

G. W. DEGENER

MBA

Desktop Reference

Hewlett-Packard Edition

Context
MANAGEMENT SYSTEMS

HP Computer Museum
www.hpmuseum.net

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GENERAL INFORMATION AND COMMANDS

GLOSSARY

- Box** Range of cells designated by a name
- Cell** Compartment in which to store data
- Cell address** Coordinates (row number and column letter) identifying specific cell
- Data** Text, numbers, or formulas entered in cell
- Database** Organized collection of records (rows)
- Document** Stored copy of workspace
- Folder** Collection of related documents
- Form** A format used to Print and View the contents of a database or workspace
- Function** Built-in formula introduced by @ sign
- Marker** Name designating specific cell address
- Prompt line** The area above the workspace that displays command options or echos current command
- Range** Array of cells in row, column, or rectangle
- Record** Set of cells containing information on same subject
- Row** Horizontal array of cells
- Ruler** Set of formats specifying appearance of text
- Spreadsheet** Array of columns and rows, used for financial planning
- Volume** Diskette or hard disk, specified by name or unit number
- Window** An expanded cell or number of cells that can contain an MBA model, graph, communications data, form, or Word Processing text
- Workspace** Cells, markers, and rulers used by MBA (limited to 95 columns, 999 rows)

DATA ENTRY

Data Types

Text Upper or lower case alphabetic characters; numbers or special characters preceded by " or '

Number Numerals, or numerals preceded by + or -

Formula Arithmetic statement preceded by +, (, or @

Entering Data

Typing any key except / or special keys starts the data entry process. Cursor moves to the prompt line, where typed data are displayed. Accepted data are displayed at original cursor location, and cursor moves back into the workspace.

— Backspaces over typed data for error correction

<enter> Accepts typed data, leaves cursor in current location

||←→ Accept typed data, move cursor in indicated direction

COMMANDS

A command consists of a slash (/), a command character (abbreviation), and command data if required. The MBA displays acceptable characters on the prompt line (e.g., after typing /, the possible command characters are displayed). Typing <shift-exec> interrupts commands. Certain commands require verification. Y or <enter> continues command execution; N or <sh-exec> ends the command. Typing <exec> accepts Insertions, Deletions, and Exchanges when Editing text, a formula, or the contents of a cell.

CURSOR MOVEMENT

||←→ Arrow keys move cursor in indicated direction

<enter> Carriage return moves cursor down one row and to column A or column right of vertical title

><marker><enter> Moves cursor to address specified by marker

><cell><enter> Moves cursor to specified cell address

><box><enter> Moves cursor to upper-left cell of specified box

; Moves cursor between windows

<ctrl-P> Sets half-screen scrolling with arrow keys

SPECIAL KEYS

<sh-exec> Interrupts command or data entry

! Recalculates results of all formulas in workspace

* Repaints screen

? Requests help screen

GLOBAL COMMANDS

The commands on the following pages are available except as noted. Commonly used symbols are:

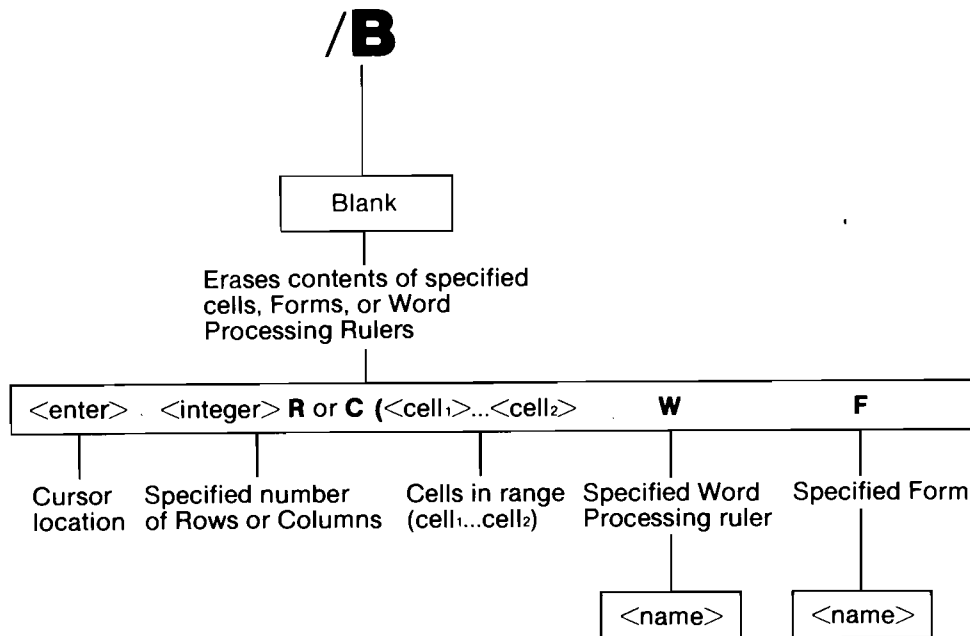
<enter> Current cursor location

nR or nC number (n) of rows or columns

(<cell>...<cell> range of cells; addresses may be entered by cursor pointing

BLANK

/B erases contents of cursor location, number of rows or columns, Forms, or boxes, or resets Word Processing ruler to default format.



COMMUNICATIONS

/C allows sending data to or receiving data from a remote computer via telephone lines.

TELECOMMUNICATIONS FORMULAS

A Telecommunications formula consists of the following functions:

@DIAL specifies the phone number to be called and the type of phone used:

@DIAL ('<number>' /<cell>, <dialing type>)

The number is the actual number or the address of the cell that contains the number to be called. The dialing type is **T** (Touch) or **P** (Pulse). The comma (,) indicates a one-second delay.

Example: @DIAL ('555-7000' , T)

@MODEM specifies the type of modem used:

@MODEM (<type>)

If your modem is an acoustic coupler type, specify @MODEM (A)

@ASYN sets up the computer's asynchronous communications hardware:

@ASYN (<select code>, <baud rate>, <bits per character>, <parity>, <stop bits>)

Specify only if these vary from the default (see **Reference Manual** for complete definitions).

Example: @ASYN (1, 300, 7, O, 1)

@PROTOCOL ensures that the 2 computers exchange characters of the right type

@PROTOCOL (<buffering type>, <character set>, <duplex>)

Specify only if these differ from the default (see **Reference Manual** for complete definitions).

Example: @PROTOCOL (N, A, H)

@WAIT specifies the number of seconds the computer should wait before it performs the next function:

@WAIT (<number of seconds>)

In general, specify too many seconds rather than too few.

Example: @WAIT (15)

@DATA instructs the program to transmit characters, messages, or data to the remote computer:

@DATA (R/C, /<cell>/<cell range>)

The @DATA function specifies cells that contain messages or characters.

Example: @DATA (R, D1 . . . LR).

@RECEIVE tells the program to wait until it receives certain characters before it executes the next function:

@RECEIVE ('<message>' /<cell>)

@RECEIVE accepts a literal message, control characters, or a cell.

Example: @RECEIVE (B2)

SAMPLE FORMULA:

With the following workspace information:

- Cell A1 The Telenet number for your region
- Cell A2 1 <enter>
- Cell A3 D1 <enter> (the terminal type)
- Cell A4 Your computer system number (e.g., C 30100 <enter>)
- Cell A5 Your password (e.g., ID TCA000 SECRET <enter>)

You could write the formula:

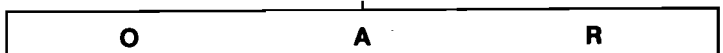
@DIAL (A1) + @PROTOCOL (,,F) + @WAIT (10) +
 @DATA (A2) + @DATA (A2) + @RECEIVE ('=') + @WAIT (5) +
 @DATA (A3) + @RECEIVE ('@') + @WAIT (5) +
 @DATA (A4) + @RECEIVE ('>') + @WAIT (5) + @DATA (A5)

@ASYN

/C

Communications

Establishes telecommunications link with remote computer to send or receive data



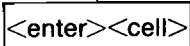
Originate a call

Answer a call

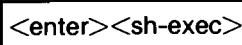
Resume telecommunications

Expands current cell into telecommunications window

Using formula in which cell?



