LOTUS 1-2-3

Update

1. In Figure 23 on page 45, the first legend should read "...because calculation in cell B6 ...".

2. In the third paragraph on page 105, the calculation should be "30926-30444".

3. In the NOTES sections of the /Worksheet Global Protection (page 139) and /Range Justify (page 166) commands, add:

Don't use the /Range Justify command while cell protection is enabled: You may get *Protected cell* errors when this command rearranges the cell entries (implicit /Move commands).

4. At the end of page 146 and in the NOTES section at the top of page 177, add:

There is no simple relationship between the amount of main memory a worksheet occupies, as displayed by /Worksheet Status, and the size of the worksheet file (.WKS) created with /File Save.

5. In the last few paragraphs on page 201, references to cell "C5" should be "C4"; the reference to cell "C6" should be "C5".

6. Under the description of criteria for the /Data Query commands starting on page 198, note that you may not use the seven database statistical functions inside the Criterion range.

7. In the NOTES sections of the /Graph Options Legend (page 247) and /Graph Options Titles (page 249) commands, add:

Be careful when specifying lengthy titles and legends. In some cases, the screen shows more characters than the printer can print; thus, you may lose characters from the printed image.

8. In the NOTES section at the top of page 253, add:

If you use 1-2-3 Release 1A to create a worksheet that includes graph names, you will not be able to /File Retrieve this worksheet using 1-2-3 Release 1. To make a usable version of such a worksheet, modify it using 1-2-3 Release 1A, cancelling all graph names with the /Graph Name Reset command.

9. In the @IRR section on page 288, delete the sentence that begins, "If there is only one sign change in the series of payments ...".

10. On page 313, add this new error message:

Directory does not exist. /File Directory or /Worksheet Global Default Directory command: There is no directory with the name you entered. (1-2-3 *does* record the new directory name in its internal memory. It will save this directory name in 123.CNF when you issue a /Worksheet Global Default Update command, even though the directory does not currently exist.)

1-2-3 Quick Reference

1. On page 4, references to "Drives" and "Drive" under the Configure option should read "Directories" and "Directory".

2. On page 7, references to *string* in the /XL and /XN commands should read *message*.

Notes on "Getting Started"

1. Step 3 (page iii) should be performed only if you are running DOS 1.10 and your system has more than 320K of main memory.

2. Lotus ships the 1-2-3 program diskettes without write-protect tabs. You may wish to place a write-protect tab on each diskette after processing it (i.e., after step 4 or step 5).

3. The 1-2-3 Tutorial Disk is not a *system* or *bootable* disk. Don't process the 1-2-3 Tutorial Disk with the INSTALL command (step 3, "Transferring DOS Programs"). However, you still must perform the "Installing 1-2-3 Drivers" procedure.

To start the Tutorial program, place the disk in Drive A, make sure that Drive A is the default drive, and issue the command

TUTOR ↵

Note that this change affects page 5 of the User's Manual, too. You will not be able to start the computer using the Tutorial Disk.

A Special Note to Hard Disk Users

This section presents additional information for those using an IBM Personal Computer with a hard disk (including the XT model). This information supplements the hard-disk instructions included in "Getting Started".

The Golden Rule: Once you have installed DOS programs and 1-2-3 drivers on your hard disk, it effectively *becomes* your 1-2-3 System Disk. In Lotus documentation, interpret most references to the 1-2-3 System Disk as references to the hard disk.

There are some exceptions, though:

A. When the 1-2-3 program begins execution, the diskette labeled *1-2-3 System Disk* **must** be in the first diskette drive (usually designated Drive A).

B. If your hard disk is not Drive A, it may not be capable of starting (*bootstrapping*) the computer. In this case, instructions to start the computer with the 1-2-3 System Disk are not appropriate — start the computer with your DOS disk.

For hard disk users, there are a few extra wrinkles involved with step 5, "Establishing 1-2-3's Standard Procedures". This step alters 1-2-3's *configuration file*. (You transfer this file to the hard disk in step 3.) As delivered by Lotus, this file refers to Drive B, which may not even exist on your system!
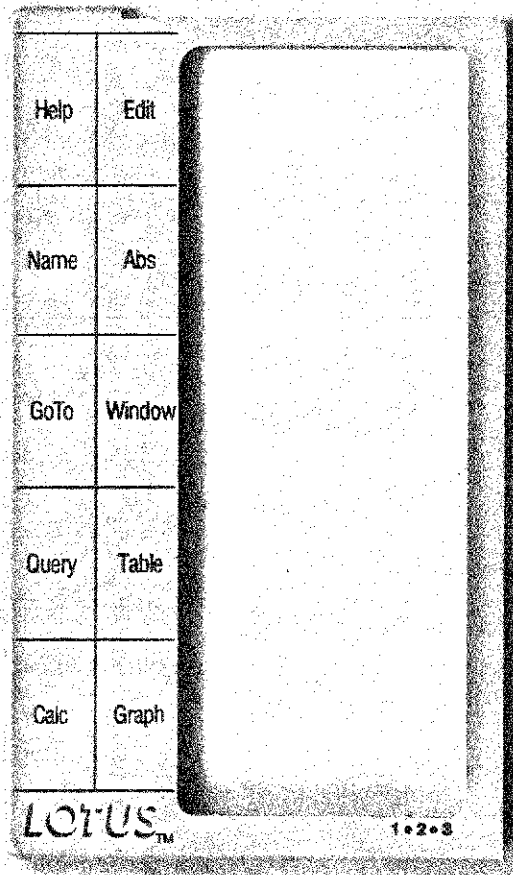
Here's what will happen. The first time you use 1-2-3, you will receive the following DOS message when you clear the 1-2-3 logo from the screen:

Insert diskette for drive B: and strike
any key when ready

(DOS lets your single diskette drive act as Drive A sometimes, and as Drive B at other times.)

Use the /Worksheet Global Default command to change the *Directory* setting from B:\ to the directory in which you wish to store 1-2-3 data files, e.g. C:\. Be sure to *Update*.

Similarly, you will need to change the configuration file of the PrintGraph program when you first use it. Initially, PrintGraph assumes that Pictures are stored on a disk in Drive B and that Fonts are stored on a disk in Drive A. See the *1-2-3 User's Manual* for details.

Help	Edit
Name	Abs
GoTo	Window
Query	Table
Calc	Graph

LOTUS™   1•2•3

Date _____

File # _____

Dear Borrower:

Some of the information you returned to us was incomplete. We are unable to establish the amount of assistance you should receive until the following information is provided.

_____ Recertification Form for Family Composition (Orange). (Complete entire form.)

_____ Verification of Employment (Tan). (Complete top half only.)

_____ Verification of Aid (Blue). (Complete top half only.)

_____ Address for _____
(Verification was returned by Post Office.)

_____ Confirmation of the income source circled on attached copy of your form. They have stated that you are not employed by them. Please check for the correct address or notify us if there has been a job change.

_____

_____

_____ Name and social security number of the person whose social security account pays benefits to your children:

Name _____ Social Security # _____

For (Child) _____ Social Security # _____

If you need additional space to answer any of the above requests, please use the back of this letter.

Your prompt attention to this matter would be greatly appreciated.

Very truly yours,

235 Department
Reserves Administration Department

LA 730 rev. 5/78

1-2-3 Commands

/Worksheet Commands

Global	Overall worksheet settings
Format	Number/Formula display
Label-Prefix	Alignment of labels
Column-Width	1-72 characters
Recalculation	Formula recalculation procedures
Protection	Enable/Disable cell protection
Default	Standards for printing, current disk
Insert	Create empty rows/columns
Delete	Eliminate rows/columns
Column-Width	1-72 characters
Erase	Erase worksheet and settings
Titles	Freeze rows/columns onscreen
Window	Split/Unsplit display window
Status	Display global settings

/Range Commands

Format	Number/Formula display
Label-Prefix	Alignment of labels
Erase	Erase cell entries
Name	Maintain set of names for ranges
Justify	Adjust width of label "paragraph"
Protect	Disallow changes to cells (if Protection Enabled)
Unprotect	Allow changes to cells
Input	Restrict pointer to unprotected cells

/Copy Command

Copy entries to new location(s)

/Move Command

Move entries to new location

/File Commands

Save	Store entire worksheet in *worksheet file*
Retrieve	Restore data from *worksheet file*
Combine	Incorporate (part of) *worksheet file* into current worksheet: methods: Copy, Add, Subtract use Entire-File or Named-Range only

For more information, use the interactive Help facility (press the F1 key) and consult the 1-2-3 User's Manual.

MASON-McDUFFIE CO.

■ LTORS ■ MORTGAGE BANKERS ■ INSURANCE ■ PROPERTY MANAGERS

2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

File # _____

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235 Department
Reserves Administration Department

LA 730 rev. 5/78

/File Commands (continued)

Xtract	Store range of entries in worksheet file: save **F**ormulas or current **V**alues only
Erase	Erase one or more 1-2-3 datafiles
List	List names of 1-2-3 datafiles, report disk space
Import	Incorporate *print file* into worksheet: treat lines as **T**ext or as **N**umbers and quoted text
Disk	Change *current disk* assignment

/Print Commands

Printer vs. **F**ile	Direct output to printer or *print file*
Range	Range to be printed
Line	Advance printer one line
Page	Advance to top of next page
Options	Page formatting
Header, **F**ooter	Set page header/footer line
Margins	**L**eft, **R**ight, **T**op, **B**ottom
Borders	Graft extra columns/rows to print Range
Setup	Set printer-control characters
Page-**L**ength	Set number of lines
Other	**A**s-Displayed vs. **C**ell-Formulas: Printing of formula texts
	Unformatted vs. **F**ormatted: Suppress headers, footers, page breaks
Clear	Cancel print settings
Align	Reset line-number counter to 1
Go	Print the selected range

/Graph Commands

Type	Select graph type
X A B C D E F	Set graph data ranges
Reset	Cancel graph settings
View	Display graph
Save	Save graph image in *graph file* (.PIC)
Options	
Legend	Enter graph legends (A–F)
Format	Set method of displaying Line and XY data: **L**ines, **S**ymbols, **B**oth, **N**either
Titles	Enter title text: axes, graph
Grid	Overlay with horizontal/vertical lines
Scale	Set/Format numeric axis scales

Color vs. **B**&**W**	Display method
Data-Labels	Range of entries to label data points
Name	Maintain set of names for groups of graph settings: **C**reate, **U**se, **D**elete, **R**eset

/Data Commands

Fill	Enter number series in a range
Table	Tabulate formula values as *Input* entries vary
Sort	Sort data records
Data-**R**ange	Set range to sort
Primary-**K**ey	Set first column to sort on
Secondary-**K**ey	Set second ("tiebreaker") column to sort on
Reset	Cancel sort settings
Go	Perform the sort
Query	Select data records from a database
Input	Range containing database
Criterion	Range containing record-selection criteria
Output	Range to receive copies of records
Find	Highlight selected records (Input, Criterion ranges required)
Extract	Make (partial) copies of selected records (Input, Criterion, Output ranges required)
Unique	Make (partial) copies of selected records — no duplicate copies (Input, Criterion, Output ranges required)
Delete	Delete selected records (Input, Criterion ranges required)
Reset	Cancel query settings
Distribution	Calculate frequency distribution

/Quit Command

End 1-2-3 session (Be sure to save your work first!)

Date _____

File # _____

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ing information is provided.

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                 _____

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Reserves Administration Department

LA 730 1/78

GRAPH Program Commands

Select	Select graphs to print
Options	Formatting options
Color	Colors for parts of graphs:
Grid	Gridwork and text
A B C D E F	Data range (A – F):
	Black Red Orange Yellow
	Green Blue Purple Brown
Font	Type fonts:
1	Font for first line
2	Font for rest of graph (if omitted, Font 1 used)
Size	Size and placement of graph
Full vs. Half	One or two graphs per page
Manual	Adjust size settings manually:
Left, Top	Margin
Width, Height	Overall dimensions
Rotation	Clockwise rotation of image
Pause	Pause between printing graphs
Eject	Page eject between printing graphs
Go	Print the selected graphs
Configure	Configure GRAPH to system hardware
Files	Drives to search for data files
Pictures	Drive to search for Picture (graph) files
Fonts	Drive to search for Font files
Device	Graphics printer:
	1: Epson single-density
	2: Epson double-density
	3: IDS Prism 4: HP 7470A plotter
Page	Default page size
Length	Default page length
Width	Default page width
Interface	Interface for graphics device: two parallel, two serial
Save	Record configuration in GRAPH.CNF
Reset	Resets "unsaved" configuration settings to default
Align	Make current paper position "top of form"
Page	Advance paper to top of next page
Quit	End GRAPH program

Function Keys

F1: Help	Display Help screens — press [Esc] to return to Ready Mode
F2: Edit	Switch to/from Edit Mode for current entry
F3: Name	(Point Mode only) Display menu of range names
F4: Abs	(Point Mode only) Make/Unmake cell addresses "absolute"
F5: GoTo	Move cell pointer to a particular cell
F6: Window	(Split-screen only) Move cell pointer to other window
F7: Query	Repeat most recent Data Query operation
F8: Table	Repeat most recent Data Table operation
F9: Calc	Ready Mode: Recalculate worksheet Value and Edit Modes: Convert formula to its current value
F10: Graph	Draw graph according to most recent graphing specifications

Names for 1-2-3 Data Files

Names assigned to 1-2-3 worksheet, print, and graph (picture) files may be at most eight characters long, and must consist of these characters only:

A B .. Z
a b .. z
0 1 .. 9
_ (underscore)

Notes:

1. Uppercase and lowercase letters are equivalent.

2. Don't try to enter a filename extension. 1-2-3 automatically uses these extensions:

.WKS worksheet file
.PRN print (text) file
.PIC graph (picture) file

3. To specify a file that is not stored on the current disk, use a disk prefix:

C:SALESFIG   B:JAN_JUN

MASON-McDUFFIE CO.

