT statement with no other specifications will print a blank line (feed the paper up one line and return to left margin) so you can format your printout neatly.

**Space on Print Line** To leave space on the print line between items, put an extra comma (,,) in the print list. Enter Microsoft BASIC statement:

#### LPRINT A,,B

This would print A in print zone 1, nothing in print zone 2, and put B in print zone 3.

See also Print Zones, Print Line (Spacing).

**Space Up One Line** To advance one line on the printer (space up) without carriage return, enter Microsoft BASIC statement:

#### LPRINT CHR\$(10)

or use the line feed button (LF) on printer.

Entering just LPRINT gives a line feed, both a space up one line (line feed) and a return to left margin (carriage return).

#### Spaces in PRINT or LPRINT See SPC.

**Spacing in Microsoft BASIC Print Lines** To get one or more spaces between fields printed by your Microsoft BASIC programs, use a literal of spaces: "". To get several spaces between the printed values of A\$ and B\$, enter Microsoft BASIC statement:

LPRINT A\$;'' '';B\$

See also Print Zones.

**SPC** A Microsoft BASIC function which causes (n) spaces to be skipped in a PRINT statement. The format is:

PRINT SPC((n))

In must be in the range 0 to 255.

If you make (n) greater than the width of the device, The value used is (n)MOD(width). SPC is restricted to use with PRINT, LPRINT and PRINT # statements. If the SPC function is placed at the end of the list of data items, Microsoft BASIC will not add a carriage return as though the SPC function had an implied semicolon after it. See SPACE\$.

**Speaker Volume Setting** The volume of the Macintosh speaker may be set from the Control Panel, accessed by selecting it from the Apple menu on the menu bar. Once the Control Panel window is being displayed, the sound may be adjusted by dragging the volume control lever on the left-hand side of the window up for louder volume, or down for lower volume. See Apple Menu, Dragging.

#### File Edit View Special



Fig. S8 The Control Panel with the volume control setting on the left-hand side.

Special Characters Meanings of in BASIC. See BASCI, Special Characters.

**Special Keys** There are three special keys on the Macintosh keyboard: the Tab key, the Return key and the Enter key. The Tab key is used to move the cursor from one insertion point to the next and to move this point from one tab setting to the next in a word processor. The Enter key is interpreted as an instruction to move down one line and continue printing. The Return key is interpreted as an instruction to move down one line, move the cursor to the extreme left-hand end of the line and continue printing. Both the Enter key and the Return key are recognized as Do it instructions by the computer.

**Special Menu** One of the menus on the menu bar of the Macintosh Desktop display, which allows the user to Clean Up the Desktop, Erase Disk and Empty Trash. The Clean Up command rearranges the icons on the Desktop and in the Directory window so they are all in neat columns and rows. The Erase Disk command is self-explanatory. The Empty Trash command is used to erase from the disk any files, programs or documents not wanted. Such files must have been placed in the Trash prior to using this command.

Spikes Sharp, temporary increases in a signal or voltage.

**Split Bar** Split bars may appear at the top of vertical scroll bars and on the left-hand side of the scroll bars located on the bottom of a window, and mean that the window may be split vertically or horizontally into two panes. The contents of each pane may be scrolled independently of the contents of the other pane. Split bars are not found frequently in Macintosh applications. See Scroll Bar, Window, Panes.

#### 278 • Split Screen

**Split Screen** Division of a CRT screen into two or more separate areas, or windows, in which distinct information is displayed.

**Spool** Simultaneous Peripheral Operating On-Line. A method of increasing the efficiency of the system throughput by allowing programs using slow output devices to complete execution rapidly. Program output data is placed in queues on high-speed mass storage devices or a part of main memory dedicated to spooling for low-speed transmission concurrent with normal system operation.

**Spray Paint** The spray paint icon is a symbol on the MacPaint drawing tool palette. When this icon is clicked, the spray paint may be used to shade an area of a drawing with the current pattern shown on the left-hand side of the pattern palette. See Drawing Tools.

**Spreadsheet** A spreadsheet or electronic spreadsheet program is a program that uses the conventions of an accountant's ledger sheet to deal with numbers and formulas. An accountant's ledger sheet is made up of rows and columns. Labels and numbers are inserted as required in the cells that are located at the junction point of a row and a column. Parts of rows or whole rows of numbers may be added across. Parts of columns or whole columns may be added down. The contents of one or more cells may be added to, subtracted from, divided by or multiplied by the contents of another cell or cells. Constants may be introduced and used.

One particularly frustrating aspect of an accountant's ledger sheet is that as the entries become more complex, as one number is changed, many more numbers that are related to the changed number must be erased and changed. All of these oprations are carried out electronically by the computer in a spreadsheet format when a spreadsheet program or electronic spreadsheet is used.

Spreadsheet programs have a number of common characteristics. They are divided into rows and columns in terms of screen display and hard copy output. They have a number of built-in commands to format individual cells or portions of a worksheet generated by the program. They have a number of built-in file handling commands that allow a worksheet to be saved to disk, loaded from disk or printed. They have a number of built-in functions that allow mathematical and analytical operations to be carried out. The Lotus Macintosh Product offers a spreadsheet as one of its integrated applications. MicroPlan and Microsoft Multiplan are examples of spreadsheet programs that are available for the Macintosh. Spreadsheet programs are easy to learn and easy to use. They are a necessity for a business and are extremely useful in the home. They are extremely verstile and flexible. See Jack 2, MicroPlan, Lotus Macintosh Product, Microsoft Multiplan.

SQ 5 See PRO Series.

**SQR** A Microsoft BASIC statement, which returns the square root of  $\infty$ . The format is:

SQR(x>)

comust be greater than 0.

Square Root See SQR(x).

Stand-alone A device which will operate by itself, requiring no other equipment.

**Starcross\*** An interactive text adventure game which takes place in outer space. Infocom, Inc.

Start or Execute To cause a program or batch file to start functioning or to Run.

**Start-bit** A bit indicating the beginning of asynchronous serial transmission. See Stop-bit.

Starting a New Program To start a new program type:

NEW

This completely erases all lines now in Microsoft BASIC's memory. If it is something you want to keep and have not already stored on disk, SAVE it first. If you do not erase the program in memory before starting on another, you will usually wind up with an unusable combination of lines from your old and new programs.

**Starting a Program after a Pause** Pauses may be delays written into a program. They may also be caused by using a key combination such as Command-C to interrupt a program's execution, or by pressing the Interrupt key on the lower left-hand side of the Macintosh. If a program has been interrupted in any of these fashions, it may be restarted by using the Continue command option from the Control menu on the menu bar. Another method is to enter CONT in the Command window followed by pressing the Return key.

**Startup Disk** A disk that contains the information required to start the computer system. The first disk inserted into a Macintosh disk drive should be a startup disk, which may also contain one or more applications and a number of files. A startup disk always contains all of the system files originally in the the System Folder. The documents included in this folder should be System, Finder, ImageWriter and Printer. At times there will be other files in a System Folder, including Scrapbook file, Clipboard file, Note Pad file, Fonts and possibly other files. When a startup disk is booted, the System and the Finder are copied into the computer's memory. About half of the space on a 400K disk is taken up by System files. See Finder, System Folder.

**Statement** A string of characters which is a syntactically complete instruction with respect to a high-level language translator, such as BASIC.

**Static Memory** MOS memory which uses a flip-flop as a storage element. It does not need to be refreshed, does not require a clock, and does not lose its contents as long as power is applied.

**Static RAM** RAM memory circuits which retain their contents as long as power is applied.

Statistical Software See Telofacts 2.

**Status** The present condition of a device, usually indicated by flag flip-flops in special registers. See Flag.

**Stepper Motor** A mechanical device which rotates by a fixed amount each time it is pulsed. Often used in disk drives.

Stock Market Software Dow Jones Market Manager, Dow Jones Spreadsheet Link.

#### 280 • STOP

**STOP** A Microsoft BASIC statement which terminates program execution and returns to command level. The format is:

STOP

You may use STOP statements anywhere in a program to stop execution. When Microsoft BASIC sees a STOP statement, it displays the message:

Break in «xxxx»

where «xxxx» is the line number where the STOP occurred.

STOP statements do not close files, as do END statements. Microsoft BASIC will always return you to command level following execution of a STOP statement. By using the CONT command you can resume execution of the program. See CONT.

The Stop command may also be exercised from the Control menu on the menu bar of the Microsoft BASIC screen display.

Stop a Microsoft BASIC Program See STOP, END.

**Stop and Terminate Current Function** To end, terminate or break current function in any program at any time, press the Command key and the C key together. Another option is to press the Reset button on the programmer's switch.

**Stop-bit** A bit indicating the end of asynchronous serial transmission.

**Stopping System Operation** System operation can be interrupted by pressing the Interrupt key on the left-hand side of the Macintosh. It can be restarted by using the RUN or CONT commands. System operation can also be stopped by pressing the Reset key on the lower left-hand side of the Macintosh, which clears everything out of memory and restarts the system as if it had been turned off. Both the Interrupt key and the Reset key are on the Programmer's Switch that may be installed by the user in the vent slots on the lower rear of the left-hand side of the computer. See Programmer's Switch, Interrupt Reset Switch.

Storage A synonym for memory.

**STR\$** A Microsoft BASIC function which returns a string representation of the numeric value in  $\infty$ . The format is:

stringvariable = STR( $\infty$ )

«» is any numeric expression.

When  $\infty$  is positive, the string returned by STR\$ contains a leading blank (the space reserved for the plus sign).