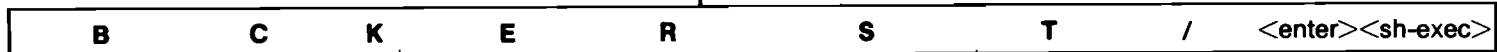
Set up communication hardware



Program enters terminal mode Exits communications



Exits terminal mode



Blank Communications Cell

Change cell address

Keep Received characters

Exit Communications

Sends Break signal to remote computer

Save contents of Communications cell to that address

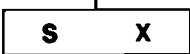
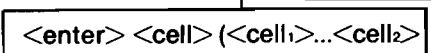
Transmit specified cells

Transmits ASCII value of characters

Return to terminal mode

Transmit Escape

Hang up?



Spreadsheet

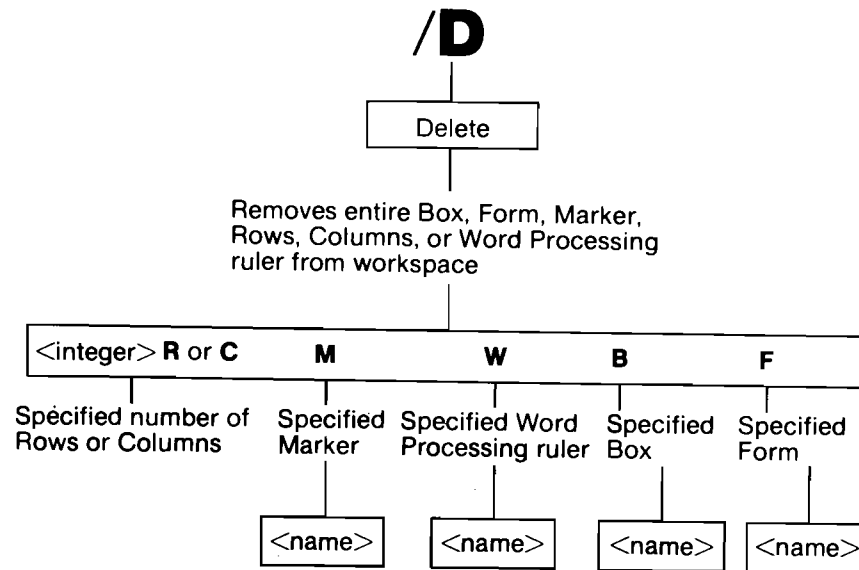
Expanded



By rows By columns

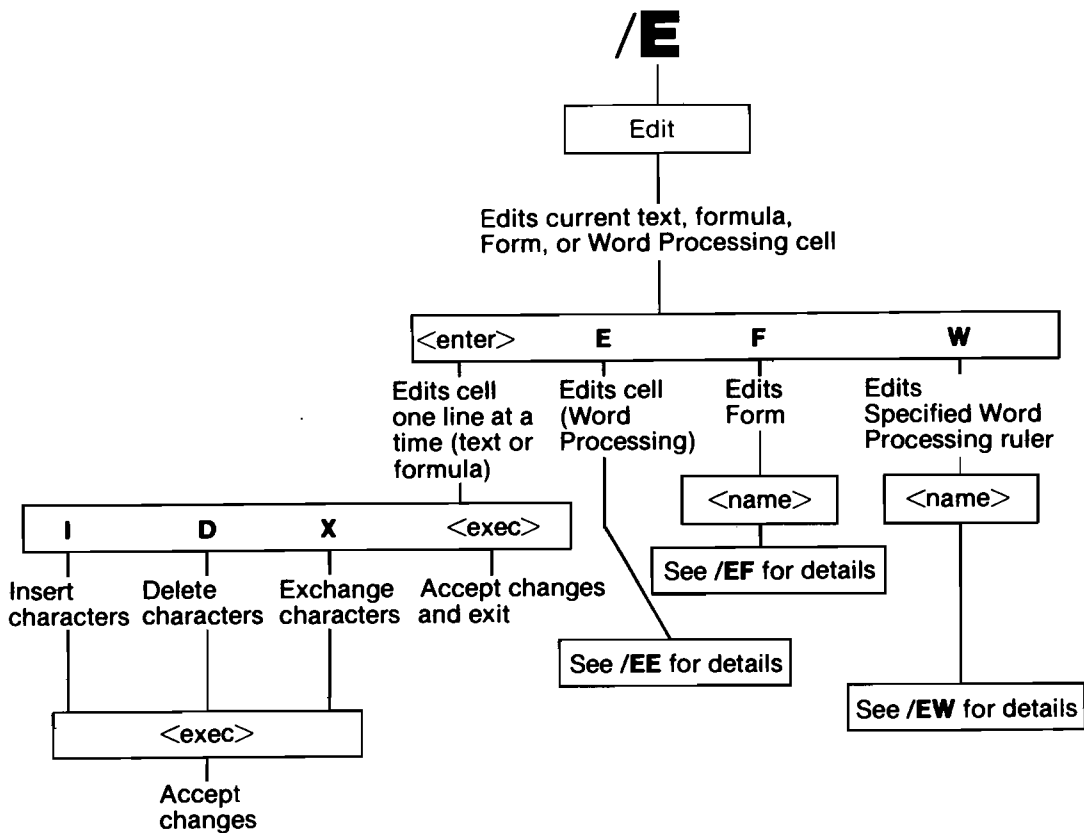
DELETE

/D removes a number of rows or columns, Marker, Box, Form, or Word Processing ruler from workspace or memory.