LTORS ▪ MORTGAGE BANKERS ▪ INSURANCE ▪ PROPERTY MANAGERS
2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

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235 Department
Reserves Administration Department

LA 730 1/78

Keyboard Macros — Names for Special Keys

(uppercase and lowercase letters equivalent)

Control and Editing Keys

~	[Enter] key
{Esc}	
{BS}	[Backspace]
{Del}	
{?}	Pause until user presses [Enter] key

Pointer-Movement Keys

{Up} {Down} {Left} {Right}
{Home} {End} {PgUp} {PgDn}

Function Keys

{Edit}	F2	{GoTo}	F5	{Table}	F8
{Name}	F3	{Window}	F6	{Calc}	F9
{Abs}	F4	{Query}	F7	{Graph}	F10

/X Commands

/XI*formula* — ...   **If–Then**

If the *formula* is **TRUE** (i.e. has a non-zero value), continue reading keystrokes in the same cell. If the *formula* is **FALSE** (i.e. zero), continue reading keystrokes in the cell below. *Be sure to follow the formula with a tilde character.*

/XG*location* ~   **Go To**

Continue reading keystrokes at *location*. Specify a cell address, a range, or a range name as the location. 1-2-3 immediately abandons the current cell and continues reading keystrokes at the specified cell (or the upperleft corner of the specified range).

/XQ   **Quit**

1-2-3 erases the *CMD* indicator from the upper right corner of the screen and returns to Ready Mode.

/XM *location* ~   **Process a Menu**

1-2-3 allows the user to make a menu choice, and branches on the user's choice. 1-2-3 constructs the menu from the *menu range* whose upperleft corner is *location*. As above, *location* may be a cell address, range, or range name.

6

@ Functions

Mathematical Functions

@ABS(x)	Absolute value of x
@ACOS(x)	Arc cosine
@ASIN(x)	Arc sine
@ATAN(x)	2-quadrant arc tangent of y/x
@ATAN2(x,y)	4-quadrant arc tangent
@COS(x)	Cosine
@EXP(x)	Exponential
@INT(x)	Integer part
@LN(x)	Log base e
@LOG(x)	Log base 10
@MOD(x,y)	x mod y
@PI	$\pi = 3.141592653589794$
@RAND	Random number between 0 and 1
@ROUND(x,n)	Round number x to n decimal places
@SIN(x)	Sine
@SQRT(x)	Square root
@TAN(x)	Tangent

Logical Functions

When determining the truth value of a formula, 1-2-3 considers any non-zero value to be **TRUE**. Only 0 itself is **FALSE**.

@FALSE	0 (FALSE)
@TRUE	1 (TRUE)
@IF(cond,x,y)	x if *cond* is **TRUE** (non-zero)
	y if *cond* is **FALSE** (zero)
@ISNA(x)	1 (**TRUE**) if $x = NA$
@ISERR(x)	1 (**TRUE**) if $x = ERR$

Special Functions

@NA	NA (not available)
@ERR	ERR (error)
@CHOOSE(x,v0,v1,.., vN)	Select value
@HLOOKUP(x,range,offset)	Table lookup with index *row*
@VLOOKUP(x,range,offset)	Table lookup with index *column*

7

MASON-McDUFFIE CO.

REALTORS ■ MORTGAGE BANKERS ■ INSURANCE ■ PROPERTY MANAGERS
2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

File # _____

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235 Department
Reserves Administration Department

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Financial Functions

@IRR(*guess,range*)	Internal rate of return
@NPV(*x,range*)	Net present value
@FV(*prn,int,term*)	Future value
@PV(*pmt,int,term*)	Present value
@PMT(*pmt,int,term*)	Payment

Date Functions

Use these functions to generate the *absolute number* by which 1-2-3 identifies particular days (e.g. 30802 = April 30, 1984). Then, use any of the three date numeric display formats (/Range Format command) to make the number *appear* in date form (e.g. 30-Apr-84).

@DATE(*yr,mth,day*)	Number (1..36525) of specified day
@DAY(*yr,mth,day*)	Day (1..31) of specified day
@MONTH(*yr,mth,day*)	Month (1..12) of specified day
@YEAR(*yr,mth,day*)	Year (00..99) of specified day
@TODAY	Today's number
	(e.g. Nov 11, 1983 = 30631)

Statistical Functions

@COUNT(*list*)	Number of argument values
@SUM(*list*)	Sum of values
@AVG(*list*)	Average value
@MIN(*list*)	Mimimum value
@MAX(*list*)	Maximum value
@STD(*list*)	Standard deviation ("N" method)
@VAR(*list*)	Variance ("N" method)

list: any number of arguments, separated by commas. Use any type of argument: number, formula, cell address, range specification, or range name.

Note: Blank cells in a range are ignored. Label entries are equivalent to the number zero.

Database Statistical Functions

These counterparts to the statistical functions operate on particular fields of records selected from a database. The selection process is exactly the same as with the /Data Query command:

@D**xxxx**(*inp_range,col_offset,crit_range*)

* The *inp_range* argument identifies the Input range — the database itself.

* The *crit_range* argument identifies the Criterion range.

    Together, these two ranges determine a set of selected records.

* The *col_offset* argument identifies the field (column) of the selected records to be used in the statistical analysis (leftmost field = 0).

@DCOUNT	Field count
@DSUM	Field sum
@DAVG	Field average
@DMIN	Field minimum
@DMAX	Field maximum
@DSTD	Field standard deviation ("N" method)
@DVAR	Field variance ("N" method)

Note: Blank cells in a range are ignored. Label entries are equivalent to the number zero.

Arithmetic and Logical Operators

Operations with larger precedence numbers are performed first, unless overridden by parentheses. Operations with equal precedence are performed left-to-right.

Operator		Precedence #
^	Exponentiation	7
+	Positive	6
−	Negative	6
*	Multiplication	5
/	Division	5
+	Addition	4
−	Subtraction	4
=	Equals	3
<	Less than	3
<=	Less than or equal	3
>	Greater than	3
>=	Greater than or equal	3
<>	Not equal	3
#NOT#	Logical *not*	2
#AND#	Logical *and*	1
#OR#	Logical *or*	1

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        _____

        _____

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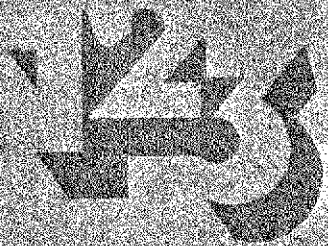   For (Child) _____ Social Security #_____

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235 Department
Reserves Administration Department

LA 730 1/78

Numeric Display Formats

Each cell has a **numeric display format** that is independent of the cell's contents. In an empty worksheet, all cells have the General format.

/Worksheet Global Format: Sets global numeric format, which 1-2-3 uses for all cells not processed with a /Range Format command.

/Range Format: Changes the numeric format of all cells in a range. The /Range Format Reset command returns the cells to using the global numeric format.

| General | 34.007 | − 689.123 |
| | *(as many decimal places as needed)* | |

Fixed	34.01	− 689.12
Scientific	3.40E + 01	− 6.89E + 02
Currency	$34.01	($689.12)
, *(Comma)*	34.01	(689.12)

| + / − | ***** | ***** |

(horizontal bar graph: asterisks indicate value is too large)

+ + +   − − − − −

These cells display 3.45 and − 5.21.

| Percent | 3400.70% | − 68912.30% |

Date-1	03-Feb-00	*****
Date-2	03-Feb	*****
Date-3	Feb-00	*****

(In Date formats, the number indicates days since beginning of century [1 = 01-Jan-00]. Asterisks show that negative numbers are meaningless as dates.)

| Text | 34.007 | − 689.123 |

*(Numbers are displayed in General format. Formula **text** appears instead of value.)*

Notes:

1. Fixed, Scientific, Currency, *(Comma)*, Percent formats: You may specify any number of decimal places between 0 and 15. The examples above all show 2 decimal places.

2. In General format, 1-2-3 automatically displays very large and very small numbers in scientific format.

Label Alignments

Labels are aligned according to their label-prefix characters. You cannot assign a label format to a cell itself, only to its label entry.

Label-Prefix	Alignment
' *(apostrophe)*	The ' prefix left-aligns.
" *(double-quote)*	The " prefix right-aligns.
^ *(caret)*	The ^ prefix centers.
\ *(backslash)*	+ = + = + = + = + = + = + =

(entering \ + = creates a repeating label)

/Worksheet Global Label-Prefix: Sets global label-prefix, which 1-2-3 automatically adds to any label entered without a prefix.

/Range Label-Prefix: Changes the label-prefix for all labels in a range.

Long Labels: If a label is too long to fit in its cell, 1-2-3 left-aligns it and borrows space from empty cells to the right, in order to display as much of the label as possible.

Entry-Editing Keys

Value Mode and Label Mode

[Backspace]	Erase character preceding cursor
[Esc]	Erase entire entry
F2 [Edit]	Switch to Edit Mode
F9 [Calc]	Convert formula to its value
[Ctrl]-[Break]	Erase entire entry

Edit Mode

[Backspace]	Erase character preceding cursor
[Del]	Erase character at cursor
[Esc]	Erase entire entry
[Ctrl]-[Break]	Erase entire entry
F2 [Edit]	Return to Value or Label Mode
F9 [Calc]	Convert formula to its value
←	Move 1 character left
→	Move 1 character right
⟵	Move 5 characters left
⟶	Move 5 character right
[Home]	Move to first character
[End]	Move to last character

Date _____

File # _____

Dear Borrower:

Some of the information you returned to us was incomplete. We are unable to establish the amount of assistance you should receive until the following information is provided.

_____ Recertification Form for Family Composition. (Complete according to the attached instructions.)

_____ Request for Verification of Employment. (Complete according to the attached instructions.)

_____ Income Verification Form. (Sign, date, and include the name and address of your income source in the upper left hand corner.)

_____ Address for _____
(Verification was returned by Post Office).

_____ Confirmation of the income source circled on attached copy of your form. They have stated that you are not employed by them. Please check for the correct address or notify us if there has been a job change.

_____

_____

_____ Name and social security number of the person whose social security account pays benefits to your children:

Name _____ Social Security #_____

For (Child) _____ Social Security #_____

If you need additional space to answer any of the above requests, please use the back of this letter.

Your prompt attention to this matter would be greatly appreciated.

Very truly yours,

235 Department
Reserves Administration Department

LA 730 1/78

Indicating Cell Ranges

1. Type addresses of two opposite corner cells.

D5..F48   H1.A17   J97...A1

(use one or more "." characters to separate addresses)

2. Expand the cell pointer to cover the range.

—	Move 1 cell left
—	Move 1 cell right
←	Move 1 page left
→	Move 1 page right
[Home]	Move to upper left corner
[End] *arrow-key*	Move in indicated direction to boundary between empty block and non-empty block
[End] [Home]	Move to lower right corner of *active area*
F6 [Window]	(Split-screen only) Jump to current cell in other window
[Esc]	Unexpand pointer and return to *anchor cell*
[Backspace]	Unexpand pointer and return to *current cell*
[Period]	*If not anchored:* Anchor pointer on the cell *If anchored:* Shift *free cell* to next corner of range
[Ctrl]-[Break]	Cancel operation — return to Ready Mode

3. Use a range name that you have previously created.

* *In a formula:* Type a range name.

* *At a command prompt:* Type a range name *or* Press **F3** [Name] to display a menu of all range names, then select one.

Range names up to 15 characters long (uppercase and lowercase letters equivalent) are created, altered, and deleted with the /Range Name command. Do not create range names that are the same as cell addresses (e.g. C47). Avoid using spaces and arithmetic operator characters in range names.

Date _____

File # _____

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235 Department
Reserves Administration Department

LA 730 1/78

LOTUS 123

Quick Reference

IBM Personal
Computer
and
COMPAQ
Portable
Computer

MASON-McDUFFIE CO.

REALTORS ■ MORTGAGE BANKERS ■ INSURANCE ■ PROPERTY MANAGERS
2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

File # _____

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       _____

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       account pays benefits to your children:

       Name _____ Social Security # _____

       For (Child) _____ Social Security # _____

If you need additional space to answer any of the above requests, please
use the back of this letter.

Your prompt attention to this matter would be greatly appreciated.

Very truly yours,

235 Department
Reserves Administration Department

LA 730 1/78

IBM Personal Computer,®
IBM XT™, COMPAQ™ Computer,
100% IBM PC Compatibles

GETTING
STARTED

1 2 3 ™

LOTUS

Lotus Development Corporation
161 First Street
Cambridge, MA 02142

33100

MASON-McDUFFIE Investment Co.

MORTGAGE BANKERS
2129 Hacienda Way, Sacramento, California 95825
(916) 483-9521

Getting Started

This booklet contains important information and directions that you must follow before using 1-2-3 for the first time. Included are procedures for transferring the operating system and installing "drivers" onto the 1-2-3 diskettes.

Follow these instructions carefully before you first use 1-2-3 on your computer.

The procedures in this booklet have been excerpted from the "Getting Started" section at the beginning of the User's Manual.

Transferring DOS Programs

This procedure makes each of the 1-2-3 disks capable of starting your computer (also known as **bootstrapping** or **booting**). Follow these instructions carefully before you use 1-2-3 for the first time.

Two-Diskette System

Follow these instructions if your system has two diskette drives.

1. Take the Lotus disks—all five of them—from the sealed envelope in which they are shipped. (First, read the License Agreement printed on the envelope.)

Before starting your computer using the DOS disk supplied by IBM, you may wish to first consult the "DOS 1.10 and DOS 2.00" section on page 5 of this booklet.

2. Place the DOS disk in Drive A (on the left), close the door, then turn on electrical power. After a short time, during which the system tests itself, you will be prompted to enter the current date and time. Here's what you would type at 4:23 PM on June 16, 1983.