**STRING\$** A Microsoft BASIC function which gives a string of length (n) whose characters all have ASCII code (m) or the first character of (x\$). The formats are:

stringvariable = STRING\$((n,m))
stringvariable = STRING\$((n),(x\$))

(n,m) must be in the range 0 to 255.(x\$) can be any string expression.
**String** An ordered sequence of data items, such as characters. For example, the word "string" is a string of six characters. See Character String.

String, Convert from Number See MK1\$, MKS\$, MKD\$.

String, Convert to Number See CVI, CVS, CVD.

String Handling The ability of a programming language to operate on strings of characters.

String, Left Justify See LSET.

String, Length of See LEN.

String, Numeric Value of See VAL.

String, Right Justify See RSET.

**String Variable** In Microsoft BASIC string variables must end in \$ or start with a series of letters specified in a DEFSTR statement. String variable names (for characters) must start with a letter, can have up to 32,767 characters, and must not use reserved words (IF, ON, THEN, GOTO, etc.) or a reserved word followed by a type declaration character (\$, %, ?, !, #). String variables can hold 0 to 255 alphabetic, numeric or special characters. See Reserved Words for complete list. See also Variable Names, DEFSTR.

**Structured Language** A computer language designed to aid or enforce structured programming. Control structures such as IF...THEN, ELSE, DO, WHILE, CASE and REPEAT, UNTIL, together with provisions for declaring logically separate program modules such as procedures, and limiting the scope of variables all lend a modular structure to programs. Unconditional control transfer statements (GOTOS) are often left unimplemented. Popular structured languages are Pascal, ALGOL and C.

**Structured Programming** A set of techniques designed to increase the reliability and comprehensibility of programs by increasing programmer discipline. Structured programming involves precise problem specification, top-down or stepwise program design and block-structured or modular programs.

**Style Menu** MacWrite uses a pull-down menu on the menu bar called the "Style menu" to select the style of text to be printed in a MacWrite document. The text styles available are Plain Text, Bold, Italic, Underline, Outline, Shadow, Superscript and Subscript. These options may either be selected from the Style menu or by pressing the Command key in conjunction with another key. Both the menu and the Command key sequences for MacWrite are illustrated below. MacPaint also has a Style menu, which serves the same purpose except that there are fewer choices in the MacPaint menu. The MacPaint Style menu does not include the Superscript and Subscript options. See Menu Bar, Pull-down Menu.

**Subdirectory** A file that lists the names of other files, and is displayed in a disk directory rather than the name of each file. This system allows files to be classified together to save space in a disk directory. The Empty Folder on the Macintosh Finder's Directory window is the same thing as a subdirectory when the icons of a number of files have been dragged into the Folder and irectory window is the same thing as a subdirectory when the icons of a number of files have been dragged into

#### 282 • Subroutine

the Folder and irectory window is the same thing as a subdirectory when the icons of a number of files have been dragged into the Folder and the Folder has been given a name. See Directory, Folder, Finder.



Fig. S9 The Style Menu from MacWrite.

**Subroutine** A program segment identified by name and often bracketed by a subroutine and a Return statement. Execution is transferred to a subroutine when a subroutine call occurs. Subroutines improve program modularity and save memory space at a minimal cost in the overhead required to process the call/return sequence. See GOSUB and RETURN, CALL.

**Subroutine, Passing Variables to a** Passing parameters (also called arguments or data) makes information from one process or program available to another process or program. Similar to a football pass where one or more bytes of data replaces the football, and the receiver is a program. The sender may be a program or a person typing the data onto a command line to be passed to a program. The most common example would be a Microsoft BASIC program passing variables to a subroutine.

Supplies See Accessories.

**Support Chips** All the components beyond the main device required for complete system operation.

**Suspend** Suspend is a command that is used to interrupt a program that is running in Microsoft BASIC. This command is selected from the Control menu. A program that has been suspended may be restarted using the Continue command from the Control menu or by pressing any key on the keyboard.

**Suspended**<sup>+</sup> An interactive text adventure game that pits the player against the program in the computer, involving a cryogenic nightmare. Infocom, Inc.

**SWAP** A Microsoft BASIC statement which exchanges the values of two variables. The format is:

SWAP (variable1), (variable2)

(variable1) and (variable2) are the names of two variables or array elements. Any type variable may be exchanged (integer, single-precision, string), but the two variables must agree with the variable type defined or a "Type mismatch" error will result.

**Symbol Table** A table constructed by an assembler or compiler to associate symbolic names with actual addresses or values.

**Symbolic** Describes the use of characters or character strings in a defined syntax to stand for machine-related entities such as instructions or data.

**Synchronous System** A system in which all events are synchronized with a common clock pulse.

**Syntax** The rules governing proper construction of statements in a language. For programs, the rules include spelling and placement of keywords and data names, and number, type and order of arguments. Punctuation rules are also usually part of syntax.

**Syntax Check** A check, performed by a program or person, to ensure that one or more statements in a programming language complies with all syntax rules of the language. A program may pass all syntax checks and still give an error message or erroneous results due to logic, data or program-flow problems.

**System** Any aggregate of two or more interconnected electronic components. See Computer System. System can also refer to a group of programs which accomplish some function (database management system), a group of interconnected devices (turn the system off) or both taken together (a total accounting system).

SYSTEM To return to the Desktop from Microsoft BASIC enter:

#### SYSTEM

**System Clock** An internal clock built into a computer sytsem, used to log access time to programs and to control activities within the computer. The Macintosh has a battery- operated clock/calendar. The time and date are read into the Macintosh RAM, and may be displayed on the screen by accessing Alarm Clock from the Apple menu. The date will not be visible until the switch on the right-hand side of the date is clicked. See Alarm Clock, Apple Menu.

**System Crashes** A system crash occurs when a program freezes up or the system locks up and leaves no way out for the user except Resetting the system or turning the computer off and back on again. On the Macintosh, an alert box might be displayed, informing the user that a fatal error has occurred and offering the option of restarting the system from the alert box or shutting down. System crashes are generally caused by software or Finder problems. See Alert Box, Reset, System Reset.

#### 284 • System Date

System Date See System Clock, Alarm Clock.

**System Disk** Used to contain system files and other system software or utility-type programs. See Data Disk. A Macintosh System disk contains at least Finder, System, ImageWriter and Printer. See Startup Disk.

**System File** A system file is a file that normally is included in the System Folder on the Macintosh. System files are necessary to allow the Macintosh to use disk drives, printers and other peripherals. For a further discussion of system files, see System Folder.

System Folder The System Folder is a folder that must be present on a Macintosh startup disk. This folder must contain at least the Finder and the System. It usually contains a number of other System files. The System files that are usually included in a System Folder are Fonts, ImageWriter, Clipboard file, Note Pad file, and Scrapbook file. The System file contains all of the subroutines that are loaded into memory or that are kept on disk for reference in making the Macintosh system work. The Finder is the program that presents and manages the Desktop display. It is the Macintosh file handling and disk handling program. The ImageWriter file is the printer driver for the ImageWriter printer. It may be replaced by another driver for another printer as these printers become available for use with the Macintosh. The Clipboard file contains information that has been stored in the Clipboard by the user if there is enough room on the disk to save this file. If there is not enough room, the file is not saved. The Note Pad file contains any information saved in the Note Pad by the user. The Scrapbook file contains any data stored in the Scrapbook by the user. Pictures, text and numbers may be moved to the Clipboard and Scrapbook by using the Cut command or Copy command from the Edit menu. They may be moved from the Scrapbook or Clipboard by using the Paste command.

**System Font** The font displayed in the title bar Finder's Directory window when this window is displayed on the Desktop. This font is identified as Font number 0 on a font list. See Fonts, Font Manager.

**System Reset** A system reset occurs when a computer is fooled into thinking that it was turned off and turned on again. This is accomplished by pressing the Reset key on the Macintosh. See Reset.

System Time See Set the Time.

**Systems Software** System programs (system software) perform functions necessary to the use of the computer yet not directly relevant to solving a particular applications problem. An example of this would be the disk operating system used by the computer, various utilities such as sort, copy or programs which facilitate the use of the program and may be used by application software, but do not directly produce useful results (keeping track of your bank balance, allowing you to play a game, produce a letter, etc.). Computer programs (software) are divided into two major categories. Application software consists of programs that actually perform some useful function directly related to what he wants done. Examples are word processing programs that produce letters, reports, etc., database programs that allow the user to manage his inventory, appointments and various other items of data, accounting programs, educational programs and even games, etc.

### T

T ASCII 84, HEX 54. t ASCII 116, HEX 74.

TAB A Microsoft BASIC function which tabulates to position (n). The format is:

PRINT TAB((n))

(n) must be in the range 1 to 255.

If the current print position is already past space (n), then TAB goes to position (n) on the next line. Space 1 is the leftmost position. The rightmost position is the defined WIDTH. You are restricted to using TAB with PRINT, LPRINT and PRINT# statements.

If the TAB function is at the end of the list of data items, Microsoft BASIC does not add a carriage return, as though the TAB function had an implied semicolon after it.

**Tab Key** The leftmost key on the second row from the top on the Macintosh keyboard. This key is used when text is being entered to move the insertion point to the next tab stop. It is particularly useful in word processors such as MacWrite to carry out columnar functions. It is also used in dialog boxes with several buttons or input rectangles to move from one response item to the next. See Insertion Point, Dialog Box.

**Tab Markers** Tab markers are used in the MacWrite rulers to indicate the current position of each tab in use. There are two types of tab markers in MacWrite. The first is the conventional tab marker, used to mark the starting point of text entry in a document. The second type is a decimal tab marker, which sets up columns of numbers to align the decimal point of the column on this tab. Tabs are set by dragging a tab icon or a decimal tab icon from its tab well in the lower left section of a ruler and placing the tab at the desired position on the ruler line. Once the tab marker is in its proper position, the mouse button may be released.