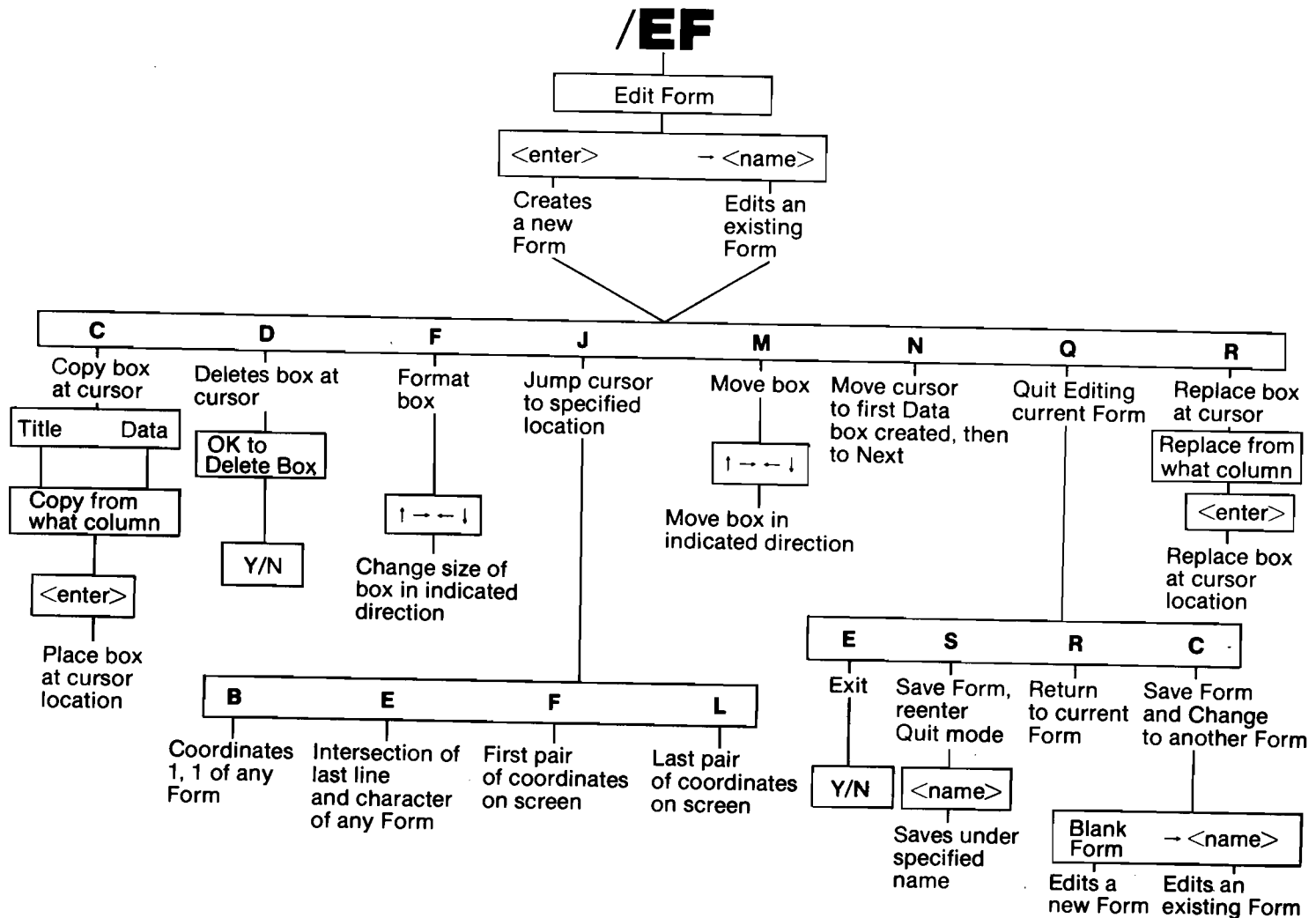
EDIT

/E Edits text or formula in cursor location (**/E <enter>**). Cell contents are displayed on prompt line. **I** Inserts, **D** Deletes, **X** Exchanges, **<exec>** terminates character changes; second **<exec>** accepts all changes. **/EW** Edits a Word Processing ruler; **/EF** Edits a Form (see next pages).



EDIT FORM

/EF uses the special Forms Editing commands to create and change a Form.



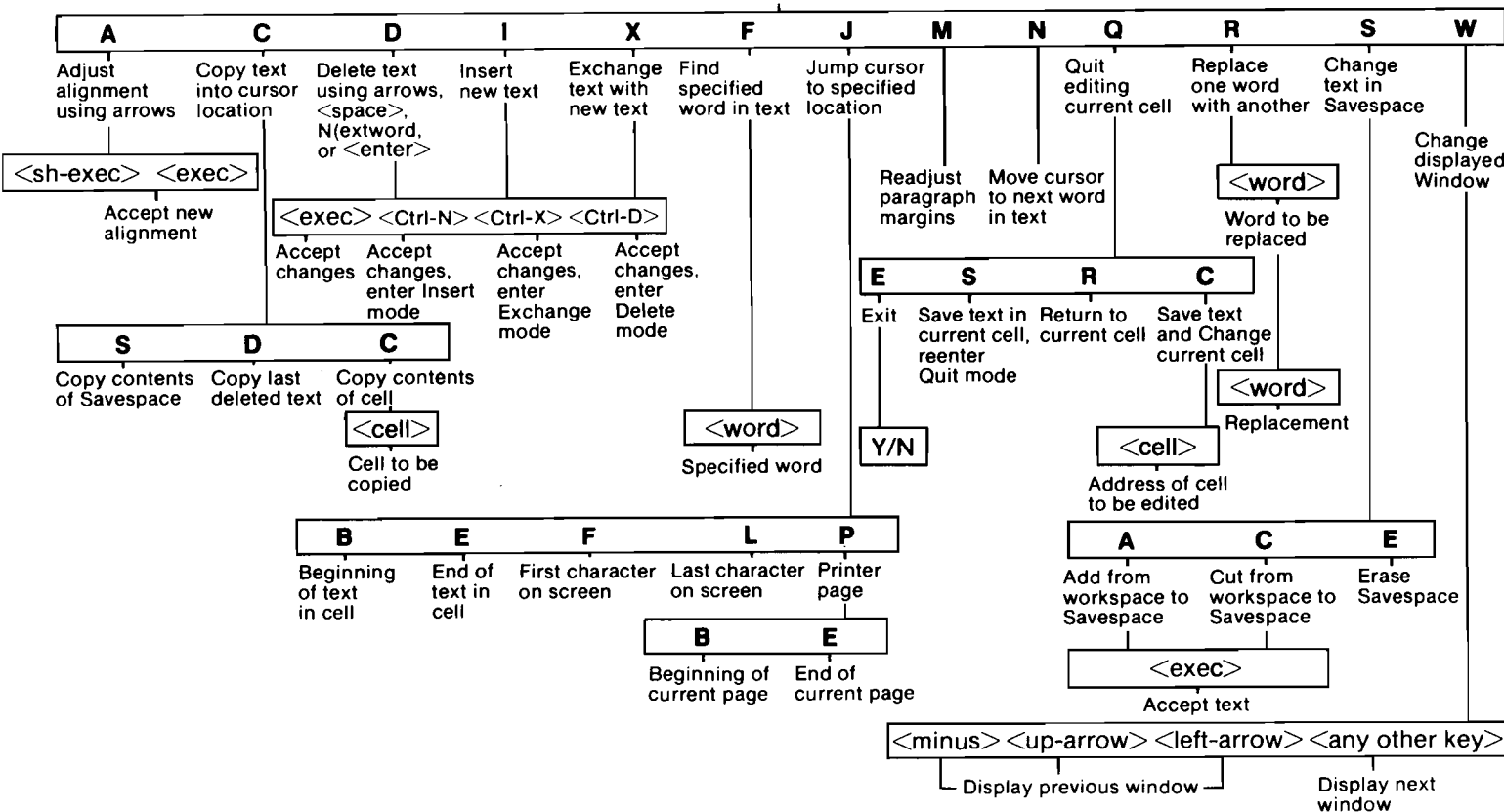
EDIT WORD PROCESSING TEXT

/EE allows text to be written and Edited using Word Processing commands.