    Current date is Tue 1-01-1980:
    Enter new date: 6-16-83 ↵
    Current time is 0:00:07.68
    Enter new time: 16:23 ↵

NOTE. Use the ↵ key to end each entry. Separate the three parts of the date with hyphens. Separate the three parts of the time with colons. Both the minutes and seconds parts are optional.

The DOS command prompt appears:

    A>

(Perform step 3 only if your system has more than 320K of main memory and you are running DOS Revision 1.10.)

2

3. Make sure the DOS disk is in Drive A (on the left). You may wish to use a copy of the original DOS disk, since you will be changing two files on this disk.

Place the 1-2-3 Utility Disk in Drive B. Type the following command:

    B:FIXDOS ↵

This corrects errors in the DISKCOPY.COM and DISKCOMP.COM programs, which are used by the Lotus Access System's Disk Manager.

4. Remove the write-protect tab from the 1-2-3 System Disk. Then place the disk in Drive B (on the right) and close the door.

5. At the A> prompt, type the following command:

    B:INSTALL ↵

Do not type a space after the colon. A message appears, asking you to make sure the disks are loaded correctly. Do so, then press any key to continue. A message appears when the process is complete—it takes less than a minute.

6. Wait for the disk drive lights to go off, then remove the 1-2-3 System Disk from the drive and return it to its protective sleeve. (Don't bother to install a write-protect tab—the next step, "Installing Drivers", also writes new information on this disk.)

7. Repeat steps 4 through 6 for the other three diskettes in the 1-2-3 package:

    1-2-3 System Disk (backup copy)
    1-2-3 PrintGraph Disk
    1-2-3 Utility Disk

3

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8. Remove the DOS disk from Drive A and return it to its protective sleeve.

The 1-2-3 diskettes are now ready for the driver installation step, described on page 6 of this booklet.

Hard-Disk System

Follow these instructions if your system has a single diskette drive and a hard disk.

1. Take the Lotus disks—all five of them—from the sealed envelope in which they are shipped. (First, read the License Agreement printed on the envelope.)

2. Start your computer, entering the date and time. (For help, see step 2 in the preceding section.)

3. Make the hard disk the **default drive**. For instance, if the hard disk is Drive C, issue the following DOS command:

    C: ↵

4. Place the 1-2-3 System Disk in the diskette drive and close the door.

5. If you have previously transferred the DOS files to the 1-2-3 System Disk, issue the following commands at the DOS prompt:

    ERASE x:COMMAND.COM ↵

            (x = A,B,C, etc.—the diskette drive)

    ERASE x:FORMAT.COM ↵

    ERASE x:CHKDSK.COM ↵

    ERASE x:DISKCOPY.COM ↵

    ERASE x:DISKCOMP.COM ↵

6. Issue the following DOS command:

    COPY x:*.* ↵

        (x = A,B,C, etc.—the diskette drive)

7. Repeat steps 4 through 6 for these other diskettes in the 1-2-3 package:

    1-2-3 PrintGraph Disk

    1-2-3 Utility Disk

    1-2-3 Tutorial Disk (optional)

8. The following files also must reside on the hard disk. These files are used by the Lotus Access System's Disk Manager:

    FORMAT.COM   CHKDSK.COM

    DISKCOPY.COM   DISKCOMP.COM

If any of these files are not already on the hard disk, place the DOS disk in the diskette drive, then issue one or more COPY commands. For instance, the following command copies the FORMAT program from diskette drive A onto the hard disk:

    COPY A:FORMAT.COM ↵

(Perform step 9 only if your system has more than 320K of main memory and you are running DOS Revision 1.10.)

9. Place the 1-2-3 Utility Disk in the diskette drive. Type the following command:

    x:FIXDOS ↵

        (x = A,B,C, etc.—the diskette drive)

This corrects errors in the DISKCOPY.COM and DISKCOMP.COM programs, which are used by the Lotus Access System's Disk Manager.

The hard disk is now ready for the driver installation step (page 6 of this booklet).

You may use either Revision 1.10 or Revision 2.00 of the DOS operating system with 1-2-3. These two revisions of the operating system are not entirely compatible, however. For instance, the "external" command programs (e.g. FORMAT.COM) are not the same for DOS Revision 2.00 as for DOS Revision 1.10.

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For this reason, we recommend that you run 1-2-3 and the Lotus Access System only under the revision of the operating system that you install on the 1-2-3 disks (or on your hard disk). For instance, if you have copied DOS 2.00 files onto the 1-2-3 disks, don't execute 1-2-3 under DOS 1.10 control.

Upgrading From DOS 1.10 To DOS 2.00. If you intend to run 1-2-3 under DOS 2.00 but you have previously used DOS 1.10, you must perform the installation procedure described in this section again, using the DOS 2.00 diskette. This ensures that the Lotus Access System will have access to the proper DOS "external" command programs.

Installing 1-2-3 Drivers

In most cases, a personal computer is not a fixed, standardized set of equipment. Rather, it resembles a component stereo system — you can mix and match hardware components to suit your needs.

To accommodate 1-2-3 to your particular hardware setup, you must install on the 1-2-3 disks several small "satellite" programs, called drivers. A set of driver programs is provided on the 1-2-3 Utility Disk. Each driver is stored in a separate file. All driver filenames have the extension .DRV.

Which drivers should you install? You have just a few choices, which are detailed below. The procedure that follows includes instructions both for two-diskette systems and for hard-disk systems.

1. Make sure the computer is started and that you have the DOS A> command prompt. (Starting the system with the DOS disk is described in the previous section, "Transferring DOS Programs".)

2. Place the 1-2-3 Utility Disk in one of the diskette drives, which we will call the **source drive**.

The other diskette drive will be the **target drive**. The driver installation procedure copies the drivers from the disk in the source drive to the several disks that you place, one by one, in the target drive.

Hard Disk Installation: If your system has only a single diskette drive, you will be using the hard disk as the target drive.

3. Make the source drive the **default drive**. For instance, if you placed the Utility Disk in Drive A, issue the DOS command

    A: ↵

4. Issue a driver installation command, consisting of two words:

The first word must be one of the installation choices described below. The word you choose determines which set of drivers will be copied from the Utility Disk onto the other Lotus disks.

The second word specifies the target drive. This word must consist of a single letter (A, B, C, etc.), followed by a colon character (:). **Hard Disk Installation:** Specify the hard disk as the target drive.

Installation Choices
(In all cases, **x:** specifies the target drive.)

☐ If you have the monochrome IBM Personal Computer Display with the alphanumeric adapter (no graphics capability), issue the command:

    MONO x: ↵

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2129 Hacienda Way, Sacramento, California 95825
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□ If you have the monochrome IBM Personal
Computer Display with the Hercules
graphics card, issue the command:

    HERCULES x: ↵

□ If you have a graphics display with the
color/graphics adapter, issue the
command that describes your graphics
monitor:

    COLOR x: ↵ or B&W x: ↵

□ If you have a two-screen system—both a
monochrome display and a graphics dis-
play—issue the command:

    BOTH x: ↵

□ If you have a COMPAQ Portable Comput-
er, issue the command:

    COMPAQ x: ↵

Examples:

MONO B: ↵	MONO installation using Drive B as the target.
HERCULES C: ↵	HERCULES installation using Drive C as the target.
BOTH A: ↵	BOTH installation using Drive A as the target.

A series of messages will instruct you to place
the remaining Lotus disks, one by one, in
the target drive. Follow these directions care-
fully. After each disk has been processed,
replace its write-protect tab and put the disk
in its protective sleeve.

Hard Disk Installation: In the preceding sec-
tion, you were instructed to copy all the 1-2-3
programs to a single disk, the hard disk.
Thus, the drivers need be copied from the Util-
ity Disk only once. You will be prompted to
interrupt the driver installation procedure at
the appropriate time.

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2129 Hacienda Way, Sacramento, California 95825
(916) 483-9521

LOTUS 1-2-3

Update

1-2-3 runs under Revision 1.10 of DOS. Revisions 1.0 and 2.0 of DOS are not compatible with the 1-2-3 enclosed in this package.

This update to the *1-2-3 User's Manual* contains information that couldn't be included in the manual itself, due to our printing deadlines. We suggest that you read this information carefully, make notations on the appropriate pages of the manual, then file this *Update* at the back of the binder.

1. At the end of page 142 and in the "NOTES" section at the top of page 173, add:

There is no simple relationship between the amount of main memory a worksheet occupies (as reflected in the /Worksheet Status *Available Memory* statistic) and the size of its worksheet — .WKS — file (as created with /File Save).

2. On page 320, the last sentence of the paragraph numbered 7 should read:

For a .WKS to .DIF translation, use only worksheet files created with the /File Save command.

3. At the bottom of page 320, add:

Note. The VisiCalc functions @CHOOSE, @NOT, @OR, and @AND will not be translated as formulas. When it encounters one of these functions, Translate displays a "Formula error" message, reports the cell address, and translates the text of the VisiCalc formula as a label entry.

4. On page 317, before "Preparation of the Hard Disk", add:

Note. Some hard disks use procedures that can result in 1-2-3 incompatibility. In particular, do not attempt to install any non-IBM operating system on the 1-2-3 System Disk. For assistance with installation of 1-2-3 on hard-disk systems, call the Lotus Customer Support staff.

5. On page 299, before "Leaving GRAPH", add:

When printing several graphs at once, some printers experience a data-buffering problem, which results in a "Printer not ready" error. If you have this problem, call the Lotus Customer Support staff.

6. On page 245, at the end of the second paragraph, add:

If a data range includes values that vary widely (e.g. 10, 20, 30, 1000000, 2000000), bars representing the large values may not be displayed at all.

7. On page 292, replace the table at the top of the page with:

1 *Single density (120 x 72 dots per inch):* Epson MX-80, FX-80, or MX-100 Printer
2 *Double density (120 x 144 dots per inch):* Epson MX-80, FX-80, or MX-100 Printer; IBM Graphics Printer
3 *84 x 84 dots per inch:* Integral Data Systems Prism Printer or MicroPrism Printer
4 *Pen plotter:* Hewlett-Packard 7470A Plotter

8. At the bottom of page 220, add:

When the Criterion range includes a formula criterion (e.g. +CREDIT>575) and the first record in the database satisfies the criteria:

• 1-2-3 deletes the first record and replaces relevant cell addresses with *ERR* (e.g. +ERR>575).

• 1-2-3 stops — it does not delete any other records that satisfy the criteria.

In order to avoid this situation, make sure that the first record in the database (Input range) will not be deleted before you issue this command. One plan might be to install a "dummy" record at the beginning of the database that will never be deleted.

9. In Figure 57 on page 92:

Exchange the "Press [Esc]" and "Press [Backspace]" callouts. Exchange the "Back to anchor cell" and "Back to current cell" callouts.

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2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

File # _____

Dear Borrower:

Some of the information you returned to us was incomplete. We are unable to establish the amount of assistance you should receive until the following information is provided.

_____ Recertification Form for Family Composition (Orange). (Complete entire form.)

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Your prompt attention to this matter would be greatly appreciated.

Very truly yours,

235 Department
Reserves Administration Department

LA 730 rev. 5/78

LOTUS™

1-2-3™

User's Manual

For the IBM® Personal
Computer and the
COMPAQ™ Portable
Computer

20123-01

Date _____

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LA 730 rev. 5/78

Credits

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	Jonathan Sachs
Programmers:	Jonathan Sachs
	George Riner
	Peter Gabel
	Richard Ross
Tutorial & Help Facility:	John Posner
Manual:	John Posner
	Steven E. Miller
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Editorial Support:	Brian Stains

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Read This First

This section contains the information and instructions on what to do before you start using 1-2-3.® When you are finished with this section, please turn to the Introduction in the beginning of the manual to get an overview of how to use both the manual and 1-2-3.

What This Package Contains

Make sure the following items are all here. If anything is missing or damaged, immediately return the entire package to your dealer.

- 1 User's Manual.
- 1 plastic slip-on function key template.
- 1 Customer Assurance Plan containing a Warranty/Registration card and a Reorder card.
- 1 Quick Reference Booklet.
- Four (4) "floppy disks" labeled
  1. "1-2-3 System Disk"
  2. "1-2-3 System Disk (back-up copy)"
  3. "GRAPH Program Disk"
  4. "1-2-3 Tutorial Disk"

Hardware Requirements

To use 1-2-3 you must have a personal computer with at least 128 kilobytes of memory, two double-sided disk drives or one double-sided disk drive and a hard disk, a monochrome display monitor and/or an RGB color (or B&W) display monitor. Additional memory up to 544 kilobytes is supported. If printing is desired, a parallel or serial printer is required. Printers may be attached to parallel ports 0 or 1, or to serial ports 0 or 1. All standard baud rates between 110 and 19200 are supported.

Fill Out The Purchaser Registration Card

We doubt that anything will go wrong with the materials you have just purchased. But, just in case, Lotus provides a limited warranty and other services, which are described in the Customer Assurance Plan.

Please take a moment now to complete and mail the Purchaser Registration Card. You must return this card in order to receive the services described in the Customer Assurance Plan. In addition, returning the card will expedite any warranty claim.

MASON-McDUFFIE co.

REALTORS ▪ MORTGAGE BANKERS ▪ INSURANCE ▪ PROPERTY MANAGERS
2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

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Very truly yours,

235 Department
Reserves Administration Department

LA 730 rev. 5/78

Preparing Lotus Disks for Use

In order to work properly, a piece of the IBM Disk Operating System, or DOS, has to be transferred onto your disks. This just takes a minute, but must be done. If you have a hard-disk in your system, please first read the "Using 1-2-3 and GRAPH with a Hard Disk" appendix.

1. Put the disk labeled "DOS 1.10," that came with your Personal Computer into disk drive A.

2. Turn on the computer. Type in the date and time when asked, pressing ↵ [Enter] after each. Be sure to use dashes (-) in the date and colons (:) in the time. You will now see a prompt: A>.