**Tab Wells** Tab wells, located on the ruler in MacWrite, are for the decimal tab marker and the regular tab marker, which must be dragged from the wells to the desired position on the ruler line. See Ruler.

**Table Look-up** Method of converting one variable to a corresponding value or verifying its accuracy by searching a list or table of entries for the known keyword or value. The corresponding values may then be extracted from corresponding positions in the table, similar to looking up a name in the phone book to find the corresponding number.

**Tables** Tables can be composed easily in MacWrite by setting a tab marker at the beginning of each column of the table, in the case of text, and at the decimal location of a column of numbers, in the case of numeric tables. As each subsequent

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tabular entry is made, a press of the Tab key places the insertion point at the next entry position. See Tab Key, Tab Markers.



Fig. T1 A MacWrite ruler with a decimal tab and a regular tab on the ruler line. The mouse pointer lies between the decimal tab well and the regular tab well.

**TAN** A Microsoft BASIC function which gives the trigonometric tangent of  $\infty$ . The format is:

variable =  $TAN(\infty)$ 

 $\infty$  is the angle in radians. Multiply by PI/180 to convert degrees to radians. PI = 3.141593. TAN is calculated in single precision.

**Tape, Magnetic** An inexpensive mass storage medium with the disadvantage of requiring sequential access. It is convenient for large files or archival storage, it is often the only external storage on very low-priced systems and is used as a backup for disk on larger systems.

**Target Drive** The disk drive to which information/data goes. Source drive is the disk drive from which information/data comes.

Tax Packages See Personal Tax Planner.

Telephone Directory Software See Habadex, MAGICphone.

**Telofacts 2\*** A program used to gather and analyze information. It may be used to design questionnaires that gather information to input into a database and to

analyze it for marketing information, opinion polls and similar information. dilithium Software.

**Template Disk No. 1 For Multiplan\*** Four worksheets for use by Multiplan, a family budget template and a check book register are included. rds labs.

Terminal Emulators See MacTerminal.

**Terminal Mode** A mode of operation for a general purpose computer so that its CRT and/or printer can be used as a terminal for another computer. Also called terminal emulation.

**Terminate Current Function** The current function in a Microsoft BASIC program can be terminated by selecting Stop from the Control menu on the menu bar, or by pressing Command-C, or as a last resort, by pressing the Reset button on the side of the computer. See Reset, Menu Bar, Control Menu.

**Test Data, Running** A programmer must ensure that a program will correctly process all of the types of data it is intended for. Samples of the data are prepared (test data) and the program is executed using this data (a test run). The program's outputs (reports, screen displays, files, etc.) are then verified to be as specified. An error in the processing logic of a program is called a "bug," hence the terms "debug" and "bug- free."

Test Sites, Alpha and Beta See Alpha Test Site vs Beta Test Site.

**Text Editor** An editor program specialized for text files, it manipulates ASCII characters such as letters, punctuation marks, etc. The Microsoft BASIC editor and word processing programs are text editors. Their basic function is to create and change text data such as a letter, report, program or book. Microsoft BASIC is edited on the Macintosh by listing the program, selecting lines from the List window and editing the lines in the Command window.

Nontext editors usually display and modify a byte of storage as either two hexadecimal digits or a three-digit numeric ASCII value. See Editor, Edit.

**TextEdit** A program residing in the Macintosh ROM, it is a basic text entry and editing program. TextEdit is one of the User Interface Toolbox programs. See User Interface Toolbox, ROM.

**Text File** A file containing character data, letters, numbers or special characters. Most data and programs that you write will be in text files. See Data File.

**Text Mode** Most graphics programs not only allow images, shapes, and pictures to be drawn by the user, they also allow text to be used along with graphics. In most such programs, the user must switch from the routines that generate graphics to the routines that generate text. When the latter routines are being used, the program is said to be in the Text mode. The Text mode is accessed in MacPaint by clicking the large letter A on the drawing tool palette on the left-hand side of the MacPaint screen display.

**The Coveted Mirror\*** The Coveted Mirror is a fantasy adventure game that combines graphics, animation and text. Penguin Software. In UK: Softsel.

The Quest\* See Quest.

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**Thimble Printer** Prints fully formed characters with a thimble, which is like a daisy-wheel element with the type petals bent up 90 degrees to form a cup or thimble shape.

**ThinkTank 128**• A tool for producing outlines which is particularly suited to putting complex thoughts and plans into outline form and then rearranging them as required. Thoughts and ideas may be classified under headers. Parts of an outline may be hidden or revealed by the user. Outlines may be added to or easily edited. Various levels of each outline may be displayed as required rather than using all levels or rewriting an outline several times to present each level. The cut and paste capabilities of the Macintosh are fully utilized by this program. It is also heavily mouse-dependent. Living Videotext, Inc. In UK: Rapid Recall Ltd.

Time See Set the Time.

**TIME\$** In Microsoft BASIC TIME\$ is both a function and a command statement. The syntax of the function is:

variable = TIME\$

This function returns the current time from the Macintosh's clock/calendar in an eight-character string in the hh-mm-ss format. hh (hours) is expressed in digits from 00 to 23. mm (minutes) is expressed in digits from 00 to 59. ss (seconds) is expressed in digits from 00 to 59. The TIME\$ command statement is used to set the current time on the Macintosh's internal clock/calendar. Its syntax is:

TIME\$ = «string-exp»

«string-exp» must be in one of the following formats:

hh	in two digits from 00 to23, sets the hour while it defaults the minutes and seconds to zero.
hh-mm	sets the hours with two digits between 00 and 23. It sets the minutes with two digits from 00 to 59. It leaves seconds at a default value of zero.
hh-mm-ss	sets the hours, minutes and seconds. The hours and minutes are set as outlined above. The seconds are set with two digits from 00 to 59

**TIMER** A Microsoft BASIC function that retrieves the number of seconds that have elapsed since midnight. This function is used frequently to generate random numbers in the RANDOMIZE statement. The syntax for this function is:

variable = TIMER

It must be included in a program line.

**Title Bar** The top section of a window, which includes the window's title and usually a close box. A window may be dragged from one place to another on the screen display by placing the mouse pointer on the title bar, holding down the mouse button, dragging the window to a new location and releasing the mouse button. See Window, Close Box, Mouse Button, Dragging.

**Title Page Option** One of the options on the MacWrite Format menu. When selected, the user may choose whether or not to show the standard header on the front page of the MacWrite document.

**Toolbox Support** Microsoft BASIC makes use of support from the Macintosh User Interface Toolbox. A Microsoft BASIC programmer may access Macintosh ROM routines by calling them by name from a program line. For instance, CALL InitCursor would access Quickdraw and set the current cursor to be used by the program to the arrow cursor with the arrow facing north- northwest. It also sets the cursor level to zero, making the cursor visible. This is one example of how Microsoft BASIC accesses the ROM routines. For more detailed discussions, consult the Microsoft BASIC Manual and other technical works. See User Interface Toolbox, Quickdraw, ROM.

**Toronto** One of the fonts available on the first release of MacWrite and MacPaint. This font was moved from MacPaint and MacWrite to a font file on the Macintosh System disk to conserve space. You may wish to move it onto your MacWrite/MacPaint disk with Font Mover.

#### This is an example of the Toronto 9 point plain text font.

This is an example of the Toronto 12 point plain text font. This is an example of the Toronto 12 point bold fon This is an example of Toronto 14 point bold. This is Toronto 18 point outline. This is Toronto 18 point outline. This is Toronto 24 point shadow.

Fig. T2 An example of Toronto from MacWrite.

**Totem Pack\*** A nylon carrying case for the Macintosh. It may be carried as a backpack or a tote bag and is fully padded. There is space for the Macintosh, the keyboard, the mouse, an external disk drive, disks and cables. Braun-Cooper.

**Track** One circle of data around the surface of a disk. The Macintosh disk has 80 tracks, each further subdivided into sectors of data. See Sector.

**Trade\*Plus\*** This is an investors' service that quotes sales price and other stock market data. It connects the user to the stock market via the Trade\*Plus network and allows all stock transactions to be carried out. Data can be transferred into Multiplan worksheets. Three portfolios can be tracked by the software. The system is open 24 hours a day, 7 days a week. Trade\*Plus.

**Transistor** An electronic device which uses one electrical signal to influence another. The two main uses of transistors are as amplifiers and switches. Used as an amplifier, a transistor uses the changes in a small signal to make large changes in a large signal. Used as a switch, the transistor opens or closes a circuit depending on the state of a controlling signal.

#### 290 • Transylvania

**Transylvania**<sup>•</sup> Transylvania is an adventure game that combines graphics, text and mouse activity. The mouse is used to select directions of movement in the game. Text entries are made to accomplish things during the game. Pictures are displayed in the upper left quadrant of the screen. This game places the player in a fantasy realm where he must rescue a maiden before the time runs out. He encounters a werewolf, a vampire and other creatures. Each of the objects that the player discovers in the game is useful in solving a part of the puzzle. Penguin Software. In UK: Softsel.

**Trash** The name given to Trash Can icon on the Macintosh Desktop. When any icon is dragged from the Desktop into the Trash, it will be erased from a disk when the Empty Trash command is selected from the Special menu, or when the disk is ejected. The Trash icon may be opened like other icons by double-clicking it. Once opened, a window will be displayed. Icons may be moved from the Directory display on the Desktop into this window or they may be moved back out at any time before the Trash is emptied or the disk is ejected. See Window, Double-clicking, Special Menu, Desktop.