/EE

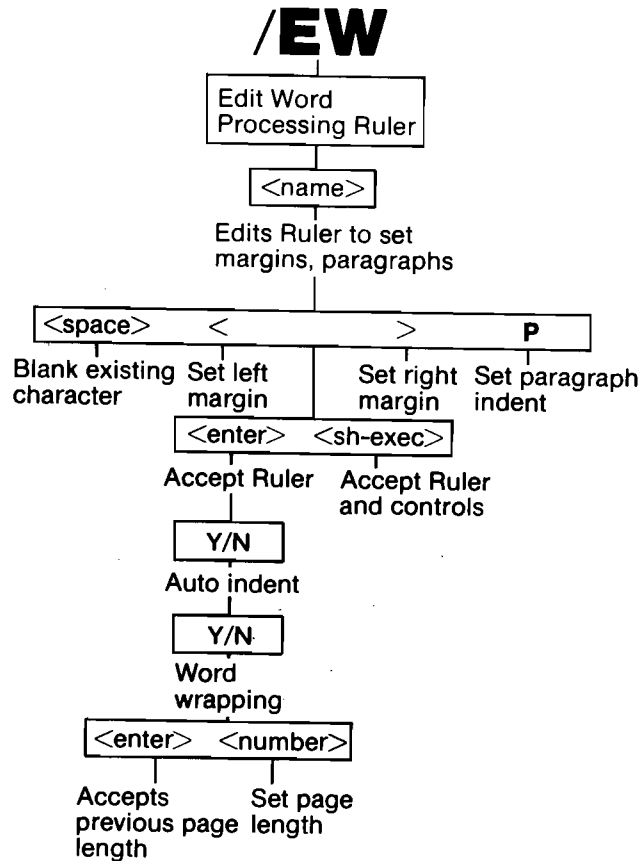
Edit Word Processing cell

Edit text at cursor location



EDIT WORD PROCESSING RULER

/EW creates and formats a Word Processing Ruler; <space> blanks existing character; <, >, P set left and right margins and paragraph indent; <shift-exec> accepts formatted ruler and default controls; <enter> accepts ruler, allows user to specify auto indent, word wrapping, and lines per page.



FORMAT

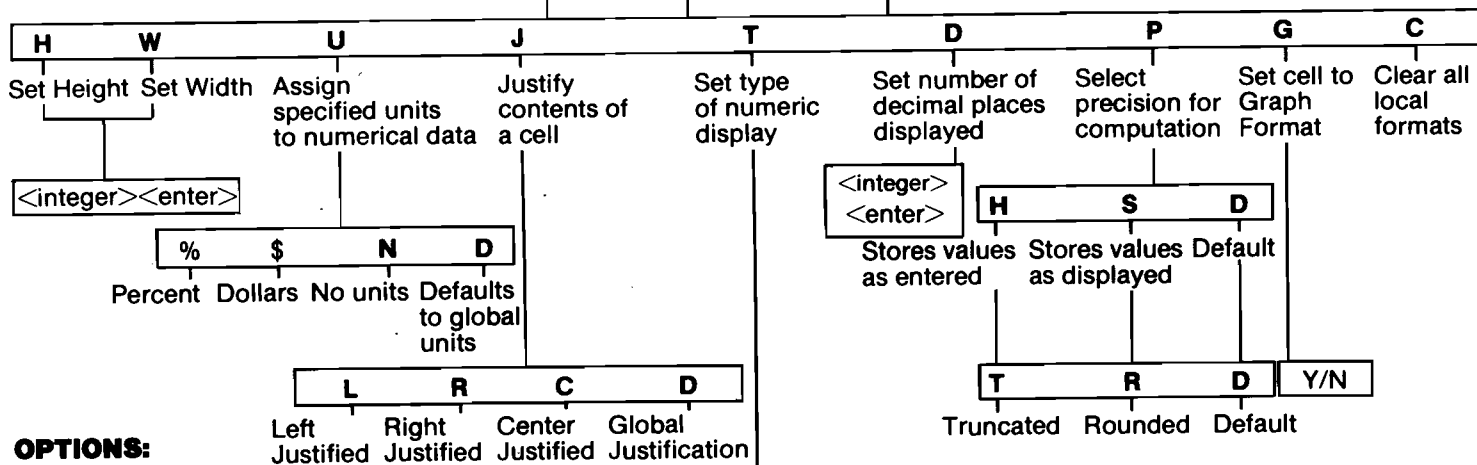
/F sets format at cursor location. Default returns to Global

/F

Format

Formats specified cell, cell range, rows or columns

<enter><cell...cell> <integer> R or C



OPTIONS:

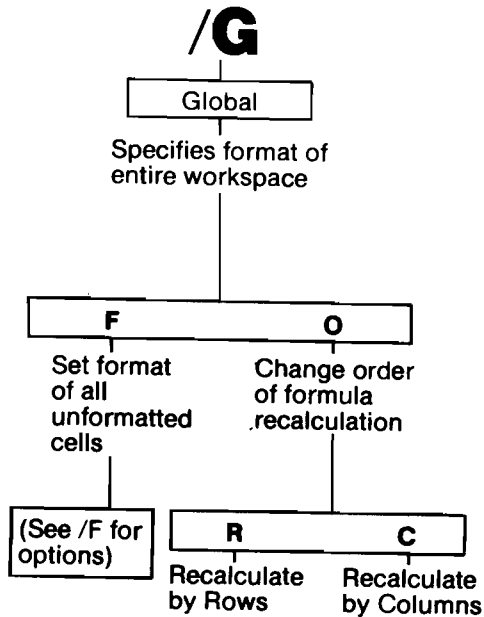
- H** <integer> <enter> sets Height.
- W** <integer> <enter> sets Width.
- D** <integer> <enter> sets number of decimal places displayed.
- P** selects precision for computation: Hidden (as entered), Shown (as displayed) Truncated, Rounded, Default
- G** sets cell to graph format.
- C** clears all formats to global.

OPTIONS:

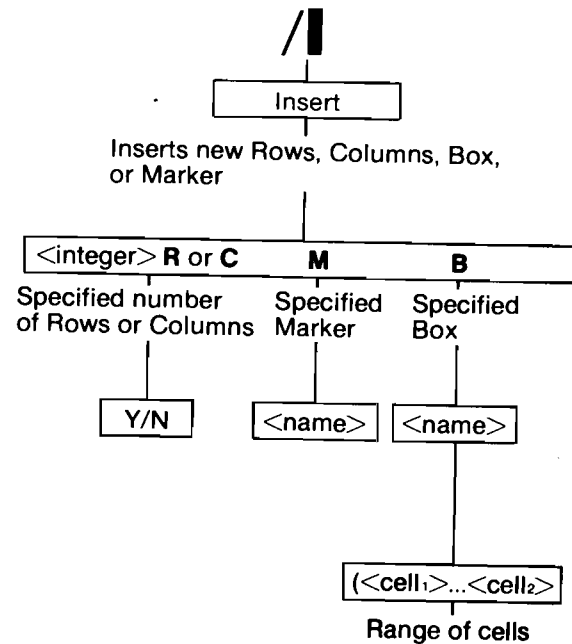
- <enter>** terminates command.
- U** assigns units: %, \$, No units, Default
- J** justifies cell contents: Left, Right, Center, Default
- T** sets type of numeric display: Engineering, Fixed point, Scientific, Any (fixed or scientific as space permits), Clear (default)

GLOBAL

/GF specifies the format of all unformatted cells in the workspace — options same as /F.
/GO changes order of formula recalculation by rows or columns.

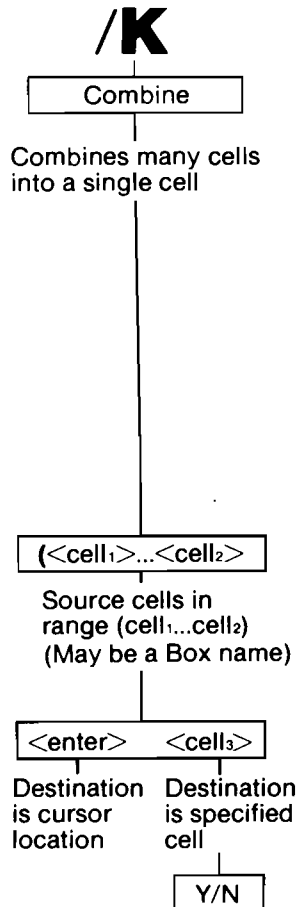
**INSERT**

/I Inserts a number of rows or columns, Marker, or Box.