3. One by one, take each of the four disks that came with this manual, remove the "write protect" tab from its side, and place it into disk drive B.

4. Type **B:INSTALL** (upper- or lowercase letters) and press ↵ . Wait for the computer to tell you when it is done.

If your computer has 320K or more memory, it will have trouble performing its own Disk-Copy or Disk compare programs. To correct this problem, you will have to do a little more to the 1-2-3 program disk itself (the other disks don't have to go through the following procedure):

5. Take the 1-2-3 program disk, remove the write-protect tab again, and place it in disk drive A. Type FIXDOS. Wait for the computer to tell you when it is done. Repeat this procedure for the System Backup disk.

6. Remove the disk and replace the write protect tab except on the 1-2-3 Tutorial Disk.

Your disks are now ready to use. For extra safety, use the Disk-Copy function of the Lotus Access System to make copies of the GRAPH Program Disk and the Tutorial Disk.

Preparing Data Disks

Before you create a worksheet you *must* have one or more **data disks** available so you can save your data. You can quickly prepare, or format, new disks to use as data disks with the **Prepare** function of the Lotus Access System (page 14).

1-2-3 Operating Assumptions

Out of the box, 1-2-3 makes certain assumptions about the type of equipment you are using, the way you ordinarily want your printed copy to look, and in which disk drive you will initially place the "data disk" you use to save or retrieve current files (the 1-2-3 System disk should usually be kept in disk drive A). Unless you tell 1-2-3 otherwise, it will, by default, use this assumed configuration:

Printer.

Left Margin: 5 (spaces, or characters, from left edge of paper. Printing begins in column 6.)

Right Margin: 75 (spaces, or characters, from left edge of paper)

Top Margin: 2 (lines from top of page)

Bottom Margin: 2 (lines from bottom of page)

Page-Length: 66 (lines from top to bottom edges of page)

Auto-Line Feed: No

Wait (after each page): No

Interface Card: Parallel

Setup (control code) String: none

Disk. B

(meaning all data files will be stored on a data disk located in drive B)

If this fits your needs, fine. But if you want to change any of 1-2-3's assumptions, you should do so the first time you use the System and Backup Disks. You will have to temporarily remove the "write protect" tab on the side of the disk, replacing it when you are done. The "Configuring 1-2-3" appendix explains how this is done.

Customer Assurance Plan

At the back of this manual is the Customer Assurance Plan. It contains information about the Lotus* warranty, our product upgrading and disk replacement policies, and two cards: the warranty/registration card and a product replacement card.

The Introduction, which follows, gives you an overview of how this manual is organized and the most efficient way for you to start using 1-2-3.

---

*1-2-3 and Lotus are trademarks of Lotus Development Corporation. Registration pending (U.S. and foreign trademark offices.)

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How to Start Using 1-2-3

1. Look over the **Read This First** section at the beginning of this manual. It describes the simple steps you must take before your 1-2-3 disks will work on your personal computer.

2. Next look at the "1-2-3 Electronic Tutorial" chapter on page 5. It shows you how to use 1-2-3's interactive on-screen Tutorial. The 1-2-3 Tutorial will allow you to quickly learn how to use 1-2-3 by guiding you through a series of step-by-step lessons in which it is impossible to make a mistake!

Even if you are an experienced computer user, we suggest you run through the Tutorial, perhaps using the special "speed typing" facility, after reading the "Note to Experienced Electronic Spreadsheet Users" appendix.

3. Once you finish the Tutorial, you're ready to start using 1-2-3 itself. "Starting Your System with the 1-2-3 System Disk," on page 12, provides a simple *how to*. If at any point you become confused or forget what to do next, just press the [Help] key: (function key F1) located at the top left corner of the keyboard. A helpful message appropriate to your situation will appear on the screen. Once in Help you can request information about other topics as well. And many Help screens have page references to allow you to consult this manual for more information.

How to Use This Manual

This manual is a reference tool, designed to be used in conjunction with the 1-2-3 Electronic Tutorial and the on-line Help facility. We recommend that you *not* try to read it all at one sitting. Instead, after running through the Tutorial, read those sections of particular interest to further acquaint yourself with the basics of 1-2-3. Then use 1-2-3 for a while, returning to the manual when you have specific questions.

If you have a particular problem or want to learn more about some aspect of 1-2-3, there are at least six ways to quickly find the page you want:

1. Skimming the **Table of Contents** is a good way to get a quick overview of what is covered by this manual, as well as where information is located.

2. The **Index**, at the back of the manual, provides a complete listing of page references for each topic.

3. The **Functional Index**, at the front of the regular Index, summarizes where to find information about common 1-2-3 operations.

4. The **Glossary**, is a listing of the most important words used with 1-2-3. Use it to look up any unfamiliar word you find in the manual.

5. Most **Help** screens contain page references to this manual.

6. The **1-2-3 Quick Reference** booklet provides both quick reminders and page references.

The bulk of this manual is a user's guide separated by dividers into several major sections:

The **Lotus Access System** chapter explains how to start 1-2-3 running on your computer, prepare new disks for use, copy data from one disk to another, and manage the storage files you will generate.

The World of 1-2-3 introduces you to the words, objects and concepts you will soon learn to use: the keyboard, the on-screen display, the parts of the worksheet, the computer and disk drives. This chapter also describes how to use the keyboard.

Basic Skills covers the general activities involved with 1-2-3, such as how to enter information into the worksheet, use menus, obtain help, and issue commands.

Each of the **Command Skills** chapters focuses on one of 1-2-3's commands. Following the narrative overview, most chapters have a series of command summaries describing: What It Does, When To Use It, How To Do It, and What Happens.

The **Appendices** include:

- How to tell 1-2-3 what kind of equipment you are using and what operating assumptions you want 1-2-3 to use each time you start a session ("configuring your system").

- An overview of 1-2-3's special "@ functions" that provide calculating shortcuts.

- A list of all 1-2-3 commands (the "command tree").

- How to use the GRAPH disk to print out copies of graphs you create with 1-2-3.

- How to convert your printer's special control codes into 1-2-3 setup strings.

- A list of error messages and how to correct the problem.

- Instructions on using a hard disk.

- How to translate files generated by other programs into 1-2-3 worksheet files, and back again.

- "A Note To Experienced Electronic Spreadsheet Users."

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Introduction

1-2-3* represents a new generation of desk-top computer programs. It combines the largest and most advanced electronic worksheet yet developed with state-of-the-art graphics and a complete information management capacity. Best of all, whether you are an experienced computer user or a beginner, learning to use it is as easy as...1-2-3!

If you are a beginner, you can quickly learn enough to start working with 1-2-3. As your skills increase, Lotus* 1-2-3's more sophisticated features will be waiting for your commands. If you are an advanced user, you will find it meets your most exacting requirements.

In some ways, 1-2-3 is an evolutionary advance, combining and improving upon the best of what is already available. In this sense, it brings together into one job what was previously split into several. Now you need only learn one program, one set of commands instead of half a dozen. But 1-2-3 also represents an important leap forward: its speed and flexibility allow you to combine its many functions to accomplish tasks previously beyond the power of a microcomputer. For example, 1-2-3 turns statistics into graphs so easily that graphing can be used as a thinking tool. You can play out your "what if" projections visually, instantaneously. It's as fast as...(what else?)...1-2-3!

Use 1-2-3, experiment with it, even play with it. You can start using it immediately, to solve simple problems and perform straightforward tasks. Then, as you grow more experienced, you'll find that 1-2-3 will keep up with you. As you find the need to use more subtle techniques and more sophisticated data processing functions, 1-2-3 will be there every step of the way. We're sure you'll find it has everything you would expect in a sophisticated business tool — and more.

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Typographical Conventions

We use a few simple typographical conventions in this manual:

* When a special term is introduced, it is printed in **boldface**. When a special term is used subsequently, it is often *italicized*.

* The icon ⊛ means "Caution." We use it to call your attention to the fact that making a mistake at this particular point could cause a significant data loss.

* We use the icon ★ to call your attention to other important points.

Throughout the manual, we show the names of 1-2-3 commands with initial letters in boldface, e.g. **/Worksheet Global Column-Width**. This is intended to remind you that you can issue 1-2-3 commands by typing the first letter of each command word. For instance, you can issue the command listed above by typing:

    / W G C

The 1-2-3 Electronic Tutorial

We think that 1-2-3 scores just as many points for ease-of-use as it does for computing-power. But with *any* new program, it is useful and encouraging to have a helping hand.

To meet this need, we have supplied you with an electronic teacher. **Tutor** is a program that knows the ins and outs of 1-2-3 *and* knows how to teach them.

Tutor is a watchful instructor. It (we've been unable to determine Tutor's gender) doesn't just suggest some exercises, then watch idly as you march off some cliff. Instead, Tutor sits beside you as you use 1-2-3, guiding you every step of the way.

Do I Really Need to Be Tutored?

We feel that there is something for everyone in these Tutor lessons. If you're an experienced spreadsheet user, you'll probably want to browse quickly through Lesson A, which introduces the spreadsheet concept to those unfamiliar with it. (By the way, in 1-2-3 it's called a "worksheet".) Don't skip Lessons B – D, though. They cover material that is unique to 1-2-3. In addition, these lessons cover areas in which 1-2-3's approach differs from that of other programs.

Lessons E and F introduce database management and graphing, two areas in which 1-2-3 has pioneered all-in-one integration with worksheet analysis.

A topic-by-topic outline of the Tutor lessons appears in the "Tutor Lessons" section at the end of this chapter.

Starting the Tutorial

Before starting, be sure you've prepared the Tutorial Disk according to the instructions in the "Read This First" section, which begins this manual.

Starting the 1-2-3 Electronic Tutorial is very simple:

If your computer is off. Place the 1-2-3 Tutorial disk in drive A, then turn on electrical power.

If your computer is on. Place the 1-2-3 Tutorial Disk in disk drive. Make sure the operating system prompt (**A >**) identifies the drive you choose.

Then, type:

    TUTOR
and press ↵ [Enter]

Note: Do not remove the 1-2-3 Tutorial Disk during a tutorial session!

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The Tutor Menu

Tutor begins by displaying a menu of lessons. To select a lesson from the menu, just press the appropriate letter. To end the Tutor session, press the [Esc] key.

Tutor returns to this menu whenever a lesson ends, either on its own or by your command.

How Tutor Works

A Tutor lesson looks like a 1-2-3 work session. That's because it *is* a 1-2-3 work session — not a simulation, not a demonstration. Tutor uses the lower right portion of the screen to display instructions, including the keys you should press.

Not only does Tutor tell you exactly what keys to press, it makes sure that you press them. If you press a wrong key at any time, Tutor simply *beeps* — you cannot proceed unless you do exactly as prompted (Exception: see "Speed Typing" below).

If you press the right key, Tutor passes it on to 1-2-3, and you see the effect immediately on the screen. This means that you must focus your attention in several places during a Tutor session:

The lower right part of the screen: To read Tutor's instructions and deride its feeble attempts at humor.

The keyboard: To press the right keys.

The top part of the screen: To view the effects of your keystrokes on 1-2-3. These effects show up both in the *worksheet* and in the *control panel* (see figure 4, page 21).

It may take a little while to get used to dividing your attention like this. Don't worry. Tutor is infinitely patient, and is more than happy to help you through the lessons as many times as you wish. (Unfortunately, it tells the same bad jokes every time.)

Speed Typing. One of the goals of the Tutor lessons is to have you get the feel of how 1-2-3 uses the keyboard. For that reason, we hope you'll go through the lessons keystroke by keystroke.

If, however, you want to pass quickly through the first few pages of a lesson, here's a convenient way to do it:

No matter what key Tutor is telling you to press, pressing the [Space-Bar] has the same effect as pressing that key.

Page by Page. Each lesson is divided into pages (screens). At the end of each page, Tutor prompts you to make a choice: Press [Space-Bar] to proceed to the next page, or [Esc] to end lesson:

- If you press the [Space-Bar] when Tutor displays this message at the bottom of the page, the lesson proceeds.

- If you press the [Esc] key, the lesson ends and the Tutor menu returns. [Esc] is in the upper left corner of the keyboard.

The Tutor Lessons

We present in this section an outline of the topics presented in each of the Tutor lessons. We don't expect you to know exactly what each topic means at this point — after all, that's what the lessons are for.

You'll find this section a useful reference as you learn 1-2-3 skills. For instance, if you've grown a bit "rusty" after a long layoff, you might use the outline to decide which lessons to review.

In many cases, you'll find the same topics listed more than once. Tutor repeatedly emphasizes and reinforces the aspects of 1-2-3 usage that are most important and most commonly used.

Lesson A: Getting Started

- The Keyboard: ↵ , [Esc], pointer-movement keys, [Backspace], [Del], [Caps Lock].
- The 1-2-3 Worksheet: window, cells, cell pointer, control panel, mode indicators.
- Moving the cell pointer
- Typing cell entries; numbers and labels
- Label alignments
- Fixing typing errors with [Backspace] and [Esc]
- Numeric formats, label formats, column-widths
- Formulas: entered by typing and by "pointing"
- Automatic recalculation of formulas
- Saving a worksheet with a 1-2-3 command

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Lesson B: The Loan-Analysis Worksheet I

* Formula recalculation
* Correcting entries: Edit Mode, [Backspace], [Del]
* Using the on-line Help facility
* Setting column-widths, individually and globally
* Formulas and "@ functions"
* Global numeric display formats; numeric formats for individual cells
* Saving and retrieving worksheets from disk storage

Lesson C: The Loan-Analysis Worksheet II

* Entering formulas: *Relative* and *absolute* cell addresses
* Making many copies at once with the /Copy command
* Copying formulas with the /Copy command
* Storing worksheets on disk

Lesson D: The Loan-Analysis Worksheet III

* Using the /Move command to transfer cell entries
* Using the /Worksheet Insert and Delete commands to add and eliminate rows
* Entering "repeating" labels
* Making copies of ranges (labels and formulas)
* Using the /Data Fill command to enter a series of numbers
* Using the @SUM function
* Titles and Split-Window (the /Worksheet Titles and /Worksheet Window commands)
* Building a table of results with the /Data Table command

Lesson E: Using a 1-2-3 Database

* Records, fields, and field names
* The [PgUp], [PgDn] and [End] keys
* The /Data Sort command; Primary and Secondary sort keys
* The /Print File command
* The /Data Query command:
  * Input range, Criterion range, Output range
  * Defining selection criteria: exact matches, approximate matches, numeric comparisons, compound conditions (AND, OR)
  * The Find and Extract operations

Lesson F: 1-2-3 Graphing

* Graph types: Bar, Stacked-Bar, Pie, Line, XY
* Data ranges; multiple ranges in one graph; resetting (cancelling) ranges
* Using the X-range as axis labels and pie-slice labels
* Titles and legends
* Printing graphs
* Graph names

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The Lotus Access System

As powerful as it is, 1-2-3 can't do the whole job alone. So, to keep things running smoothly for you, a number of additional programs are included on your disks, some provided by Lotus and others installed by you (see "Read This First").