**Tree Structure** A collection of data organized so that each item is linked to one or more other items, creating a spreading network of linkages, analogous to the branches of a tree. Genealogical data provides the classical model. Each person has exactly one mother, but may have zero or more daughters. An example might be the parts list of an airplane. The main entry is for the entire airplane. It is linked to the major components, such as wings, fuselage, tail. Wings, in turn, are linked to their smaller components, such as flaps, engine supports, engines, etc. Each of these can be further linked to smaller and smaller subassemblies, until individual parts such as nuts and bolts are reached.

**TROFF/TRON** One of the tools available in Microsoft BASIC for debugging programs is the Trace function. When trace is on, each program line is listed as the program runs. Trace may be turned on and turned off from the Control menu on the menu bar or with TRON, and turned off with TROFF from within a program line. The syntax for these statements is:

TRON TROFF

**Troubleshooting** The process of determining what has caused a malfunction or other problem with a computer system. It is similar to a doctor starting with the symptoms to determine what ails a patient. He examines the patient more and more closely, making note of each symptom he encounters. Then he checks his medical books and other sources based on the symptoms encountered until he finds a number of things that exhibit the symptoms. Further investigation finally eliminates everything except the cause of the problem. If you encounter a problem with the use of your Macintosh, write down what has occurred. Note what has happened to the screen display, and note any alert boxes with error IDs that may have been displayed. Check pages 135 through 139 of your Macintosh Manual, which contain very basic information about troubleshooting and advice on what to do.

**Truth Table** A table showing the logical value (true or false) of a compound logical expression, based on the logical value of the simple components of the expression. Example:

<u> </u>	<u> </u>	A OR B
т	т	Т
Т	F	Т
F	т	Т
F	F	F

This table reflects the definition of OR: A or B is true if and only if either A or B or both are true.

**TTL** Transistor-Transistor Logic. Logic circuits based on bipolar devices, usually low-power Schottky circuits. These are fast but expensive because gold-plated Schottky diodes are required on every TTL bus input.

Turtle See Macintosh Logo.

**Two-pass** A two-pass operation or program has to manipulate its data twice. It partially accomplishes its purpose on the first pass through the data. The operation is completed in the second pass through the data. Some processes can only be accomplished in two passes, while others are organized as a two- pass operation because inadequate resources are available to do everything at once. RAM memory and disk space are the two most frequent limiting resources.

Type Declaration Character or Statement See BASIC, Variable Names.

Types of Variable Names In Microsoft BASIC. See BASIC, Variable Names.

**Typing Tutor III**<sup>•</sup> This is both a game and a typing tutor. The typing tutor consists of lessons that improve typing skills. These lessons include practice paragraphs, key combination lessons and speed drills. Performance graphs are maintained. The game portion is an arcade game called Letter Invaders. Simon and Schuster Electronic Publishing. In UK: Softsel.

# U

U ASCII 85, HEX 55. u ASCII 117, HEX 75.

**U** Underflow. Also a lower-case u is sometimes used to represent the Greek letter mu meaning micro.

**UCSD P-System** An integrated program development system created by Kenneth Bowles at the University of California at San Diego. It includes an operating system, a full-screen text editor and compilers for Pascal, FORTRAN and Microsoft BASIC. Although originally developed to teach programming, it has been enhanced to provide the tools necessary for large-scale programming projects.

The P refers to a Pseudocomputer. The system compilers produce a very compact P-code, which runs on a pseudocomputer. An interpreter converts the P-code into acceptable code for the actual computer on which the program is run, making the system very portable. Only a very small interpreter need be written for each computer on which the P-System runs. The P-System now works on over 50 different computers, with new ones being added all the time.

The system is highly interactive and consists of five main parts:

1) The full-screen Editor allows you to write both programs and text. It is easy to learn and to use. There is also an Advanced Screen Editor with editing capabilities equal to sophisticated word processors.

2) The System Compilers convert the source code which you write into P-code. The Pascal Compiler is integrated with the Editor. When a syntax error occurs, you can return to the Editor at exactly the point where the error was detected. The Compiler error messages are accurate and informative.

3) The System Filer allows you to format disks, and to list, copy, rename and remove files. File names may be up to sixteen characters long. The Filer will also check for errors on the disk and mark any bad areas located.

4) The System Linker will automatically link together separately compiled units of P-code. This allows you to build up libraries of useful procedures which can then be used by many different programs.

5) Finally, the Interpreter automatically converts the P-code to executable code, when the program is run.

The system is relatively easy to learn, and since it is highly integrated, is very easy to use. Although expensive, it is useful for beginners as well as professional programmers. There is a full range of application programs available which run under the P-System, including spreadsheets, word processors, accounting programs and a host of others. Several well known programs were developed using the P-System, including VisiSchedule from VisiCorp and MBA from Context.

The excellent documentation is in five manuals, from the first volume *Beginner's Guide* to the last *System Architecture*. Many examples of useful programs are provided, along with a tutorial in Pascal programming.

There is a version of Pascal available for the Macintosh that closely resembles UCSD Pascal. See Pascal.

**Underline** One of the options available from the Style menu on the menu bar of MacWrite and MacPaint. When selected, the text that follows until it is unselected will be underlined. See Style Menu, Menu Bar.

**Understanding the Macintosh Computer**<sup>\*</sup> By Rick Dayton. A conversational book about the Macintosh hardware and hardware application. It explains how the Macintosh works. Reston.

**Undo Option** Available in many Macintosh applications from the Edit menu on the menu bar, and allows the user to cancel the last action carried out. For example, if a crooked line is drawn in MacPaint or a filled rectangle is placed in the wrong position on the screen, the Undo command will erase the line or the rectangle and leave the rest of the screen intact. The Undo command will function until the mouse button has been clicked for the first time after an action has been taken or, until the Return key has been pressed. Undo is available in such applications as MacWrite, MacPaint, Multiplan and others. The Undo Typing command in MacWrite accomplishes the same function as the Undo commands in other applications. Undo commands may be undone by using the Undo command again before clicking the mouse button or pressing Return.

Undo Typing See Undo Option.

**Unix** A mini- and microcomputer operating system developed by Bell Labs which features multiprogramming, a hierarchical file structure and numerous useful utilities. See XENIX.

**Untitled Document** When a new document is generated by applications such as MacPaint and MacWrite, the title bar for the document is displayed at the top of the document window as Untitled. When a document is saved for the first time, a dialog box is displayed on the screen, containing an input rectangle for the user to enter the document's name. Document names can have a length up to 63 characters but may not contain a colon. All other keyboard characters including spaces are allowed. Upper and lower case are also allowed. See Dialog Box, Document, Title Bar.

**Unwanted Returns** When using a word processor such as MacWrite to edit a block of text, you may find that half of a line is displayed above the current insertion point. As you add more text, the half-line remains above the text you have entered. It is likely that a Return was used at the end of the half-line for some reason. The best way to remedy this situation is to move the I-beam pointer back to the insertion point, click the mouse button, press the Backspace key one time and press the space bar one time. This will clear the Return character and should merge the two lines together. See Insertion Point, I-beam, Clicking.

**uP** Microprocessor. The u represents the Greek letter mu, which is not available in most character sets.

**Up Arrow**  $\uparrow$  **Key** Pressing the up arrow will move the cursor up one line in the same position on the screen it previously occupied. This function is commonly used in text entry and in entering commands. Although these are the recommended values, this key may be defined differently by various application programs, and is only available from the numeric keypad accessory.

**Upward Compatible** Indicates that programs developed for one version of a programming language, operating system, application software package or com-

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puter will work without alterations on an expanded, more powerful version of the same language, system or package.

us Microsecond, one-millionth of a second.

USASCII Same as ASCII. See ASCII.

User A person who owns or uses a computer.

**User Friendly** For programs you write, the operator will often be you. But if others will ever use your program, you need to give some thought to issues like giving clear prompts for every item of input data, freezing the screen long enough for them to read or act on the information displayed, providing clear error messages if anything is entered incorrectly or error situations arise, etc. This is often referred to as human engineering, making the program easy to use as well as technically correct. Another term for this side of programming is making the program user friendly.

Several other guidelines exist for writing user-friendly programs. If a complex series of data items has been typed in but some entries turn out to be invalid, the user should be able to reenter only the bad items. Error messages should indicate not only that an entry is invalid, but also in just what way it is invalid and, if at all possible, some hints as to how to correct it (such as a list of possible correct values).

**User Group** A group or club focused on an aspect of computers. Some clubs direct their attention to one particular computer. There are many Macintosh User Groups, some of which are listed below. Other groups focus on a language (FORTH Users Group, Pascal Users Group, etc.), on an operating system (CP/M, etc.), on an area of application (accounting, education, science, graphics, etc.), or other aspects of computing. Many large user groups have Special Interest Groups (SIGs) that specialize in a single type of computer, such as the Macintosh, or specialize in a particular application, such as spreadsheets. Many magazines on computing carry lists of clubs/groups and report on their activities.

User groups provide a valuable opportunity to get and give advice on Macintosh hardware, software and applications. Often you can talk to someone who used a product you are considering buying. User group newsletters also offer useful information. If you need a programmer or consultant, you may meet or hear about a good one at a user group meeting.