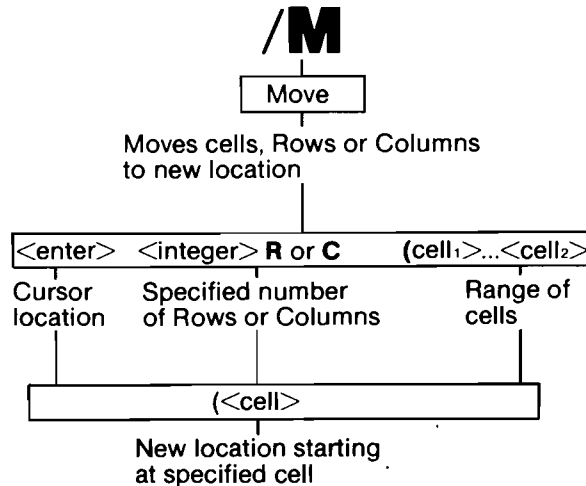
COMBINE

/K Combines cells in range into cursor location or specified cell.



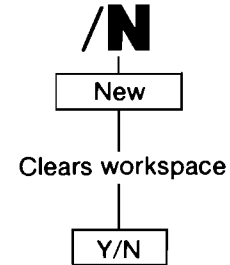
MOVE

/M Moves contents of cursor location, number of Rows or Columns, or range of cells to new location.



NEW

/N Clears workspace.



PRINTING

/P sends out all or part of the workspace to a printer or a plotter, or to disk using a specified formula or default formula supplied by the program.

PRINTING FORMATS

A Printer Format consists of up to 6 functions, including the following:

PRINTER AND PLOTTER TYPES: See list of supported peripherals.

@PRINTER specifies the model of printer or plotter, whether its HPIB, and the select code:

@PRINTER (<model no.>, HPIB/SERIAL, # <select code>)

Example: @PRINTER (2671G, HPIB, #701)

@PPAPER specifies the page length of the paper, number of lines to Print per page, the maximum number of characters per line, and whether the paper is continuous or in single sheets:

@PPAPER (<page length>, <lines>, <width>, CONT/CUT)

Example: @PPAPER (66, 55, 70, CONT)

@PFORMAT indicates whether or not to Print a Spreadsheet, Word Processing or Graphs, or using a Form; whether to Print Titles or cell addresses on each page; whether to Print pages that can be pasted; whether or not to number the pages; and whether or not to double the size of graphs or screen prints:

@PFORMAT (SPREAD/EXPAND/FORM '<Form name>', ADDR/NOADDR, H/V/B/NOPASTE, PAGENUM/NO PAGENUM, H/V/B/NODOUBLE)

Example: @PFORMAT (NOPASTE, NOPAGENUM, VDOUBLE)

@PHEADING contains the heading to be repeated at the top of each page:

@PHEADING ('<heading text>' /DOCNAME/<cell>)

Example: @PHEADING ('Sales Figures')

@PSETUP contains the setup characters needed to use special formats, including control characters. The tilde (~) preceding any character changes it into a control character:

On the HP keyboards, press the K8 function key to generate a tilde (~).

@PSETUP ('<setup characters>')

Example: @PSETUP (' ~ [&k2S']

prints in condensed mode on an HP82905B printer.

@DATA specifies the cells to be Printed and whether to Print them by row or column (if Word Processing):

@DATA (R/C, <cell>, <cell range>)

Example: @DATA (A1 . . . A5)

DEFAULT PRINTER FORMAT:

@PPAPER (66,54,80, CONT)

+@PFORMAT (NOADDR, HPASTE, PAGENUM, BDOUBLE)

You can specify a default printer during the boot-up procedure.

@Printer ('Silence')

/P

Print

Sends contents of workspace to disk, printer, or plotter

Printer formula in what cell?

<enter> <cell>

Cell containing printer formula; if no formula, uses default.

Print cells in what mode?

S or <enter> X F

Prints using spreadsheet format

Prints Word Processing cells and graphs

Prints using the Form specified

* <enter>

Prints only alpha portions of screen range

<enter> <integer> R or C . (<cell₁>...<cell₂>)

Prints current cell

Prints number of rows or columns

Prints a range of cells

If format specified is eXpanded

R C

Prints by rows

Prints by columns

Okay to do large operation?

Y/N

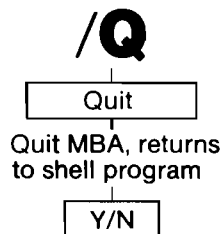
Database

Printing

Storage

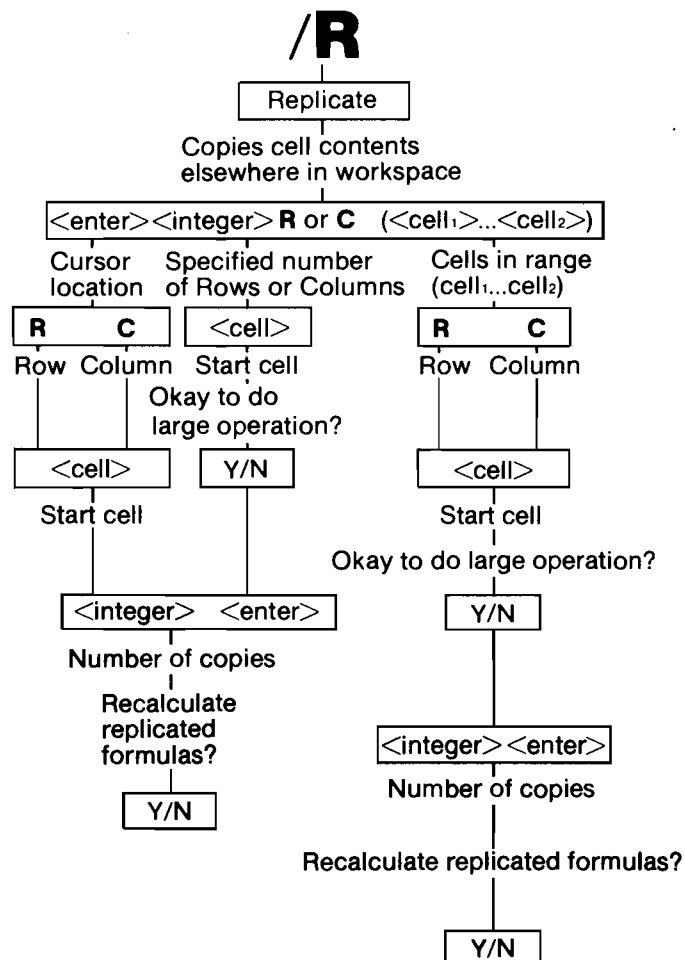
QUIT

/Q will Quit the MBA to run another program or reboot.



REPLICATE

/R copies contents of specified cells in Rows or Columns starting at specified new location; creates specified number of copies; formulas may use relative or constant cell addresses; replicated formulas may be recalculated.



DATABASE STORAGE COMMANDS

/SA has the options listed below. The database commands will Search, Retrieve, Index, and Update the Accessed database.

DATABASE STORAGE COMMANDS

- A** Accesses database, loads column headings at specified address.
- E** Ends access to database.
- N** Removes duplicate records (Uniques) in Rows, Columns, or range using criteria in row of specified cell. Criteria: nonblank cells indicate fields to be searched for duplicates.
- R** Retrieves selected records from Database or Workspace according to criteria (<, >, <=>, ..x, x.., ..x..) in specified cells; places retrieved records at specified address. Workspace cells to be searched must be indicated in command.
- U** Updates database with specified records; update letters in column containing specified cell: **A** adds, **C** changes, **D** deletes record.
- X** Indexes column containing cursor.