But don't worry that you'll have to learn a whole bunch of different programs in order to get your work done. It is true that, in the past, many microcomputer systems suffered from this problem. And, in fact, the problem has not been fully licked yet — there still is no single computer program that addresses all your business, engineering, and mathematical needs and *also* takes care of the various "housekeeping chores" necessary to maintain a livable data processing environment.

But Lotus has taken a significant step forward. We have gathered the essential programs needed to support 1-2-3 usage under a single, easy-to-use umbrella — the **Lotus Access System**.

The Access System is like 1-2-3 itself in several ways:

* You select tasks to perform from a series of *menus* that both present all your options and provide a short explanation of each one.

* Every step of the way, you can press the **F1** [Help] key to get more detailed explanations.

* Procedures that erase data are protected with confirmation steps, to minimize the likelihood of accidentally doing something you'll later regret.

The net effect is that learning 1-2-3 skills also pays dividends in making the rest of the system easy to learn.

Access System Functions

Here is an outline of the essential functions you can perform using the Lotus Access System:

1-2-3 Functions

* Run 1-2-3 itself.

* Print the "graph files" created with 1-2-3 using the GRAPH Program disk.

* Translating files created by other programs into a form acceptable to 1-2-3, and back again.

Housekeeping Chores

* Perform disk-maintenance functions: preparing (formatting) new disks for use in the system, making and verifying copies, listing disk usage statistics.

* Perform file-maintenance functions: copying, renaming, and erasing individual files; displaying sorted lists of filenames.

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In the descriptions that follow, we will describe the functions performed by each program under the Access System umbrella. For the IBM-supplied programs, we won't attempt to duplicate the documentation provided in the IBM Manual "DOS — Disk Operating System" (#6024001). Instead, we'll refer you to the appropriate section in that manual.

Starting Your Computer with the System Disk

Before starting, be sure you've prepared the 1-2-3 System Disk according to the instructions in the "Read This First" section, which begins this manual.

When you turn the computer on with the 1-2-3 System disk or Backup disk in drive A (on the left), the computer automatically passes control to the Access System. First, though, it prompts you to enter the current date and time. If you have any trouble with these entries, see "How to Enter the Date and Time" in the "Starting DOS" chapter of IBM's DOS manual.

If you are already in DOS and the A> prompt is visible on the screen, you can reenter the Access System by typing **LOTUS**, in upper or lower case letters, and pressing ↵ [Enter].

(If you are already in DOS and wish to bypass the Access System to go directly to 1-2-3, type **123** and press ↵. This makes available a small additional amount of memory for the worksheet.)

The Access System menu screen appears.

NOTES

1. This startup procedure is stored on the Program and Backup disks in a file named AUTOEXEC.BAT. Don't alter or erase with this file unless you wish to change the startup procedure. (See "DOS Commands/Batch Processing" in the DOS manual.)

2. It *is* possible to bypass date and time entry, but we urge you to be conscientious in entering them each time the computer prompts you to do so. These entries allow DOS to "timestamp" all the data you store, a very valuable service. You'll quickly find that life becomes quite difficult if you can't determine when files were created.

3. Even after you start using the program you can get the computer to "start again from scratch" without turning the power off and on. Hold down both [Ctrl] and [Alt], then press [Del]. (The power-down-power-up method works, but you must leave the power off for at least five seconds and then wait for the system to self-test.)

Getting Help

Whenever you're at an Access System menu, you can press the **F1** [Help] key to interrupt the session and view one or more help screens. This Help facility works the same way as the 1-2-3 Help facility. (For details, see the "Using The Help Facility" chapter in this manual.)

The Access System Menu

Using the menus in the Access System is just like using 1-2-3 command menus. There are two ways to make a menu choice:

1. Use the pointer-movement keys on the right side of the keyboard to put the pointer (highlight) on your choice, then press ↵ [Enter].

2. Type the first letter of the menu choice.

To return to an earlier menu, select Quit.

(For details, see the "Using 1-2-3 Commands" chapter in this manual).

Selecting 1-2-3 and GRAPH

Three of the choices on the Access System main menu pass control to the main components of the 1-2-3 system: 1-2-3 itself, the GRAPH Program, and Translate.

123. Selecting **123** brings the 1-2-3 logo on screen. Press any key to erase the logo and then start using the program. (If you are in DOS and the A> prompt is visible, type **123** and press ↵ to bypass the Access System and directly enter 1-2-3.) To return to the place from which you entered 1-2-3, either the Access System or DOS, select the Quit command. The 1-2-3 program itself is stored in file "123.EXE". The Help screens for 1-2-3 are stored in file "123.HLP". Make sure not to erase or change these files.

Once 1-2-3 is active, do not remove the 1-2-3 System Disk from drive A unless the program specifically requests you do so.

GRAPH. This program is stored in file GRAPH.EXE on the GRAPH Program disk. When you make this choice, the Access System will prompt you to take out the 1-2-3 Program disk and place the GRAPH Program disk in drive A. (To return to the Access System menu *before* you change disks, press [Esc].) At the end of the GRAPH Program session, another prompt will remind you to replace the 1-2-3 Program disk in drive A.

Translate. This program allows you to transfer files between 1-2-3 and other programs. For more details see the "Transferring Files Between Programs" appendix.

Housekeeping Chores

Two other menu choices, **Disk-Mgr** and **File-Mgr**, give you access to the essential functions that maintain an orderly data processing environment.

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Date _____

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Disk-Mgr (Disk Manager)

There are four disk manager functions, each implemented as a separate IBM-provided program:

Menu Choice	IBM program	Purpose
Prepare	FORMAT.COM	Tests a new disk and prepares it for use as a "data disk." You cannot use a disk that has not been "formatted." (This has nothing to do with 1-2-3 "display formats.") Disks formatted this way are *not* "system" disks.
Disk-Copy	DISKCOPY.COM	Makes exact duplicates of an entire disk. The Access System restricts you to copying from drive A to drive B.
Compare	DISKCOMP.COM	Verify that two disks are exact duplicates. Typically, you use this function to verify the validity of a Disk-Copy.
Status	CHKDSK.COM	Checks the directory of files on a disk to make sure there are no inconsistencies (e.g., two different files lay claim to the same "sector" of data). Reports overall disk usage statistics.

File-Mgr (File Manager)

The File Manager is a program stored as a file named FILEMGR.COM, provided by Lotus. It gives you an easy-to-use way to handle individual files on your disks. When you select the File Manager, it has you choose a disk drive to use as a source for processing. (Don't worry — you can change in midstream.) Then, the File-Mgr menu appears above a list of all the files on the "source" disk.

Following are capsule descriptions of the File Manager functions.

Disk-Drive. Controls which disk drive will contain the source disk for all other File-Mgr functions. Place the disk containing the files you wish to process in the desired drive. Then select Disk-Drive and indicate the letter of the chosen drive. To change, place source disk in a different drive. Then reselect the command, indicating the new drive letter.

The other File Manager functions all process files on the source disk. (See "Selecting Files," below, for how to indicate which files you wish to use).

Copy. Copies files from the source disk to another disk. The newly-created files always have the same names as the originals.

Erase. Erases files on the source disk.

Rename. Assigns new names to files on the current disk.

Archive. Creates a second copy of files on the current disk under new names.

Sort. Rearranges the displayed list of filenames, but does not affect the disk files themselves. This function is very similar to 1-2-3's /Data Sort command (page 215). You can sort the lines of filenames, in ascending or descending order, according to the data in any one or two of the four columns.

A submenu allows you to indicate the column that will be used as the primary basis for the re-ordering. This is the Primary-key. The optional Secondary-key is used to break ties in case two lines have the same primary-key entry. Go triggers the sort. You can resort the list as many times, in as many ways, as you wish.

Selecting Files

The Copy, Rename, and Erase functions all process a set of files on the current disk. The process of selecting sets of files is something unique to the Access System's File Manager: 1-2-3 itself never processes more than one file at a time. You indicate the files you want processed by:

1. Selecting a Command: Copy, Erase, or Archive. An indicator will appear in the upper right corner to remind you which command you are using.

2. Moving the "pointer" up and down the list of filenames with the pointer-movement keys:

↑ [Up]	Up one line	↓ [Dn]	Down one line
[PgUp]	Up one screenful	[PgDn]	Down one screenful
[Home]	First entry	[End]	Last entry

3. Each time the pointer highlights a file you desire to have processed, **mark** it by pressing the [Space-Bar]. The mark looks like this >>. Pressing the [Space-Bar] a second time removes the mark. Pressing [Esc] removes all the marks from the list and returns you to the File-Mgr menu.

4. When you have selected as many files as you wish, press ↵ to end the selection process and proceed to the next step of the File Manager function.

Special case: If you wish to select a single file, you may skip step 3. Just move the pointer to the file you desire and press ↵ .

Date _____

File # _____

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The Keyboard

The keyboard includes four major parts (figure 2).
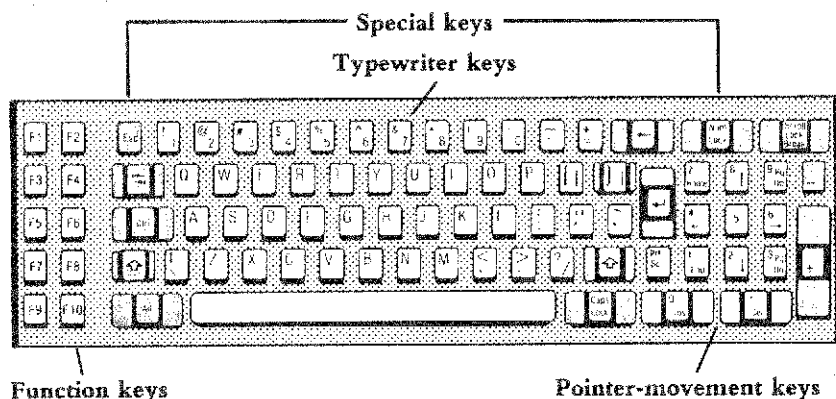
Figure 2. The Keyboard

Typewriter Section. The typewriter section acts just like a typewriter. The letter keys are in their usual places. Holding the Û [Shift] key down and then pressing a letter key gives you a capital letter. (In many 1-2-3 situations, upper- and lowercase letters are equivalent.) Pressing Û and then a number or punctuation key gives you the upper symbol pictured on the key.

Instead of a shift lock, there is a [Caps Lock] key which affects only the letters — you still have to use the Û to get the upper symbols on non-letter keys. When [Caps Lock] is "on," pressing the Û and a letter gives you a lower case letter.

You will usually use the typewriter keys to enter numbers.

Another kind of shift function is performed by the [Alt] key. If you find yourself repeating the same sequence of keystrokes over and over, you can "name" that sequence with a letter. Then, if you hold [Alt] and press that letter, the entire series will be entered automatically (see "Keyboard Macros: The Typing Alternative").

As with a typewriter, there is also a tab key ⇥. In many situations, pressing it moves you to the right. (The exact action depends on the context.) Holding down Û and then pressing ⇥ gives you a ⇤ [BackTab] and moves you to the left.

Pointer-Movement Keys. In several situations, you use the pointer-movement keys on the right side of the keyboard to direct 1-2-3's attention: to a particular cell in the worksheet, to a particular menu choice, etc. (see the "Moving Around the Worksheet" chapter).

If you want, you can turn the pointer-movement keypad into a "numeric keypad" by pressing the [Num Lock] key. Now the numeric keypad will give you numbers, exactly as if you had used the top row of the typewriter keypad.

The Û key works also with the pointer-movement keypad. With [Num Lock] off, you can use Û with these keys to produce numbers. With [Num Lock] on, you have to use Û to have access to their pointer-movement abilities. Pressing [Num Lock] repeatedly turns it on and off. 1-2-3 displays an indicator at the bottom of the screen to let you know the current status. You will usually find it most convenient to leave the pointer-movement keypad alone and enter numbers with the typewriter keys.

As with some electric typewriters, holding a key down will cause it to repeat.

But there are some differences.

- You cannot use the lowercase letter (l) as a substitute for the number one (1): the computer knows the difference.

- Addition, subtraction and multiplication signs can be entered using either the typewriter section or the dark-shaded keys surrounding the pointer-movement keypad. But a division sign can only be entered from the typewriter section. Notice that the sign used for multiplication is an asterisk (*) rather than an "×" and the sign for division is a slash (/) rather than a "÷".

Function Keys. F1 through F10 perform specific 1-2-3 operations. These keys are described where appropriate throughout the manual. Place the plastic "template" over the function keys to help remind you which key does what.