#### **Macintosh User Groups**

Association of Apple 32 Users c/o Sid Hymes P.O. Box 634 Santa Clara, CA, 94032 415-392-2800

Boston Computer Society Macintosh Users Group c/o Jack Hodgson One Center Plaza Boston, MA, 02108 617-354-7899 British Apple Systems User Group PO Box 174 Watford, England WD2 6NF 0344-483713

Club Mac c/o Steve Elliott 735 Walnut Boulder, CO, 80302 303-449-6917

International Apple Core\* 908 George Street Santa Clara, CA, 95050

MAC User Group c/o Betsy Radner 1077 Vallejo Strett San Francisco, CA, 94133 415-441-8648

Mid Columbia MAC % Edward Taylor (Alpha Compute Ctr) 1341 D. George Washington Way Richland, WA 99352 509-943-5608

New York Mac Users' Group Box 6686 Yorkville Station, NY, 10128 212-535-1943

San Diego Macintosh Users' Group c/o Charlie Jackson Box 12561 La Jolla, CA, 92037 619-566-3939

San Francisco Apple Core Mac/Lisa User Group c/o Stan Guidero 1515 Sloat Blvd. San Francisco, CA, 94132 415-566-2342

**\*NOTE:** Newly formed user groups may wish to contact the International Apple Core as it is maintaining records of Macintosh user groups throughout the United States.

**User Interface** The method used to communicate events, results, alternatives and questions from the computer to the user, and to accept commands and instructions from the user. The most common user interfaces are menus that list alternatives and

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include a data entry area where the user indicates his choice. User interfaces may also include Help screens that explain what is needed or what is occurring at a particular point in a program. The Macintosh and Macintosh applications use the User Interface Toolbox to implement its user interface.

**User Interface Toolbox** A collection of more than 400 subroutines accessed by the programmer to carry on critical communication between the computer and its user. These subroutines are stored in the Macintosh ROM, and are arranged into units that carry out particular tasks. The most important Toolbox units are the Control Manager, the Desk Manager, The Dialog Manager, the Event Manager, the Font Manager, the Menu Manager, QuickDraw, the Resource Manager, the Segment Loader, TextEdit, the Scrap Manager, the Toolbox Utilities and the Window Manager.

The Control Manager is made up of about 26 subroutines, which create, manage and interpret Macintosh control features such as scroll bars, check boxes, close boxes and buttons. The Desk Manager is made up of about seven subroutines that handle the desk accessories. The Dialog Manager is made up of about 23 subroutines that create and interpret dialog boxes and alert boxes. The Event Manager is made up of about eleven subroutines used to interpret and keep track of keypresses, mouse button clicks, disk inserion and disk ejection. The Font Manager is made up of about five subroutines used to select fonts for QuickDraw and to tie a particular font to an application. QuickDraw is made of about 130 subroutines used to draw images on screen. It is the heart of the Macintosh. The Resource Manager is made up of about 34 subroutines used to give an application access to data structures stored in resource files. These data structures include the graphics images and the warning messages that appear in alert boxes. The Segment Loader is made up of about six subroutines that govern the loading and saving of parts of programs up to 32K in length. These routines make memory use more efficient by ensuring that only the portions of programs in use are in memory. The Scrap Manager is made up of about six subroutines that handle Clipboard functions. TextEdit is made up of about 21 subroutines used to format and edit text in applications. Toolbox utilities are made up of about 24 subroutines used to perform fixed-point arithmetic, bit manipulation, byte manipulation and string manipulation and also handle the loading and plotting of icons. The Window Manager is made up of about 43 subroutines used to create and manipulate windows. The User Interface Toolbox makes Macintosh applications and the Macintosh a wonderful experience to use.

**Using MacWrite and MacPaint\*** By Tim Field. A complete explanation of MacWrite and MacPaint, which leads the user through the full potential of both applications. The book is full of ideas and examples. Osborne/McGraw-Hill.

**Using Your Apple Macintosh: Beginning Basic and Applications\*** By Richard Swadley and Joseph Wikert. This book describes how to operate the Macintosh and introduces BASIC programming. It discusses the features of the Macintosh in depth and explains what the Macintosh can do for the user. The book may be purchased with or without the disk. Prentice-Hall.

**Using & Programming the Macintosh\*** By Frederick Holtz. This book describes the use of the Macintosh for the novice. It explains programming in Microsoft BASIC and book includes 32 ready to run programs. Tab Books, Inc.

**Utilities** The software used for routine tasks. Utilities are designed to facilitate or aid the operation and use of the computer for a number of different applications and uses. Examples of utilities are an editor, a sort, a debugger and a file handler. Most of the current utilities are available only to software developers from Apple Computer.

and include programs to edit icons, resources, windows, fonts and other aspects of the User Interface Toolbox. Other utilities include memory dump programs, to examine the contents of various memory locations and disk dump programs, or to view the contents of specific tracks on a disk. The availablity of such utilities will improve as these tools are disseminated through the developer community by Apple and, as they are eventually released commercially for the hobbyist, either by Apple or by other independent developers. See Link Module, Mac.Transfer, MacWorks, Utilities for the Macintosh Computer.

**Utilities for the Macintosh Computer**<sup>\*</sup> A disk containing eight utility programs which run in Microsoft BASIC on the Macintosh. These programs include Typer, Dump, Remove, XRef, Lister, SetBaud, Rename, and Transfer. Typer displays ASCII files on the screen. It can scroll from left to right and page through text screen by screen. Dump is used to display the contents of any file on the screen. Both the Hex value and ACSII value of each character is shown. Remove allows files to be erased from disks without using the Trash Can. XRef will cross-reference the variables in a Microsoft BASIC program. Lister lists any ACSII file on a printer. Each page of the listing contains a header which includes the page number, the date, and the user's company name. SetBaud will set the baud rate for the COM1 I/O port. Rename allows the user to rename any file on a disk. Transfer can be used to transfer any file in ASCII format to the Macintosh via the COM1 port. Basic Business Software, Inc.

### V

V ASCII 86, HEX 56. v ASCII 118, HEX 76.

**VAL** A Microsoft BASIC function which returns the numerical value of the beginning of string x\$. The format is:

variable = VAL(x\$)

x\$> is a string expression.

The VAL function strips blanks, tabs, and line feeds from the argument string and selects numeric characters in order to determine the result. If the first characters of x are not numeric, then VAL(x) will return 0. See STR\$. Here is an example of this function:

```
PRINT VAL ("52 CASES")
52
OK
```

**Variable** A symbolically named entity which may assume an assigned value, or a number of values.

Variable Names In Microsoft BASIC. See Variable Names.

Variable, Type and Address See VARPTR\$.

**VARPTR** A Microsoft BASIC function which returns the address in memory of the variable or file control block. The formats are:

variable = VARPTR(<variable>)

«variable» is the name of a numeric or string variable or array element in your program. You must assign a value to «variable» prior to the call to VARPTR, or an "Illegal function call" error will result.

The first format returns the address of the first byte of data identified with (variable). All simple variables should be assigned before calling VARPTR for an array, since addresses of arrays change whenever a new simple variable is assigned. The address returned will be a number between 0 and 16777215.

**VDT** Video Display Terminal. The term used in the newspaper community for CRT.

VDU Video Display Unit. The British term for CRT.

**Vector Display** A CRT which moves the electron beam randomly to trace figures on the screen. Contrast this with a raster display, which sweeps the beam through a

fixed pattern, building up an image with a matrix of points. Vector displays are used in many arcade games.

**Venice** One of the fonts available on MacWrite and MacPaint, which may be selected from the Font menu from the menu bar in both applications. See Menu Bar, Font Menu.

This is an example of Venice 18 point plain text. This is an example of Venice 12 point plain text. This is an example of Venice 12 point bold. This is an example of Venice 14 point bold. This is an example of Venice 14 point bold. This is Blankes 18 policies couldings This is a standard for the second second

Fig. V1 This is a sample of the Venice font from MacWrite.

Versions, Program and Software Programs and software packages are changed from time to time to correct errors or add new capabilities. To keep programs from being in a constant state of flux and to simplify distributing modified programs to users, a number of changes are made, tested and packaged as a new version or release of the program.

Versions or releases are typically numbered as follows: 1.0 for the first version, 1.1 for the first minor revision, 1.2 for the second minor revision, etc. When a major change or large number of minor changes have been made, a new number may be assigned (Version 2.0). Version numbers help programmers support a program by letting them know with which version the user has encountered problems. Numbering also helps users know which changes are effective in the version they possess.

**Versions, Upward Compatible** Upward compatible indicates that programs developed for one version of a programming language, operating system, application software package or computer will work without alterations on an expanded, more powerful version of the same language, system or package.

Vertical Bar Cursor An I-beam pointer is displayed on the Macintosh screen when text is being edited. It is displayed when the mouse pointer touches an icon name on the Desktop, when program lines are being edited in Macintosh BASIC, and when text is being inserted or edited in MacPaint or in MacWrite. This pointer is used to locate the text insertion point in a document. When this point is located by moving the pointer to the selected insertion point, the mouse button is clicked. As soon as the mouse button has been clicked, a flashing vertical bar is displayed. This is the vertical bar cursor. It denotes the location where characters will be entered or deleted from a program line or document. It is also used to denote the insertion point and deletion of characters in the Note Pad. The vertical bar cursor will be displayed at any point where the mouse button is clicked when the I-beam is present on the screen.

**Video-Digitizer\*** Used to capture an image, store it on the Macintosh and print it. It requires any home video camera to operate. Discrete Time Systems.

#### 300 • Video RAM

**Video RAM** A specific portion of the Macintosh RAM contains a map of the Macintosh screen display and takes up about 22K of space. Each pixel or screen location has been assigned a corresponding location in memory. This method is called "bit-mapped" video.

**Video Signal** An electronic signal containing information specifying the location and brightness of each point on a CRT screen, along with timing signals to place the image properly on the screen.