DATABASE COMMAND EXAMPLES

- RETRIEVAL** searches database or workspace using specified criteria.
- One set of criteria per row.
 - Criteria are examples of data in each Field.
 - Partial criteria may be used by adding 2 periods before and/or after number or text. Use " or ' before periods to enter text or numbers as criteria.
 - Upper or lower case letters may be used.
 - Boolean symbols may be used: > (greater than), < (less than), >= or => (equal to or greater than), <= or =< (equal to or less than), or <> (not equal to).
 - Up to 20 search criteria may be used.

UNIQUING removes duplicate rows from Retrieved Records.

- Criteria can be any character.
- Criteria can be entered in any Field.
- The program examines the first 40 characters of each Record.
- The Unique command looks for the first Record that meets the criteria, and throws out the rest.
- The Unique command does not affect the database — only the Records already Retrieved.

INDEXING works on a database to alphabetize Records for easier and faster search and Retrieval.

- Index works in up to 8 Fields.
- The database must be Accessed first.
- Indexing is most effective on large databases.
- The Index becomes a permanent part of the database until you change it.
- Added Records are automatically Indexed.

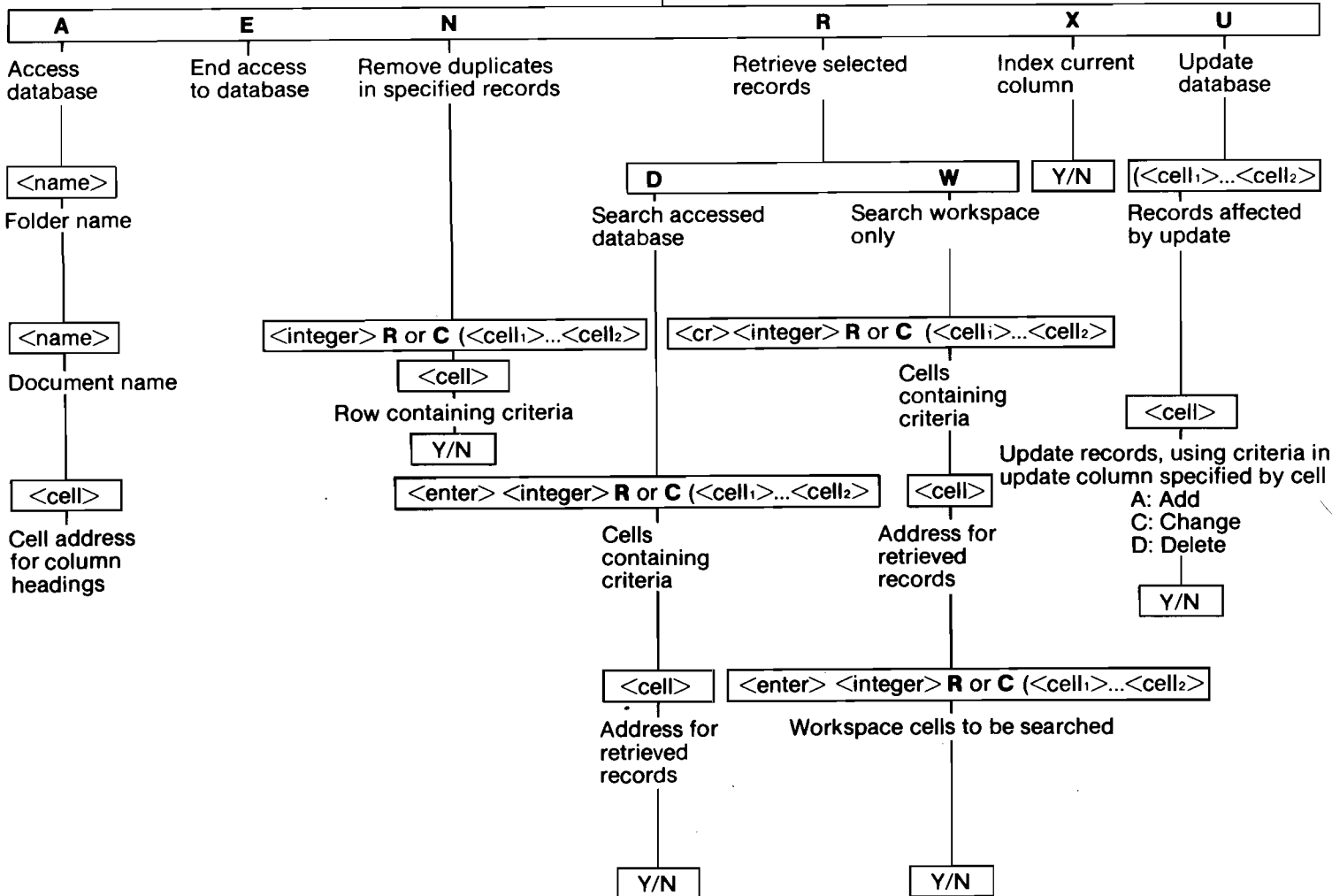
UPDATING Adds, Changes, or Deletes specific Records from a database.

- Update criteria must appear in a separate column.
- A** Adds a Record.
- D** Deletes a Record.
- C** Changes a Record.
- The MBA recognizes a Record by its position in the workspace, not by its contents. (If a Record from Row 3 is Blanked, then a new Record Added in Row 3, the program will not accept it — it must be Changed.)

/SA

Database

Performs database storage commands

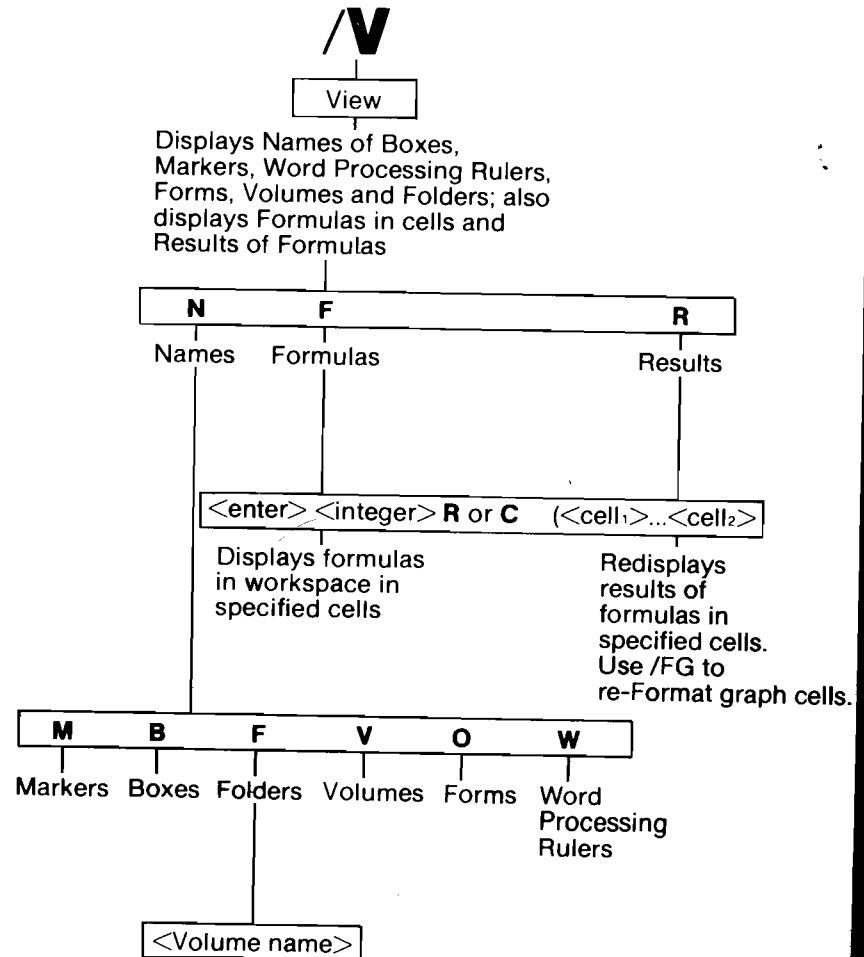
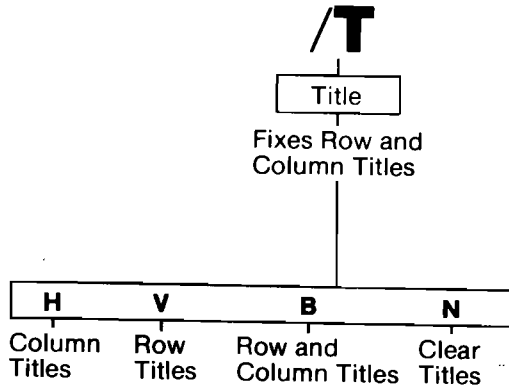