Special Keys. We have already introduced several of the "special keys" that appear on your Personal Computer keyboard, but not on the standard typewriter keyboard:

Û [Shift]	Changes the meaning of the typewriter section and the pointer-movement keys.
[Alt]	Changes the meaning of letter keys, invoking keystroke sequences you have assigned to these keys.
[Num Lock]	Changes the meaning of the pointer-movement keys.
⇥ [Tab]	Perform rightward-movement and leftward-movement functions.

There are several other special keys that we haven't introduced as yet:

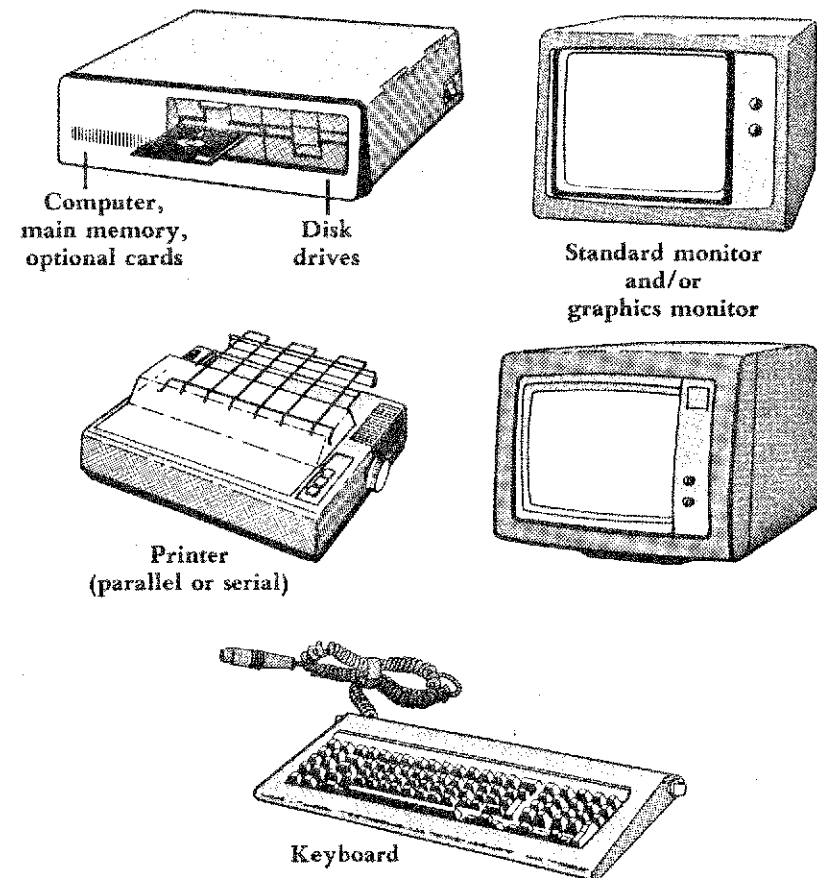|	
[Backspace]	In typing situations, means "erase the last character I typed." In pointing situations, means "go back to where I started from."
[Del]	In typing situations, means "erase the character I'm pointing at."
[PrtSc]	("Print Screen") when used with Û, makes an exact printed copy of what is currently on the display screen.

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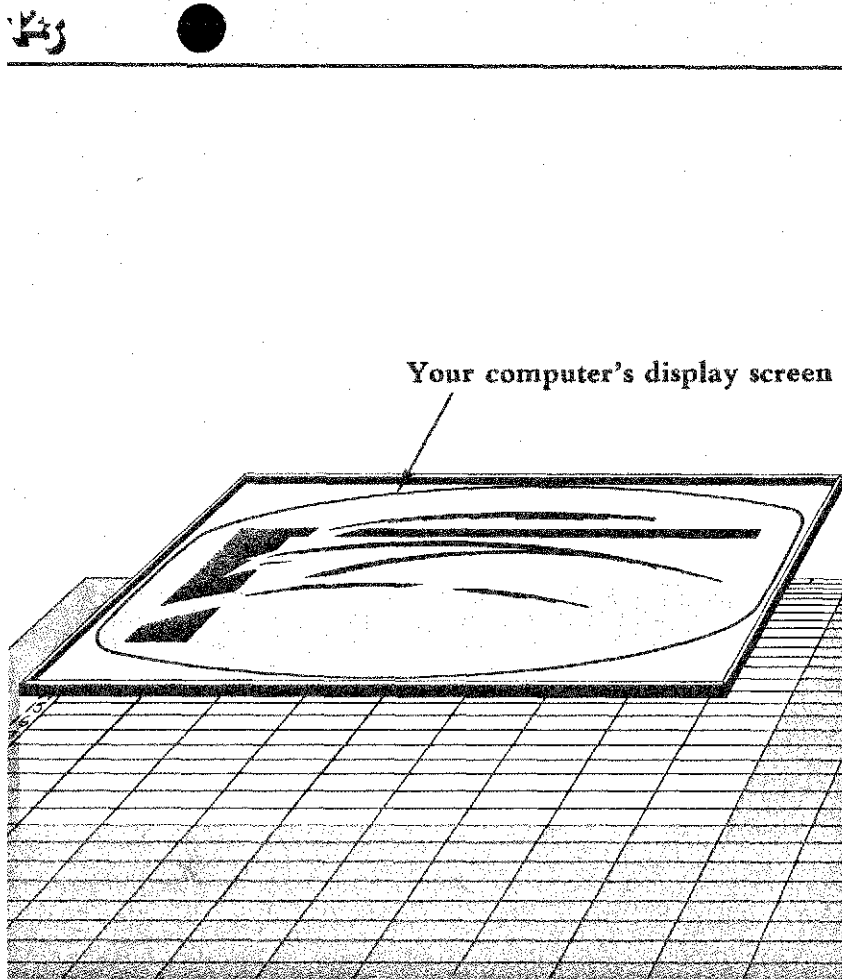Name _____ Social Security # _____

For (Child) _____ Social Security # _____

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Very truly yours,

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We've saved two other special keys for last, since they are very important for 1-2-3 users:

↵ **[Enter]. The** ↵ key performs a function similar to that of the "carriage return" key on electric typewriters and on many other computers. Pressing ↵ tells 1-2-3 "I'm finished, now Go!" You use it when you have finished typing an entry, when you have moved the electronic "menu pointer" to your choice, etc.

[Esc]. The [Esc] key is the opposite of ↵ . It tells 1-2-3 to "go back a step." The exact meaning of this depends on what you're doing with the program at the moment (see the "Typing Cell Entries" and "Using Commands" chapters).
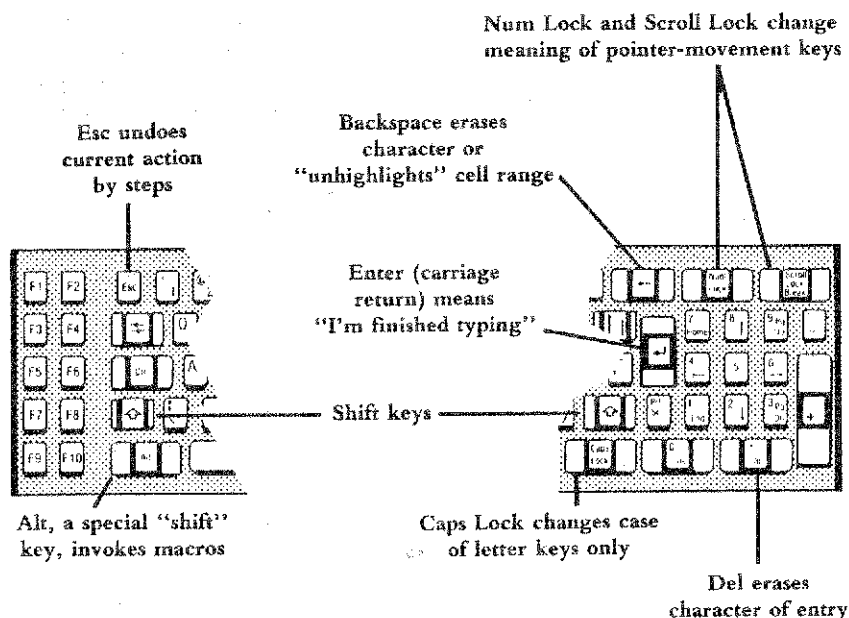
Figure 3. Special Keys

The Display Screen

The 1-2-3 on-screen display typically has three parts (see figure 4). At the top is the "Control Panel." Most of the rest of the screen is usually taken up by a section of the worksheet. Separating the two is a "border" showing the column letters and row numbers of the section of the worksheet you are viewing.

Parts of the screen appear in "reverse video." The most important of these is the "cell pointer." The upper right corner of the screen tells you the "Mode" you are in. The lower right corner contains Indicators letting you know if the [Num Lock], [Scroll Lock], [Caps Lock],or other special keys have been pushed "on." And the lower left corner shows Error Messages when appropriate (see page 305).
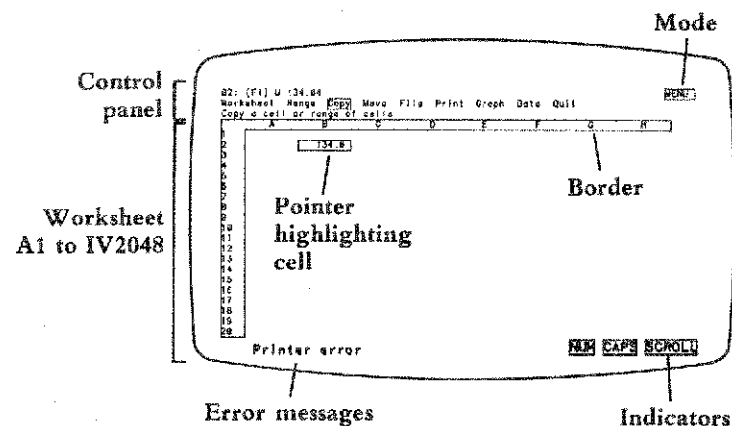
Figure 4. The Display Screen

The Border Area

The horizontal border area contains letters identifying each column. It starts with A through Z, continues with AA through AZ, then BA through BZ, and so on up to IV for a total of 256 columns. The vertical border on the left side contains row numbers 1 through 2048. No matter where you are in the worksheet, the border will show the appropriate column letters and row numbers.

The Worksheet

Think of the worksheet as a piece of ruled paper spread out on your desk ready for your entries. Each entry you type is placed in a "cell," each with its own "address" such as (A23), describing its column and row location. But this is a huge piece of paper: If each cell in the worksheet were 1/4 inch high and 1 inch wide, the entire worksheet would be more than 21 feet wide and twice as high!

Since the entire worksheet is too large to fit on your monitor screen, 1-2-3 displays only a section of it at a time. Think of it as looking through a "window" on to a small portion of a landscape. However, you can move this window to show any scene you wish to see (figure 5).
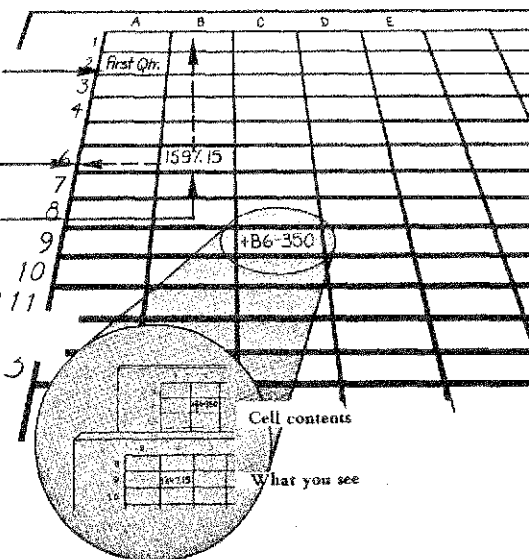
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The World of 1-2-3

1-2-3 turns your computer's memory into a giant "worksheet." The worksheet is similar to a financial ledger sheet — it's ruled into rows and columns. Each of the spaces in the worksheet (called "cells") can store a piece of information: a number, letters, words, or an instruction to calculate a value.

This chapter introduces your computer system and 1-2-3 itself. We've organized it around what you can see — the physical equipment ("hardware") that makes up your personal computer (see figure 1). Your personal computer manual explains how to set up your system hardware.

Computer,
main memory,   Disk
optional cards   drives   Standard monitor
                                                      and/or
                                                graphics monitor

Printer
(parallel or serial)

Keyboard

Figure 1.   System Hardware

17

Date _____

File # _____

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Your computer's display screen

The display screen acts as a "window" that provides a view of a portion of the worksheet.

Figure 5. The Window

Ranges. You will often want to deal with a particular group of cells. One or more cells that form a rectangular block is called a range (see the "Indicating Cell Ranges" chapter).

A "range" is a group of one or more cells arranged in a rectangle.

A single cell is the smallest possible range.

A range may be part of a single column or row.

This is a range that spans several rows and columns.

You can assign a name to a range, or refer to it using cell addresses

"A12...B13"

or

"DEPOSITS"
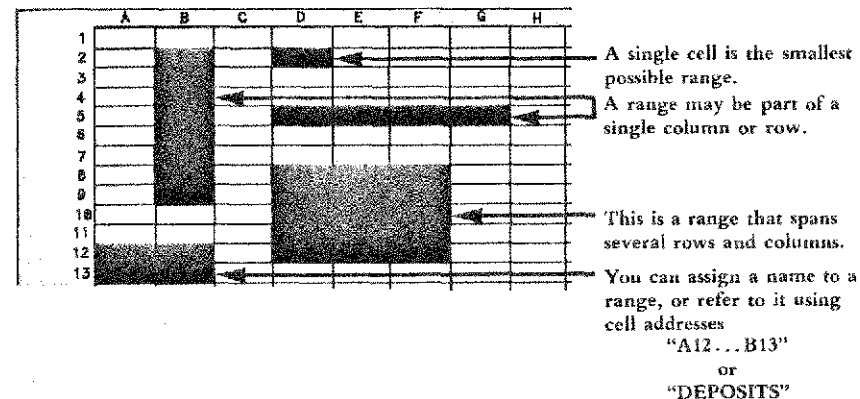
Figure 6. Ranges

Formulas. You can enter a label, number, or formula into any cell. A formula is an instruction for 1-2-3 to calculate a number. And, although 1-2-3 stores the formula in the cell, usually only the current *numeric value* of that formula is displayed on the screen (figure 7).