**View Menu** One of the pull-down menus available from the Finder. When a disk is first booted, the Desktop is displayed. If a disk icon is opened, a Directory window is displayed. The manner in which the Directory displays the contents of the disk is determined by the selection made from the View menu which offers the choice of viewing a disk directory by Icon, by Name, by Date, by Size and by Kind. Each file type on the Macintosh has a specific icon and must have a name. Each time a file is modified, the date and size of each file is recorded. The file Kind is also identified and recorded in the disk Directory. There are times when the user may wish to sort the Directory by one of these file characteristics and display the file according to one of these characteristics. The View menu is used to make this happen. See By Date, By Icon, By Kind, By Name, By Size.

**Virtual Memory** The memory address space available to any process running on the processor. It may be larger than the physical memory.

Volatile Storage Storage which loses its contents when power is removed.

**Volksmodem\*** This is a portable 300 baud modem, which offers full-duplex and half-duplex capability. It requires an additional cable called a "G" cable to be connected to the Macintosh. It may be operated with a nine volt battery and will supplement this with power from the phone line. Anchor Automation.

**Volumes** The Macintosh Disk Operating System uses a particular method to direct the computer to a particular disk drive for saving or reading data. The internal disk drive is assigned the number 1. The external disk drive is assigned the number 2. Either drive is assumed to have the same name as the disk booted from that disk drive if numbers are not used to access the disk drive. The name or number is used to refer to a particular disk drive is called the "volume" or "volume name." When a SAVE command is given from BASIC, first supply the volume name (1, 2, MacBASIC, or whatever applies), then enter a colon (:), then the file name of the file to be saved.



W ASCII 87, HEX 57. w ASCII 119, HEX 77.

**Wait State** A microcycle or internal state entered by an MPU when a synchronizing signal is not present. It is used to synchronize a fast processor with a slower memory.

**Warm Boot** The term "warm boot" describes the process of fooling the computer into thinking that its power has been turned off although power is still on. A warm boot is accomplished by pressing the Reset button on the Programmer's switch.

**WHILE...WEND** Microsoft BASIC statements which execute a series of statements in a loop as long as a given condition is true. The format is:

WHILE (expression)

doop statements>

#### WEND

«expression» is any numeric expression.

When expression is true (not zero), doop statements are executed until the WEND statement is found. Microsoft BASIC then returns to the WHILE statement and checks expression. This process continues until the expression is not true and execution resumes with the statement following the WEND statement.

WHILE...WEND loops may be nested to any level, but each WEND will match the most recent WHILE. An unmatched WHILE statement will cause a "WHILE without WEND" error to occur, and an unmatched WEND statement causes a "WEND without WHILE" error.

**WIDTH** A Microsoft BASIC statement which sets the output line width in number of characters. When the indicated number of characters has been output, Microsoft BASIC adds a carriage return. The formats are:

WIDTH sizes WIDTH dilenum,sizes WIDTH device,sizes

(size) is a numeric expression in the range 0 to 255. This will be the new width. WIDTH 0 is the same thing as WIDTH 1.

filenum This is a numeric expression. This is the number of a file opened to one of the devices listed below.

«device» is a string expression identifying devices. Valid entries are SCRN:, CLIP:, LPT1:, COM1:.

#### 302 • Winchester Disk

The following actions are possible, depending on the device specified:

WIDTH (size) or WIDTH "SCRN:",(size) WIDTH (device), (size)

This format using the device name is used as a deferred width assignment for the device which stores the new width value without actually changing the current width setting. A subsequent OPEN to the device will use this value for width while the file is open. The width does not change immediately if the device is already open. The following program prints at 80 column width from lines 20 and 30. The WIDTH 40 statement at line 30 does not affect the following print at line 40, it is "deferred" until the OPEN at line 60. The WIDTH 40 then takes effect and causes the PRINT at line 70 to print in 40 column width, providing two lines, 40 columns wide. The output is two lines 80 characters long followed by two lines 40 characters long.

The final WIDTH 80 and OPEN are to leave your ImageWriter in 80 column mode for subsequent operations.

10 OPEN "LPT1:" FOR OUTPUT AS #1 20 PRINT #1,"12345678901234567890123456789012345678901234567890 123456789012345678901234567890 30 WIDTH "LPT1:",40 40 PRINT #1,"123456789012345678901234567890 1234567890123456789012345678901234567890 50 CLOSE 60 OPEN "LPT1:" FOR OUTPUT AS #1 70 PRINT #1,"1234567890123456789012345678901234567890 1234567890123456789012345678901234567890 1234567890123456789012345678901234567890 80 WIDTH "LPT1:", 80 90 CLOSE 100 OPEN "LPT1:"FOR OUTPUT AS #1 110 END

It should be noted that LPRINT, LLIST and LIST, "LPTn:" do an implicit OPEN and are therefore affected by the WIDTH (device), size) this statement.

#### WIDTH (filenum), size)

This format changes the width of the device associated with filenum to the new size specified, allowing the width to be changed at will while the file is open.

Any invalid entry in the parameters will cause an "Illegal function call" error to occur. WIDTH has no effect for the keyboard (KYBD:).

**Winchester Disk** A hard disk system characterized by very light read/write heads, low head-to-disk clearance and complete enclosure of the magnetic media in a dust-free environment to achieve high-information density and fast access-time. In the world of microcomputers, hard disk and Winchester disk are the same.

**Window** A section of a CRT screen dedicated to displaying specific types of information. Windows are used by the Macintosh's User Interface Toolbox to accomplish many tasks. The Desktop directory is displayed in a window. Alert boxes and dialog boxes are windows. When the Clipboard and scrapbook are opened, they are displayed as windows. The header and footer displays in MacWrite are displayed in windows. Microsoft BASIC uses a Command window, a List window and an Output window to display each of these activities. Most windows may be closed by

clicking the close box in the upper left-hand corner. Many windows use scroll bars to scroll the document or file through the visible portion of the window. Most have a size box in the lower right-hand corner. All windows except alert boxes and dialog boxes have a title bar across the top. Windows are used in MacBASIC and MacPascal to run two or more programs at the same time.

**Window Manager** A collection of programs and routines in the User Interface Toolbox in the Macintosh ROM. It consists of about 43 subroutines used to create, display and manipulate windows. The routines it carries out include dragging windows from one place to another on the screen, scrolling the contents of a window, sizing a window, opening and closing windows and keeping track of active and inactive windows. The Window Manager uses Quickdraw to display windows and the contents of windows.

**Wizardry\*** One of the most entertaining and popular adventure games for the predecessors of Macintosh. It has been rewritten for the Macintosh. This game combines 3-D mazes with text and illustrations to involve the player in a high-level fantasy role-playing game. The player builds a party of six characters with distinct skills and powers to challenge the multilevel maze. He outfits the characters at an armorer's shop and gathers his party together at an inn before entering the maze. Once he enters the maze with his party, they encounter a large variety of men and monsters. If characters are not killed, they gain skill and wealth by overcoming their opponents. SirTech.

**WOM** Write-Only Memory. Used as a semihumorous term for parts of the address space of a computer not actually populated with memory devices, or which must be disabled for some reason.

**Word** A logical unit of information. It may have any number of bits, but for MPUs, usually 4, 8, 16, or 32 bits. For the Macintosh, a word is two bytes or sixteen bits. The Macintosh's microprocessor can also handle 32-bit words that are called "long words."

**Word Processing on Your Macintosh\*** By Rudolph Langer. A complete treatment of word processing with the Macintosh. The book is written for inexperienced users. Sybex.

**Word Processor** A computer-based system for writing, editing and formatting documents such as letters, reports and books. It may be either a specialized hardware system dedicated to these tasks or a program package run on a general purpose computer. See MacWrite, Microsoft Word.

Word Processors See DocuPlan, Jack 2, Lotus Macintosh Product, MacWrite, MegaMerge, Microsoft Word, PFS Write, ThinkTank 128.

**Words, Reserved** Microsoft BASIC reserved words have particular meanings and are used for commands, statements, function and operator names. These words cannot be used as variable names and variable names cannot be a reserved word followed by a type declaration character (, , , , , , #).

The reserved words are to be delimited (separated with space or spaces around them) so that they are easily recognized by Microsoft BASIC. If you accidentally use one of the reserved words, you may see an error message or have strange results when you execute the program. See Debugging; BASIC, Reserved Words for the complete list.

#### 304 • Word Wrap

**Word Wrap** A common characteristic of word processors which allows the user to continue typing beyond the end of a line without entering a Return character. When the end of the line is reached, the whole word that extends beyond the right margin is automatically moved down to the next line of text.

**Worksheet** Worksheet is a term that is used to describe working spreadsheets that are created by users of electronic spreadsheet programs. Worksheets contain labels, formulas, and data entered by the user to solve particular problems. Worksheets may be blank master forms that contain labels and formulas but do not yet contain data. They may also be completed forms that have archival significance. Some worksheets that contain complex investment analysis procedures or similar applications are written by commercial software companies for the convenience of spreadsheet users.

Workspace An area of memory allocated for working storage.

**Wristwatch** A symbol employed to warn the user to wait for the current process to end before continuing. For example, it is displayed during the time it takes a program to load from disk into the computer's memory or the time it takes to save a program to disk.

**WRITE** A Microsoft BASIC statement which is used to output data to the screen. The format is:

WRITE [dist of expressions>]

dist of expressions is a list of numeric and/or string expressions, separated by commas or semicolons.

If dist of expressions is left out, a blank line is output. When included, the values of the expressions are output on the screen.

When the values of the expressions are output, each item is separated from the last by a comma. Strings are delimited by quotation marks. After the last item in the list is printed, Microsoft BASIC adds a carriage return/line feed.