TITLE

VIEW

/T fixes Horizontal, Vertical, Both horizontal and vertical titles, or clears to No titles.

/V displays Names of Markers, Word Processing rulers, Volumes on-line, Folders on specified volume, Boxes, Forms; displays formulas and results of formulas.



WINDOWS

/W merges windows, creates Vertical or Horizontal window, Synchronizes or Unsynchronizes scrolling, expands cell to fill window (graph cells plotted), displays workspace using specified Form.

/W

Window

Creates, formats Windows

EXPAND

/X places the contents of one cell into a range of cells.

/X

Expand

Expands cell contents into range of cells

Expand cell into:

N **T**

Numbers

Text

(<cell₁>...<cell₂>)

Specified range

<cell>

Cell to be expanded

Y/N

(/XN uses expansion guide [parens] to distribute numbers among cells.)

RECALCULATE

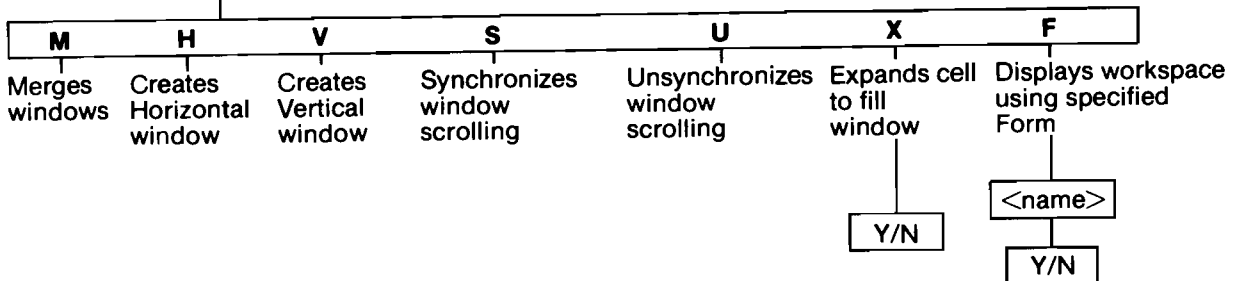
!/ Recalculates formulas in specified portions of the workspace.

!/

Recalculate

Recalculates formulas in specified cells

<enter> <integer> **R** or **C** (<cell₁>...<cell₂>)



GRAPHS

GRAPH FUNCTIONS

A graph is specified by entering a graph description in a cell. The plotted graph is displayed with the /WX command or printed using /P. A graph description consists of several graph functions linked by + signs. Each function describes one characteristic of a graph. The @PLOT and @DATA functions are required for every graph; the other functions are optional.

THE GRAPH TYPES

@PLOT (<type>) Specifies type of graph:

- @PLOT (PIE)** creates a pie chart.
- @PLOT (SCAT)** creates a scatter graph.
- @PLOT (HLC)** creates a high-low-close graph.
- @PLOT (LINE)** creates a line graph.
- @PLOT (AREA)** creates an area graph.
- @PLOT (BAR)** creates a bar graph; **BARS**, a stacked bar graph; **BARP**, a perspective bar graph; **BARM**, a multiple bar graph.

THE COMPLETE GRAPH

@PLOT (BARS) + @DATA (C, L12 ... P23, L10, L11)
+ @PLOT (LINE) + @DATA (C, G12 ... J23)
+ @TTL (T, J11) + @TTL (B, 'Forecast for 1985')
+ @XLBL (K12 ... K23) + @GRD (B)

OTHER GRAPH FUNCTIONS

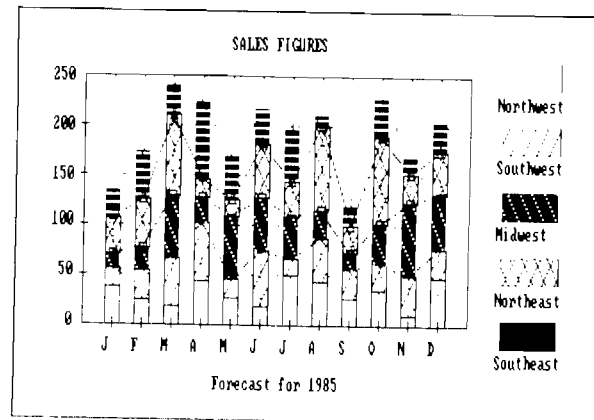
@DATA (<R/C>, <range>, <legend>, <pattern>)

Specifies whether data are arranged by Row or Column and location of data. Optional legends and/or patterns may be included by specifying the address of the first cell in the range of legend or pattern data. Possible patterns are: diagonal lines (/ or \), horizontal lines (-), vertical lines (|), perpendicular (+) or diagonal (X) crosshatching, or blank (B or blank); any of these patterns may be preceded by B or W to generate white on Black or black on White patterns respectively. (White and black are reversed when printed.) On the HP keyboards, press the K7 function key to use the back slash symbol (\). For information about pen colors for HP plotters, see last page of Desktop Reference.

@TTL (<R/L/T/B>, <cell> or '<title>') Adds Right, Left, Top or Bottom title to graph. The address of the cell containing the title is provided, or the title may be entered directly in the function. One @TTL function is required for each title.

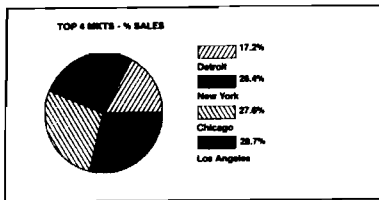
@XLBL (<range>) Labels x-axis with data from specified cells.

@GRD (<H/V/B>) Adds Horizontal, Vertical, or Both horizontal and vertical grids.