A label is a string of characters for 1-2-3 to display. Although it doesn't appear on screen, labels actually start with a positioning prefix (see page 46)

Cell address: the column letter and row number of the cell (i.e. B6)

A number can be used in calculations

A formula is an instruction for 1-2-3 to calculate a number. Usually, although the formula is the actual contents of the cell, only the resulting number is displayed on screen.

Cell contents

What you see

Figure 7. Cell Entries

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Display Formats. 1-2-3 lets you change how each cell appears on screen, its "format," without changing its contents (see page 131). The appearance of a cell's contents is also affected by the column width you choose. As a further option, 1-2-3 lets you "protect" cells so that their contents can not be accidently altered by subsequent users (figure 8).

Initially, all cells in the worksheet have fences,
but protection "power" is disabled.
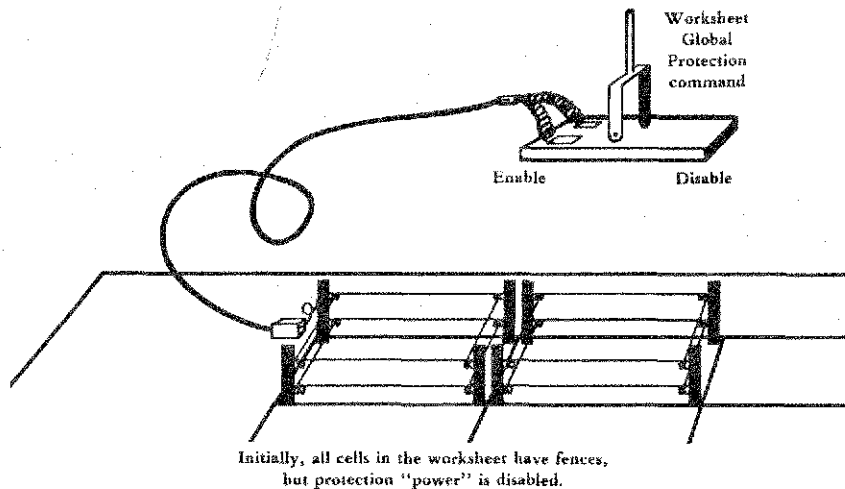
Figure 8.   Protection Fences

Windows. What if you want to see two parts of the worksheet at the same time, or one part using two different display formats? 1-2-3 can do this with its "split screen" capability. It's as if two TV cameras were pointing at the same worksheet and sending their images to two separate monitor screens (figure 9).

You see it all on one screen, which you can split into vertical or horizontal "windows". You can put a different format "lens" on each camera so that the windows have different appearances. Additionally, the cameras can be locked together to scan across the worksheet in a synchronized manner, or can remain unlocked (unsynchronized) so they turn independently.

But no matter what part of the worksheet is visible in each window, entering data through either window affects the underlying worksheets cell contents and will therefore show up in both windows.
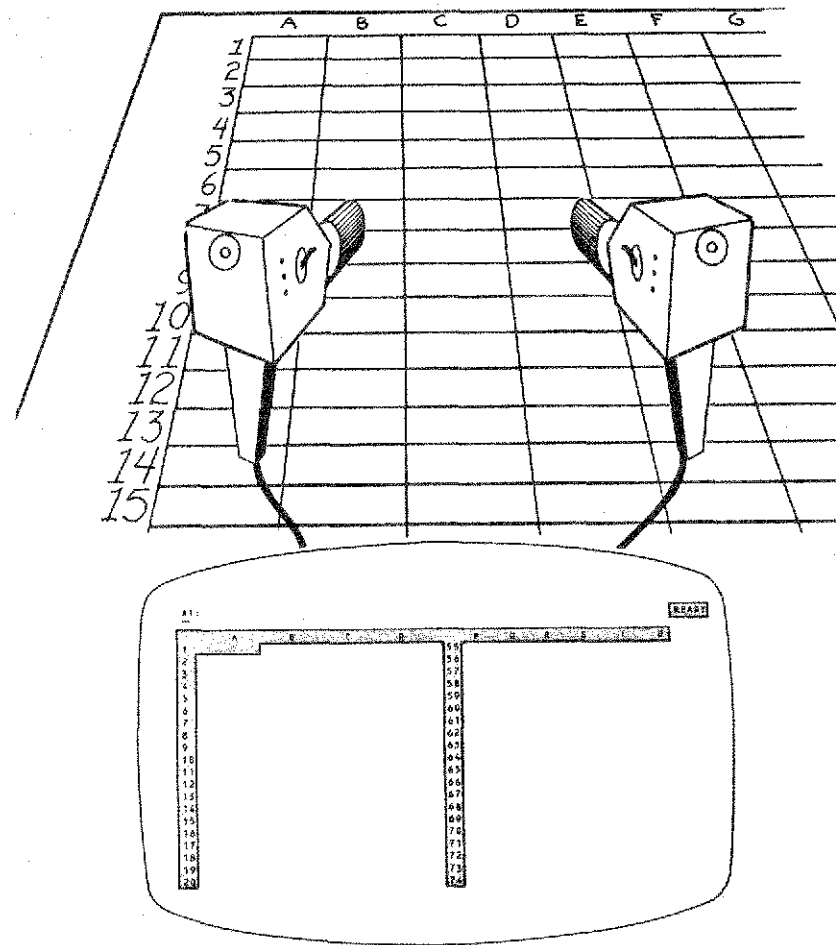
Figure 9.   Split Screen

The Control Panel

The Control Panel has three lines (figure 10). The first line contains information about the location ("address"), display format (page 130), protection status (page 142), and contents of the "current cell": the cell currently highlighted. At the far right of the first line is the Mode indicator.

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The second line displays one of three things: the characters of your entries as you type and edit them; menu items; or "prompts" asking for additional command specifications.

1-2-3 uses the third line to display "quick summaries" while you are selecting a command to perform. As you move the menu pointer among the various command words before selecting one of them, 1-2-3 changes the third line so that its information always refers to the currently highlighted word.
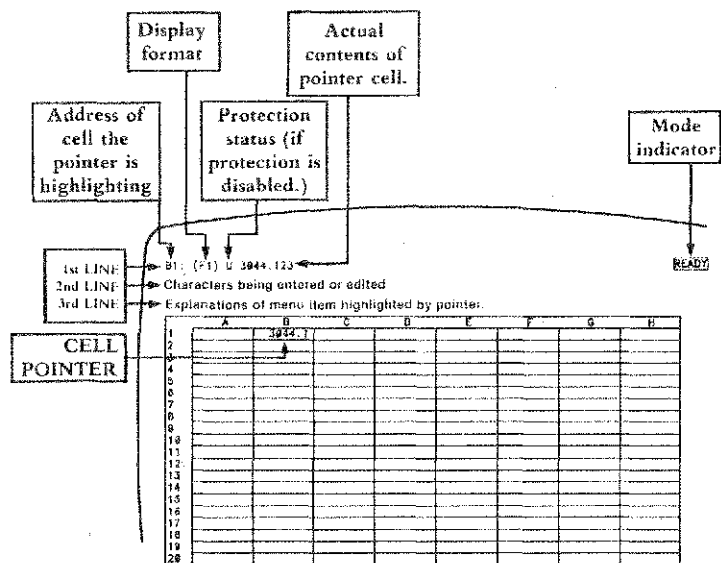
Figure 10.   The Control Panel

The Graphics Monitor

If your system only has a graphics monitor (B&W or RGB color), 1-2-3 uses it to display both worksheets and graphs. If you are using two monitors, the worksheet appears on the non-graphics (monochrome) screen and graphs on the graphics monitor. This allows you to view graphs and the data that generates them simultaneously.

If you are only using a non-graphics monitor, 1-2-3 cannot draw graphs on the screen, although you will still be able to get printed copies using the GRAPH Program disk.

The Printer

There are many good-quality printers available for use with the personal computer. Lotus Development Corporation does not endorse any one printer. Instead, we've equipped 1-2-3 and its companion program, GRAPH (see Appendix), with the ability to run many different types of character and graphics printers.

Your personal computer sales representative can give you a complete list of printers supported by 1-2-3.

What kind of printouts can you get? By itself, 1-2-3 can use a character printer to produce a copy of:

* Part or all of the electronic worksheet,

* A cell-by-cell listing of the entries stored in any part of the worksheet, or the entire worksheet.

You can create a printout at any time during a 1-2-3 session. Alternatively, you can store the information to be printed in a "Print file," to be printed later using DOS's "[Ctrl]-[PrtSc]" facility (see the DOS manual).

Using the GRAPH Program disk and a graphics printer you can produce a printout of:

* Any graph that you've drawn on the graphics display screen with 1-2-3. In fact, you can print a graph even if you don't have a graphics monitor on which to display it. You use 1-2-3 to "define" the graph, store the definition in a "picture file," then use the GRAPH Program to produce the printout.

Main Memory and Disk Storage

The "current" worksheet, the one displayed on the monitor screen, only really exists in the computer's main memory. This is a temporary storage place. If you turn off your computer, have a power failure, or exit 1-2-3 without saving the worksheet, it will be lost. To make a permanent record of your worksheet, you *must* save it in a "disk file." To once again make it the "current" worksheet in main memory, you retrieve it from the data disk (the data disk usually goes in drive B while the 1-2-3 and GRAPH Programs disks are kept in drive A). Think of the disk as a file cabinet and each file as a folder containing your papers. You pull the file out and lay it on your desk when you want to make entries, close it up and return it to the cabinet when you're done. The major difference when using 1-2-3 is that when you retrieve a file you are actually pulling out an *exact copy* of the file. The original stays safely on the disk, where it can be later retrieved again, or replaced with your updated worksheet.

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Contents

The Printer

There are many good-quality printers available for use with the personal computer. Lotus Development Corporation does not endorse any one printer. Instead, we've equipped 1-2-3 and its companion program, GRAPH (see Appendix), with the ability to run many different types of character and graphics printers.

Your personal computer sales representative can give you a complete list of printers supported by 1-2-3.

What kind of printouts can you get? By itself, 1-2-3 can use a character printer to produce a copy of:

* Part or all of the electronic worksheet,
* A cell-by-cell listing of the entries stored in any part of the worksheet, or the entire worksheet.

You can create a printout at any time during a 1-2-3 session. Alternatively, you can store the information to be printed in a "Print file," to be printed later using DOS's "[Ctrl]-[PrtSc]" facility (see the DOS manual).

Using the GRAPH Program disk and a graphics printer you can produce a printout of:

* Any graph that you've drawn on the graphics display screen with 1-2-3. In fact, you can print a graph even if you don't have a graphics monitor on which to display it. You use 1-2-3 to "define" the graph, store the definition in a "picture file," then use the GRAPH Program to produce the printout.

Main Memory and Disk Storage

The "current" worksheet, the one displayed on the monitor screen, only really exists in the computer's main memory. This is a temporary storage place. If you turn off your computer, have a power failure, or exit 1-2-3 without saving the worksheet, it will be lost. To make a permanent record of your worksheet, you *must* save it in a "disk file." To once again make it the "current" worksheet in main memory, you retrieve it from the data disk (the data disk usually goes in drive B while the 1-2-3 and GRAPH Programs disks are kept in drive A). Think of the disk as a file cabinet and each file as a folder containing your papers. You pull the file out and lay it on your desk when you want to make entries, close it up and return it to the cabinet when you're done. The major difference when using 1-2-3 is that when you retrieve a file you are actually pulling out an *exact copy* of the file. The original stays safely on the disk, where it can be later retrieved again, or replaced with your updated worksheet.

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Saving a worksheet is a vital part of your work with 1-2-3. You probably should do it several times while you are *still creating* the worksheet to avoid the loss of data that occurs because of human error, power failures, or other mishaps.

To protect yourself against a disk being damaged, lost, or simply wearing out, it is extremely important to make at least one extra copy of every disk you use. This can be done with the Disk-Manager and File-Manager programs in the Lotus Access System. To be *really* safe make extra copies of all important files and store them in a secure place, perhaps a fireproof safe, far away from the rest of your disk library.

This was just a brief overview of The World of 1-2-3. If you have more questions, please explore the multiple methods of finding information in this manual.

Using the HELP Facility

The 1-2-3 Help facility is a reference manual that's always open to the right page. At virtually any time while using 1-2-3, you can press the **F1** [Help] key — between commands, in the middle of typing a command or entry, whenever you need it. After getting help, the session continues exactly where you left off.

When you press [Help], 1-2-3 temporarily suspends the session, remembering exactly where you are. It clears the worksheet from the display screen, but leaves the control panel as a reminder of where you paused. Then it displays a screenful of information tailored to your current situation.

The Help screens are inter-connected and cross-referenced. Each Help screen includes a menu of further-help topics, usually at the bottom of the screen. You can get further help on any or all of these topics before returning to the worksheet. Some of the Help facility's features make it particularly useful:

* Most 1-2-3 commands involve several steps. Each step has its own Help screen, which includes the further-help topic "Next Step."

* At each Help screen, you can go to the "Help Index," which provides access to the entire set of Help screens (more than 200 in all).

* Many Help screens list pages in this manual where you can find further information on the topics. The page numbers appear in the upper right corner of the screens.

Getting Further Help

When 1-2-3 is displaying a Help screen, it displays a *HELP* indicator in the upper right corner of the control panel. Once in this **Help Mode**, you can either return to the worksheet or continue getting help.

To Get Further Help. Use the pointer-movement keys to highlight the Help topic of your choice. The topics are connected together both left-right and up-down. Press ↵ [Enter] to display the Help screen for the topic you selected.