WRITE is similar to PRINT except that WRITE inserts commas between the items as they are displayed and delimits strings with quotation marks. Also, positive numbers are not preceded by blanks.

**WRITE** # A Microsoft BASIC statement which writes data to a sequential file. The format is:

WRITE #dilenum, dist of expressions

(filenum) is the number under which the file was opened for output.

dist of expressions is a list of string and/or numeric expressions, separated by commas or semicolons.

The difference between WRITE # and PRINT # is that WRITE # inserts commas between the items as they are written and delimits strings with quotation marks. It is therefore necessary for the user to put explicit delimiters in the list. WRITE # also does not put a blank in front of a positive number. A carriage return/line feed sequence is inserted after the last item in the list is written.

Write Data to File See PUT.

Write-protect Describes the act of preventing information from being written onto

a storage medium. Microfloppy disk jackets often have lock tabs which can be opened to write-protect the disk by disabling the disk drive's write circuitry.

Write-protected Disk A disk is write-protected if its lock tab is open. This frees a small spring-loaded switch or a light beam inside the disk sensed by Macintosh's disk driver programs. You will get an error message (Locked Disk) anytime you attempt to alter a file on a write-protected disk by changing it, deleting it, copying a file onto the write protected disk or formatting the disk.

You are allowed to use files, load them or copy from the write-protected disk. The purpose of these limitations is to prevent accidental loss of the only copy of programs or data. In most cases the procedure is to copy the write-protected disk onto an unlocked disk, put away the write-protected disk as a permanent copy, then modify the unlocked disk. In some cases you will close the locking tab of a locked disk (after thinking it over) and proceed to change the disk.

It is a good practice to lock any important disk you will backup. Then if you accidentally ask for the backup in the wrong direction (from the old disk to your important disk), you will get a second chance to make the backup rather than losing your data.

## X

X ASCII 88, HEX 58. x ASCII 120, HEX 78.

**XENIX** The Microsoft implementation of the UNIX Operating System for microcomputers.

**Xyphus**<sup>•</sup> A combined fantasy role-playing adventure game that places the player on the Lost Continent of Arroya. The player must seek out Xyphus, the Lord of Demons. Xyphus and his minions must be conquered through the use of spells and weapons. The game is made more interesting by six different scenarios, each more difficult than the last. Penguin Software.

**X-Y Plotter** A device which draws points or lines on a sheet of paper based on X and Y coordinates from a computer.

## Ζ

Z ASCII 90, HEX 5A. z ASCII 122, HEX 7A.

**Zero Byte** A byte with all bits set to zero. The zero byte is used to mark the end of variable length strings of data.

**Zones On the Printer Line** Each group of spaces across the print line as defined by the WIDTH command is called a "print zone." A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without even a single space between. See also Print Line (Spacing).

**Zork I: The Great Underground Empire**<sup>+</sup> This fantasy adventure is the first chapter in the Zork trilogy. The players journey through the caverns and mazes of the Underground Empire, and encounter perils ranging from the mystical to the macabre. Infocom, Inc.

**Zork II: The Wizard of Frobozz\*** More wonders and dangers unfold before the adventurers when Zork II steers them into new depths of the subterranean realm. Surrounded by dragons and demons, players meet the Wizard, exiled from the Great Underground Empire ages ago. Infocom, Inc.

**Zork III: The Dungeon Master\*** Zork III is the final test of courage and wisdom. Players meet new dimensions of clever opponents and harrowing predicaments while wandering from the shores of an underground ocean to the Royal Museum where players finally encounter the Master of the Dungeon himself. Infocom, Inc.

### SPECIAL SYMBOLS

1-2-3 See Lotus Macintosh Product.

**68000 Assembly Language Programming**<sup>•</sup> By Gerry Kane, Doug Hawkins and Lance Leventhal. A complete guide to writing assembly language programs for the MC68000 chip. It guides the assembly language prgrammer through the intricacies of dealing with this chip. Each mnemonic is explained completely and clearly. Osborne/McGraw Hill.

**68000** Microprocessor Handbook\* By Gerry Kane. This book deals with 68000 signal conventions, timing diagrams, logic and all of the other intricacies of the powerful microprocessor that is the heart of the Macintosh. Osborne/McGraw-Hill.

! See BASIC, Rules for Variable Names.

" In Microsoft BASIC a special character indicating the double quotation mark or string delimiter which cannot be used for any other purpose.

# See BASIC, Rules for Variable Names.

\$ See BASIC, Rules for Variable Names.

% See BASIC, Rules for Variable Names.

& In Microsoft BASIC, the ampersand is a special character, indicating an octal number, or H indicating Hex numbers. It cannot be used for any other purpose.

! A synonym for REM in Microsoft BASIC. See REM.

<sup>1</sup> In Microsoft BASIC, a special character indicating the single quotation mark, apostrophe or remark delimiter which cannot be used for any other purpose.

(In Microsoft BASIC, a special character indicating the left parenthesis which cannot used for any other purpose.

) In Microsoft BASIC, a special character indicating the right parenthesis which cannot be used for any other purpose.

• In Microsoft BASIC, a special character indicating the times sign (multiplication) which cannot be used for any other purpose.

+ In Microsoft BASIC, a special character indicating the plus sign (addition) which cannot be used for any other purpose.

, In Microsoft BASIC, a special character indicating the comma delimiter, which cannot be used for any other purpose.

On the printer, each group of spaces across the print line as defined by the WIDTH command is called a "print zone." A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediatly after this one, without even a single space between.

- In Microsoft BASIC, a special character indicating the minus sign (subtraction) which cannot be used for any other purpose.

• In Microsoft BASIC, a special character indicating the period or decimal point which cannot be used for any other purpose.

In a file name, the period (.) and colon (:) are specified to delimit extension and drive name, respectively.

.BAS (.BAS) The suggested file extension for a Microsoft BASIC source program.

**.TXT** (.TXT) The suggested file extension for a text or documentation file.

/ In Microsoft BASIC, a special character indicating the division symbol or slash which cannot be used for any other purpose.

: In Microsoft BASIC, a special character indicating the colon or statement separator which cannot be used for any other purpose.

In a file name, the colon(:) and period (.) are specified to delimit drive name and extension, respectively.

Also used for multiple Microsoft BASIC statements on a line. You can put a colon (:) at the end of one statement and continue entering another statement on the same line, without giving a new line number. The line number at left refers to all statements on the line. An apostrophe (') allows a comment or remark to be added after a statement with or without a separating colon.

; In Microsoft BASIC, a special character indicating the semicolon symbol which cannot be used for any other purpose.

On the printer each group of spaces across the print line as defined by the WIDTH command is called a "print zone." A comma (,) in an LPRINT list of items to be printed means "start printing the following item at the start of the next print zone." Contrast this with the semicolon (;), which means the next item is to print immediately after this one, without even a single space between.

In Microsoft BASIC, a special character indicating the less than symbol which cannot be used for any other purpose.

= In Microsoft BASIC, a special character indicating the equal sign or an assignment symbol which cannot be used for any other purpose.

> In Microsoft BASIC, a special character indicating the greater than symbol which cannot be used for any other purpose.

? In Microsoft BASIC, a special character indicating the question mark or PRINT abbreviation which cannot be used for any other purpose.

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 $\$  In Microsoft BASIC, a special character indicating the integer division symbol or backslash which cannot be used for any other purpose.

^ In Microsoft BASIC, a special character indicating the exponentiation symbol or caret which cannot be used for any other purpose.

\_\_\_ In Microsoft BASIC, a special character indicating the underline symbol which cannot be used for any other purpose.

### Vendors of Products Described in the Apple Macintosh Encyclopedia

Categorized listings of products will be found alphabetically in the main text. The highest level categories are Software, Hardware, Publications, and Accessories. These will in turn point you to more detailed categories such as Modems, Database Programs, or to specific product descriptions. Product descriptions are distinguished from informational entries in the main text by an asterisk (\*) following the product name. The name of the vendor is the last item in each product description. Magazine descriptions and addresses are listed only in the article under Magazines. New products for the Macintosh are appearing regularly. The magazines and computer fairs are excellent sources for up-to-the-instant news on new products and programs for the Macintosh.