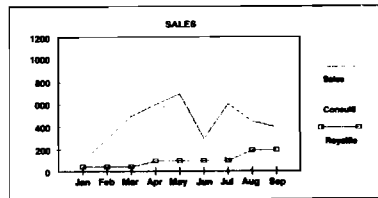


GRAPH TYPES

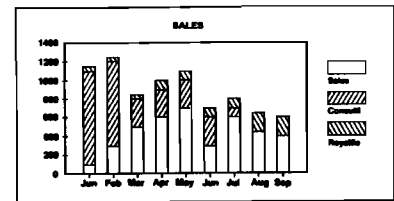
PIE



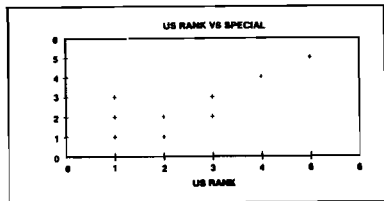
LINE



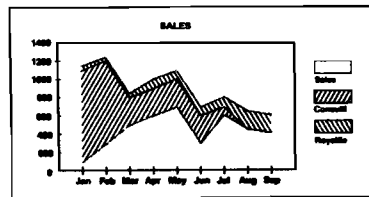
BARS



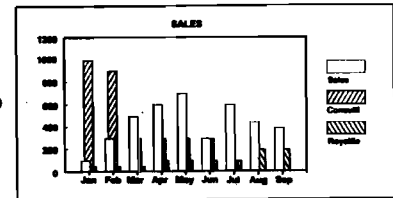
SCAT



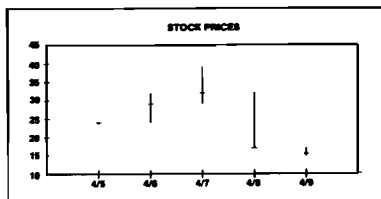
AREA



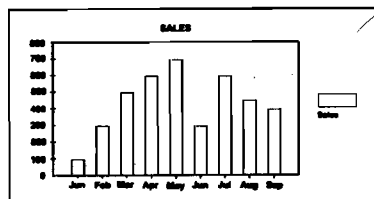
BARP



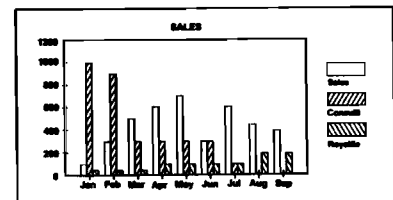
HLC



BAR



BARM



LINE graphs may be overlaid with any graph except PIE or SCAT. HLC graphs may be overlaid with SCAT or BARS graphs.

BUILT-IN FUNCTIONS

DATA

Formula Number, cell address, Built-In Function, or combination

Range Cell address, cell addresses separated by periods, range (i.e., <cell1...cell2>), or combination

Rate Number, cell address or marker of number or formula, or formula

ARITHMETIC OPERATORS

The +, -, *, and / operators add, subtract, multiply, and divide. The ^ is the exponential operator.

GENERAL FUNCTIONS

@ABS (formula) Returns absolute value of formula.

@EXP (formula) Calculates e to the power <formula>.

@INT (formula) Returns integer portion of formula.

@LNE (formula) Calculates log base e of formula.

@MAX (range) Returns maximum value in range.

@MIN (range) Returns minimum value in range.

@PI Returns 3.14159.

@SQRT (formula) Calculates square root of formula.

@SUM (range) Calculates sum of numeric entries in range.

STATISTICAL FUNCTIONS

@AVG (range) Calculates average (mean) of values in range.

@SDV (range) Calculates standard deviation of values in range.

@VAR (range) Calculates variance of values in range.

BUILT-IN FUNCTIONS

LOGICAL FUNCTIONS

@AND (range) Returns TRUE if all boolean values in range are TRUE; otherwise returns FALSE.

@ERROR Returns ERROR.

@FALSE Returns FALSE.

@IF (f1,f2,f3) Returns value of f2 if formula f1 is TRUE; otherwise returns f3.

@IFV (f1,f2,f3,f4,f5) If f1 < f2, returns f3. If f1 = f2, returns f4. If f1 > f2, returns f5.

@ISERR (formula) Returns TRUE if formula contains ERROR; otherwise FALSE.

@ISNA (formula) Returns TRUE if formula contains N/A; otherwise FALSE.

@NAV Returns N/A (Not Available)

@NOT (formula) Returns TRUE if formula is FALSE; otherwise FALSE.

@OR (range) Returns TRUE if any boolean value in range is TRUE; otherwise FALSE.

@TRUE Returns TRUE.

SEARCH FUNCTIONS

@CHZ (formula, range) Chooses value at position = start of range + formula value.

@CPY (folder, document, M1, M2) Specifies portion of stored document from marker M1 to marker M2. /SC command copies specified portion of document into workspace.

@CNT (range) Counts the number of numeric entries in a range.

@LOK (formula, range) Looks up formula in row or column specified by range; returns corresponding value in next row or column.

TRIGONOMETRIC FUNCTIONS

@SIN (formula) @ASN (formula) Sine, arcsine of formula

@COS (formula) @ACS (formula) Cosine, arccosine of formula

@TAN (formula) @ATN (formula) Tangent, arctangent of formula

FINANCIAL FUNCTIONS

The @IRR, @MIRR and @NPV functions require that the first value in the specified range be the initial capital outlay, a negative number.

@IRR (range) Calculates internal rate of return of cash flows in range.

@MIRR (r1,r2,range) Calculates modified internal rate of return on cash flows in range using known rate of return r1 and reinvestment rate r2.

@NPV (rate,range) Calculates net present value of cash flows in range using specified discount rate.

HEWLETT-PACKARD PERIPHERALS SUPPORTED BY THE MBA

Mass Storage Devices

HP 82901M 5¼" Dual Drive
 HP 9121D 3½" Dual Drive
 HP 9133A 3½" Drive w/ 4.6 MByte Winchester
 HP 9133A 3½" Drive w/ 4.6 MByte Winchester Opt 10
 HP 9133B 3½" Drive w/ 10 MByte Winchester
 HP 9135A 5¼" Drive w/ 4.6 MByte Winchester
 HP 9135A 5¼" Drive w/ 4.6 MByte Winchester Opt 10

Printers and Plotters

HP 82905B Low-cost Graphics Printer
 HP 82906A Low-cost Impact Printer
 HP 2602A Daisy Wheel Printer
 HP 2631G Impact Graphics Printer
 HP 2671G Thermal Printer
 HP 2673A Thermal Graphics Printer
 HP 9876A Thermal Graphics Printer
 HP 9872C/T 8-pen Plotter
 HP 7470A Low-cost Plotter
 HP 7580A D-size Plotter
 HP 7585A E-size Plotter

Modem

HP 13265A 300-Baud Modem

HP PLOTTER PEN SELECTION

For plotting graphs on an HP multi-pen plotter. Use the following format to specify pen information:

<background color> <pattern symbol> <pattern color>

Refer to colors by pen number; use integer from 0 to 9 (0=no color). Possible patterns are /, \, |, +, X, B, (see "Graphs" page of Desktop Reference).

Example: 4+7 Pen #4 draws background.
 Pattern is perpendicular crosshatching.
 Pen #7 draws pattern.

Enter pen information in a single cell; use @DATA function to refer to cell address:

@DATA (<R/C>, <range>, <legend>, <pen information>)

HP FUNCTION KEYS

The MBA uses the following function keys on the HP keyboards:

- k5** same as typing the ! (Recalculation) key
- k6** same as typing the ? (Help) key
- k7** generates the back slash symbol (\) used to specify graph backgrounds
- k8** generates the tilde symbol (~) used for control codes in Printing and Communications
- k9** the "Home" key; returns the cursor to the beginning of Word Processing cells, to the first character in a line you are editing with /E <ENTER>, or to Cell A1 on the spreadsheet

OTHER HP KEYS

The **Reset (RST)** key can be used to end an MBA session and return to the boot-up state. Note, however, that inadvertently typing <RST> can result in a loss of work. You should always use this key carefully.

DEL L, DEL LN, DEL C, or DEL CHR If you are editing text, a formula, or the contents of a cell, typing one of these keys is the same as typing D.

INS L, INS LN, INS C, or INS CHR If you are editing text, a formula, or the contents of a cell, typing one of these keys is the same as typing I.

RUN Typing this key returns the character R.

EDIT Typing this key returns the character E.

STOP, C I/O, or CLR I/O Typing one of these keys will stop a current MBA print or plot operation without ending your MBA session.