Aardvark-McGraw-Hill 1020 North Broadway Milwaukee, WI 53202 414-225-7500 Products: Personal Tax Planner (Personal Management) Programming the MC68000 (Book)

Alpha Delta Communications, Inc. P.O. Box 571 Centerville, OH 45459 513-435-4772 Products: MACC and MACC-4 (Power Supply)

American Training International 3770 Highland Ave. Ste. 201 Manhattan Beach, CA 90266 213-823-1129 Products: How to Use Your Macintosh (Education)

Anchor Automation 6913 Valjean Avenue Van Nuys, CA 94106 818-997-6493 Products: Volksmodem (Modem)

Anchor Pad International, Inc. 3224 Thatcher Avenue Marina Del Rey, CA 90292 213-306-3881 Products: Anchor Pad (Security Kit)

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Apple Computer, Inc. 20525 Mariani Avenue Cupertino, CA 95014 800-662-9238 Apple Computer (UK) Ltd. Eastman Way Hemel Hempstead Hertfordshire, HP2 7HO 0442 60244 Products: Apple Modem 300 (Modem) Apple Modem 1200 (Modem) AppleBus (Interface) AppleLine (Interface) ImageWriter (Printer) Lisa (Computer) MacBASIC (Programming Language) MacDraw (Graphics) Macintosh Assembler/Debugger (Programming Language) Macintosh Logo (Programming Language) Macintosh Pascal (Programming Language) MacPaint (Graphics) MacProject (Business Software) MacTerminal (Communications) MacWorks (Utility) MacWrite (Word Processing) Security Accessory Kit (Security Kit) **Applied Creative Technology** 2156 Northeast Highway **Building C-303** Dallas, TX 75220 214-556-2916 Products: Printer Optimizer (Printer Buffer) Artsci, Inc. 5547 Satsuma Avenue North Hollywood, CA 91601 818-985-2922 Products: MAGICphone (Accessory) Ashton-Tate 10150 W. Jefferson Blvd. Culver City, CA 90230 213-204-5570 ATS Cases, Inc. 25 Washington Ave. Natick, MA 10760 617-653-6724 Products: Carrying Case (Carrying Case)

**Banbury Books** 353 West Lancaster Ave. Wayne, PA 19087 Products: Macintosh: The Appliance of the Future (Book) Basic Business Software, Inc. P.O.Box 26311 Las Vegas, NV 89126 Products: Utilities for the Macintosh Computer (Utility Program) Blackwells Scientific Publications Ltd. Osney Mead Oxford, OX1 4HB 722146 Products: dBase III (Database) Friday (Database) Blue Chip Software 6744 Eton Avenue Canoga Park, CA 91303 213-246-0720 Products: Millionnaire (Game) **Blythe Computers** Wenhaston Hadesworth Suffolk, IP19 9DM 050 270 371 Brady Communications, Inc. Routes 197 and 450 Bowie, MD 20715 301-262-6300 Products: Inside the Macintosh (Book) Macintosh Assembly Language (Book) Macintosh Programmer's Handbook (Book) Braun-Cooper 207 Gough Street #38 San Francisco, CA 94102 415-621-4909 Products: Totem Pack (Carrying Case) Brock Software Products, Inc. P.O. Box 799 Crystal Lake, IL 60014 815-459-4210 Products: Keystroke Data Base (Database) Keystroke Report Base (Database)

Business Solutions, Inc. 60 East Main St. Kings Park, NY 11754 516-269-1120 Products: Jack 2 (Integrated Software System) **CBS Computer Books** 383 Madison Avenue New York, NY 10017 212-872-2619 Products: MAC Book: Using Your Macintosh Computer, The (Book) Macintosh Computer Graphics (Book) **CBS Software** One Fawcett Pl. Greenwich, CT 063836 203-622-2615 Products: Murder by the Dozen (Game) Chang Labs 5300 Stevens Creek Boulevard San Jose, CA 95129 800-972-8800 800-831-8080(CA) Products: DocuPlan (Word Processing) FilePlan (Database) GraphPlan (Graphics) Link Module (Utility Program) Chapman & Hall 733 Third Avenue New York, NY 10017 212-922-3550 11 New Fetter Lane London, EC4P 4EE 01-583 9855 Products: Apple Macintosh Encyclopedia (Book) Computer Bookshops Ltd. 30 Lincoln Road Olton Birmingham 021-707 7544 Products: Complete Guide to Your Macintosh, The (Book) Doing Business with Your Macintosh (Book) Easy Guide to Your Macintosh, The (Book) Macintosh for College Students (Book) Programming the MC68000 (Book) Word Processing on Your Macintosh (Book)

Computer Cover Co. P.O.Box 3080 Laguna Hills, CA 92654 714-380-0085 Products: Macintosh Covers (Cover) **Continental Software** 11223 Hindry Ave. Los Angeles, CA 90045 213-410-3977 Products: Home Accountant (Financial Management) **Creative Solutions** 4801 Randolph Road Rockville, MD 20852 310-984-0262 Products: MacForth (Programming Language) **Cuesta Systems** 3440 Roberto Ct San Luis Obispo, CA 93401 805-541-4160 Products: Datasaver (Power Supply) **Davong Systems** 217 Humboldt Court Sunnvvale, CA 94086 408-734-4900 Products: Mac Disk (Hard Disk) **Desktop Software Corporation** 238 Alexander St. Princeton, NJ 08540 609-924-7111 Products: NPL Information Management System (Database) DIGI-GRAPHICS P.O.Box 273 Logan, UT 84321

Products: Picture Disk (Graphics)

dilithium Press 8285 Southwest Nimbus Ste 151 Beaverton, OR 97005 800-547-1842 503-646-2713 Products: Presenting the Macintosh Computer (Book) Teleofacts 2 (Database) Discrete Time Systems, Inc. 6649 E Roswell Rd. Ste 240 Atlanta, GA 30328 Products: Video-Digitizer (Digitizer) Dow lones Software P.O. Box 300 Princeton, NI 08540 609-452-2000 Products: Dow Jones Market Manager (Business Software) Dow Jones Spreadsheet Link (Business Software) Dreams of the Phoenix. Inc. P.O. Box 10273 Jacksonville, FL 32247 904-396-6953 Products: Cut 'N' Paste (Graphics) Electronic Specialists, Inc. 171 S. Main St. Natick, MA 01760 800-225-4876 617-655-1532 Products: Kleen Line Conditioner (Power Supply) FactFinder Software P.O. Box 206 Deer Harbor, WA 98243 206-376-4912 Products: FactFinder (Database) Frazier, Peper & Associates P.O.Box 3019 Santa Cruz, CA 95063 408-476-2358 Products: Clip 1 (Graphics)
R.I.Gear 8760-A Research Blvd. #136 Austin, TX 78758 512-345-0642 Products: Mac Sac (Carrying Case) Haba Systems 15154 Stagg Street Van Nuys, CA 91405 818-901-8828 Products: Habadex (Business Software) Harris Technical Systems 624 Peach Street P.O. Box 80837 Lincoln, NE 68501 402-476-2811 Products: AgDisk (Agriculture) Harvard Associates 260 Beacon Street Somerville, MA 02143 617-492-2999 Products: MacManager (Business Software) Hayden Book Company 10 Mulholland Drive Hasbrouck Heights, NJ 07604 201-393-6000 Products: MacBASIC Programmer's Reference Manual (Book) MacBASIC: Programming Power (Book) Mac Multiplan (Book) MacPascal (Book) Mac Revealed: Programming with the Mac Toolbox (Book) Hayden Software 600 Suffolk Street Lowell, MA 01853 800-343-1218 **Hippopotamus Software** 1250 Oakmead Parkway Ste. 210 Sunnyvale, CA 94086 408-730-2601 Products: C for the Macintosh (Programming Language)

Human Edge Software Corporation 2445 Faber Place Palo Alto, CA 94303 800-624-5227 800-824-7325 (CA) Products: The Management Edge (Business Software) The Negotiation Edge (Business Software) The Sales Edge (Business Software) Industrial Computations 40 Washington St. Wellesley, MA 02181 617-235-5080 Products: MacPuzzle (Graphics/Game) Infocom. Inc. 55 Wheeler St. Cambridge, MA 02138 617-492-1031 Products: Deadline (Game) Enchanter (Game) Infidel (Game) Planetfall (Game) Seastalker (Game) Sorcerer (Game) Starcross (Game) Suspended (Game) Zork I (Game) Zork II (Game) Zork III (Game) Integrated Systems P.O. Box 2618 Ann Arbor, MI 48106 Products: MacAnimation (Graphics) MacMath (Education) MacSpell (Education) International Datawares 910 George Street Santa Clara, CA 95050 408-988-5594 Products: Microdisk Minder (Accessory) Justin Case 334 Main St. Port Washington, NY 11050 416-883-2299 Products: Basket Case (Carrying Case)

Kensington Microware Ltd. 251 Park Avenue South New York, NY 10010 212-475-5200 Products: Portable Modem, Maccessories (Modem) Maccessories Swivel (Accessory) Maccessories Surge Protector (Power Supply) Maccessories Starter Pack (Accessory) Maccessories Printer Stand (Accessory) Maccessories Printer Buffer (Printer Buffer) Maccessories Cleaner Kit (Accessory) Maccessories Disk Case (Carrying Case) **Kearsarge Industries** 12310 Pinecrest Rd. **Reston**, VA 22091 703-620-5760 Products: Kearsarge SX-70 Switcher/Spooler (Printer Buffer) Living Videotext Inc. 1000 Elwell CT Palo Alto, CA 94303 415-964-6300 Products: ThinkTank 128 (Word Processing)

Lotus Development Corporation 161 First Street Cambridge, MA 02142 617-412-7171 Products: Lotus Macintosh Product (Integrated Software System)

McGraw-Hill Book Co. 1221 Avenue of the Americas New York, NY 10020

McGraw-Hill Book Co. (UK) Ltd. McGraw-Hill House Shoppenhangers Road Maidenhead Berkshire, SL6 2QL 0628 23432

Macinsoft P.O.Box 27853 San Diego, CA 92127 Products: Paintmover (Graphics) MacPacks P.O. Box 3928 Kent, WA 98032 Products: MacBag (Carrying Case) MacCover (Cover) MacFreighter (Carrying Case) MacPak (Carrying Case) MacSak (Carrying Case)

Macro Micro Software 19909 NE l45th St. Woodinville, WA 98072 Products: Shapes 'N' Shots (Graphics)

Magnum Software 27115 Devonshire St. Chatsworth, CA 91311 818-700-0510 Products: McPic (Graphics)

Main Street Software 700 Larkspur Landing Larkspur, CA 94939 800-824-8757 415-332-1274 Products: Main Street Filer (Database) .

Mark of the Unicorn 222 Third Street Cambridge, MA 02142 617-576-2769 Products: Professional Composer (Music)

Matrix Advocates Company P.O. Box 1238 Brick, NJ 08723 201-899-4739 Products: Images (Graphics)

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