To View Previous Help Screens Again. Press [Backspace] one or more times; 1-2-3 remembers up to 15 previous screens. But you can't use [Backspace] to retrieve a Help screen you viewed during a prior Help pause.

To Return to the Worksheet

Press [Esc]. 1-2-3 redisplays the worksheet and lets you continue exactly where you left off.

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Moving Around the Worksheet

The 1-2-3 worksheet is a collection of **cells**, organized into rows and columns. Each cell can store a single piece of information — number, formula, or label. The computer's display screen is a **window** into the worksheet. At any particular moment, you can see part of the worksheet, but not all of it.

A reverse-video bar always highlights one of the cells in the window, indicating which cell is the **current cell** — the current focus of 1-2-3's attention. Using this bar — called the **cell pointer** — is probably the most important new skill to master in learning to use 1-2-3 (figure 11).
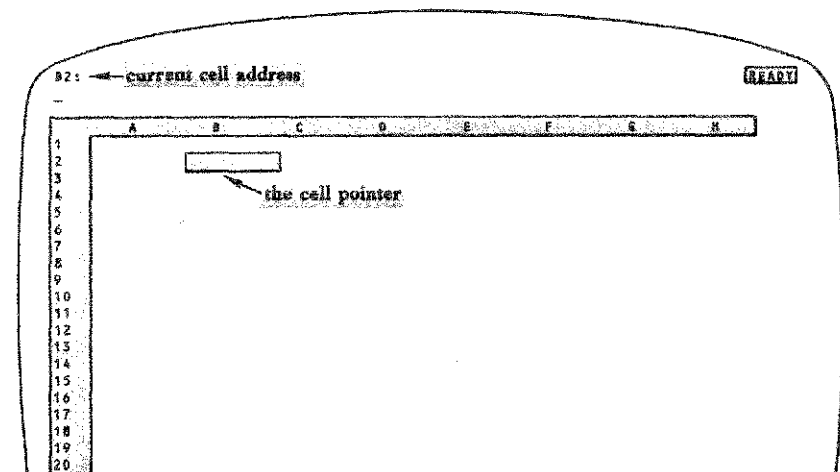
Figure 11. The Current Cell and Cell Pointer

That's because you typically fill in the worksheet by repeatedly performing the following actions:

1. Move the cell pointer to a particular cell.

2. Type an entry or issue a command that affects the cell.

As so often happens, the above description doesn't tell the whole story. Many 1-2-3 commands process an entire group of cells — called a **range** — all at once. In such situations, you can indicate the range by expanding the cell pointer to highlight all the cells at once. For the time being, we'll concentrate on mastering the art of pointing to a single cell. ("Expanding the Cell Pointer" is described in the "Indicating Cell Ranges" chapter.)

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Moving One Cell at a Time

You can use the arrow keys on the pointer-movement keypad to move the cell pointer one cell at a time (figure 12). The keyboard's *auto-repeat* feature works nicely with these keys. Give it a try by holding one of the arrow keys down for a few seconds.
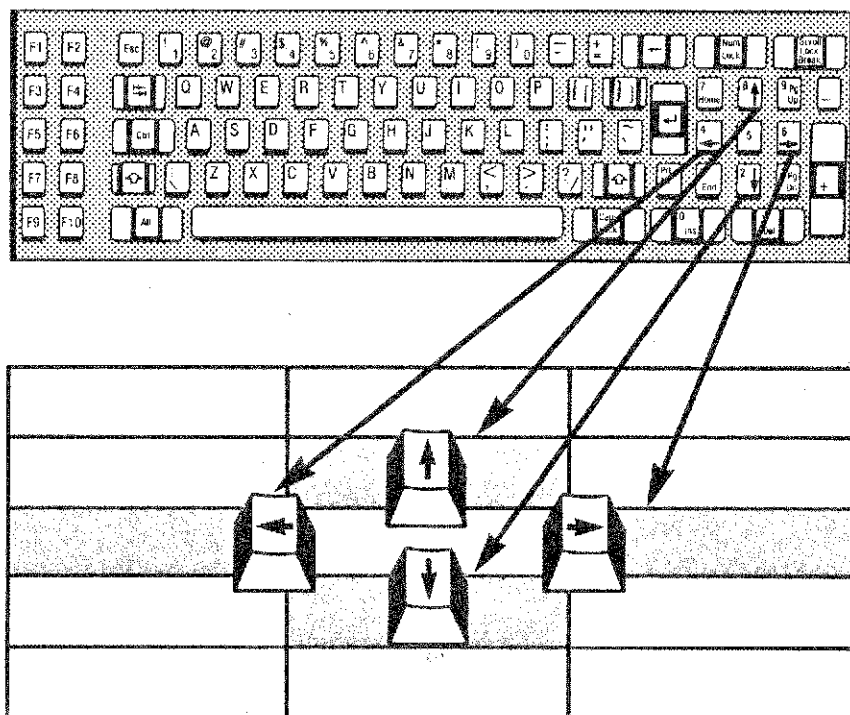
Figure 12.   Using the Arrow Keys

Note. Be sure that the keyboard's *number lock* facility is turned off before you use the arrow keys. If the [Num Lock] key has been pressed, a *NUM* indicator appears in the lower right corner of the screen. We strongly advise that you leave the number lock off when using 1-2-3. We feel that the advantage of using the numeric keypad to enter numbers is greatly outweighed by the confusion caused when you forget that these keys won't move the cell pointer.

Don't worry about the edges of the display screen. If you try to move the cell pointer off the worksheet (e.g. above row 1), the program simply beeps at you, to
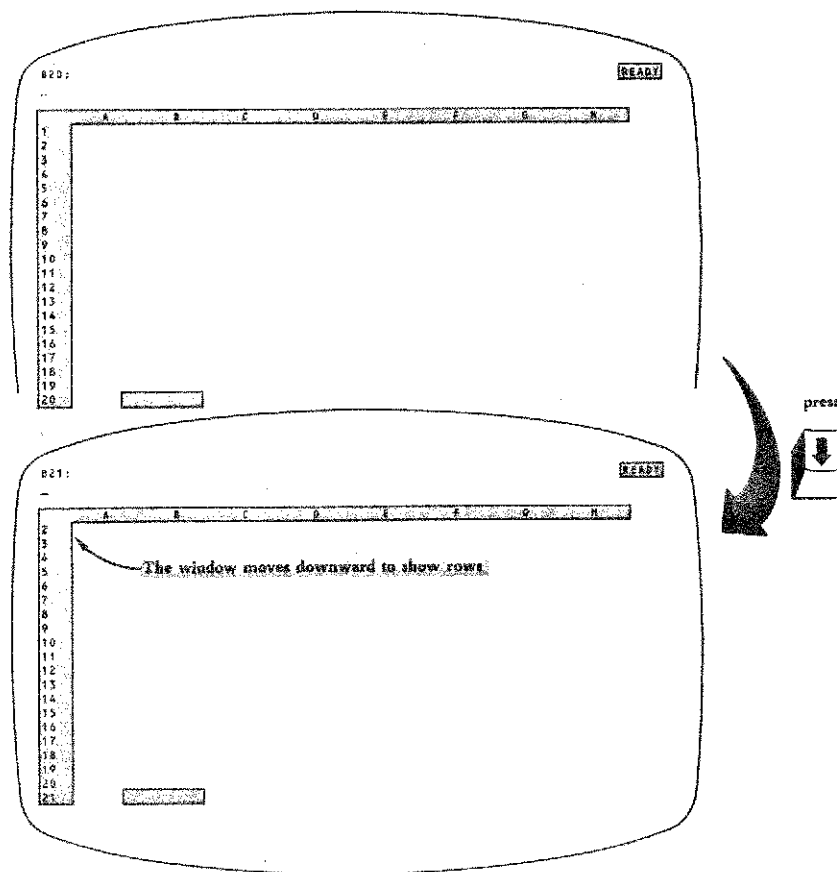
Figure 13.   Scrolling the Window

say "you can't do that." On the other hand, you *can* move the pointer downward if you're at row 20 (figure 13).

1-2-3 automatically adjusts the window downward so that the cell pointer remains onscreen. You can never make the cell pointer disappear — whenever the cell pointer moves in a way that would take it "over the edge," 1-2-3 automatically adjusts the window. In particular, when you make the pointer "push against the side of the window," the window moves.

It's also possible to do the opposite — move the window with the arrow keys, pulling the cell pointer along with it. (See "The Scroll Lock Facility," later in this chapter.)

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Direct to the Destination

Moving one cell at a time is easy, but it's not the fastest way to move the cell pointer a long distance. You can move the cell pointer to any cell "in a single bound" just by pressing the **F5** [GoTo] key and entering its address (figure 14).
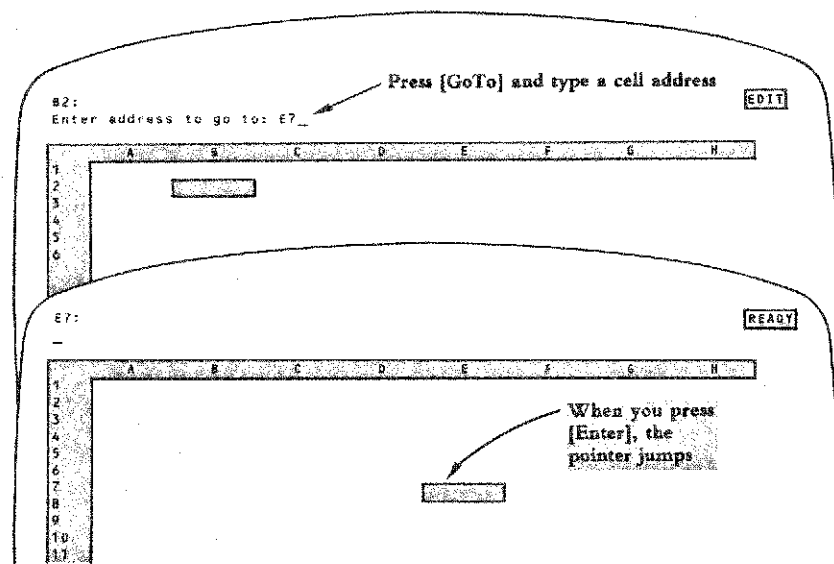
Figure 14. Using the [GoTo] Key

If your destination is offscreen, 1-2-3 automatically adjusts the window to place your destination cell in the upper left corner of the screen. You can specify a *range name* instead of a cell address in a [GoTo] operation (see the "Range Commands" chapter). 1-2-3 "goes to" the cell in the upper left corner of the range.

The [Home] Key. The [Home] key is actually a special type of [GoTo] operation. When you press this key in Ready Mode, the cell pointer returns to the cell in the upper left corner of the worksheet. If necessary, 1-2-3 adjusts the window to include this cell. Typically, this is cell A1, but not always: If you've expanded the worksheet's border using /Worksheet Titles to include the first few row(s) and/or column(s), the upper left corner might be cell A5, cell D1, cell C10, etc.

You can also use [Home] in combination with the [End] key to move the pointer to the lower right corner of the "active" area of the worksheet. (For details, see "Moving to the End of the Active Area," below.)

Moving the Window by Pages

You can think of the entire worksheet as being divided into *screenfuls* or *pages*. Typically, pages are twenty rows high and several columns wide:

Just as the arrow keys allow you to move the pointer cell-by-cell, several other keys allow you to move the window around the worksheet page-by-page (figure 15).
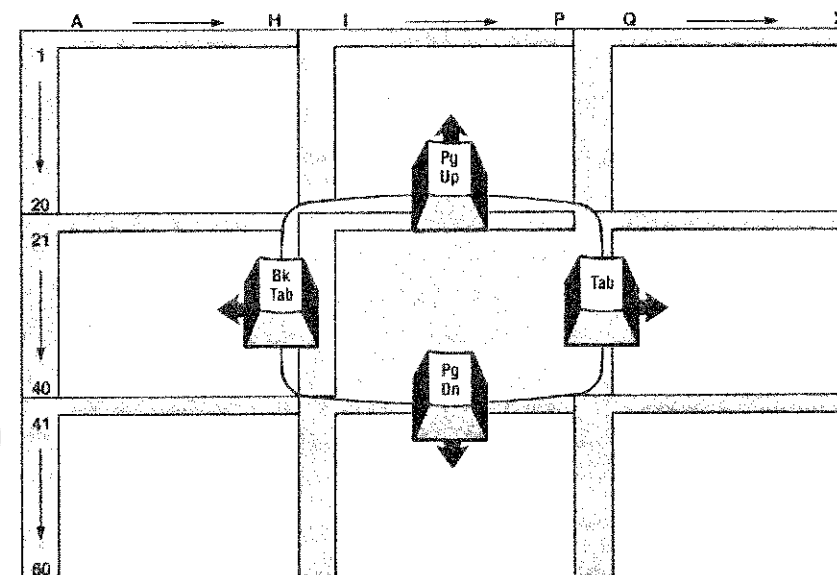
Figure 15. Moving by Pages — [PgUp], [PgDn] and [Tabs]

Note what happens to the cell pointer during this movement: with [PgUp] and [PgDn], it moves to the same relative position on the new page; with → [Tab] and ← [BackTab], it moves to the first column of the next page, staying in the same row.

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Advanced Topics

The Scroll Lock Facility

We saw above that when you move the cell pointer with the arrow keys, it sometimes pushes the window in the direction of movement. But sometimes you'll only want to move the window a bit without necessarily changing the position of the cell pointer. That's where the *scroll lock* facility comes in.

The [Scroll Lock] key is located in the extreme upper right corner of the keyboard, above the pointer-movement keypad. Pressing this key turns "on" the scroll lock facility. A *SCROLL* indicator appears in the lower right corner of the screen to confirm this. Pressing the key again turns scroll lock "off," erasing the indicator at the same time.

What does this key do? Figure 16 below shows how the meaning of the ↓ [Down] key is affected by pressing [Scroll Lock].
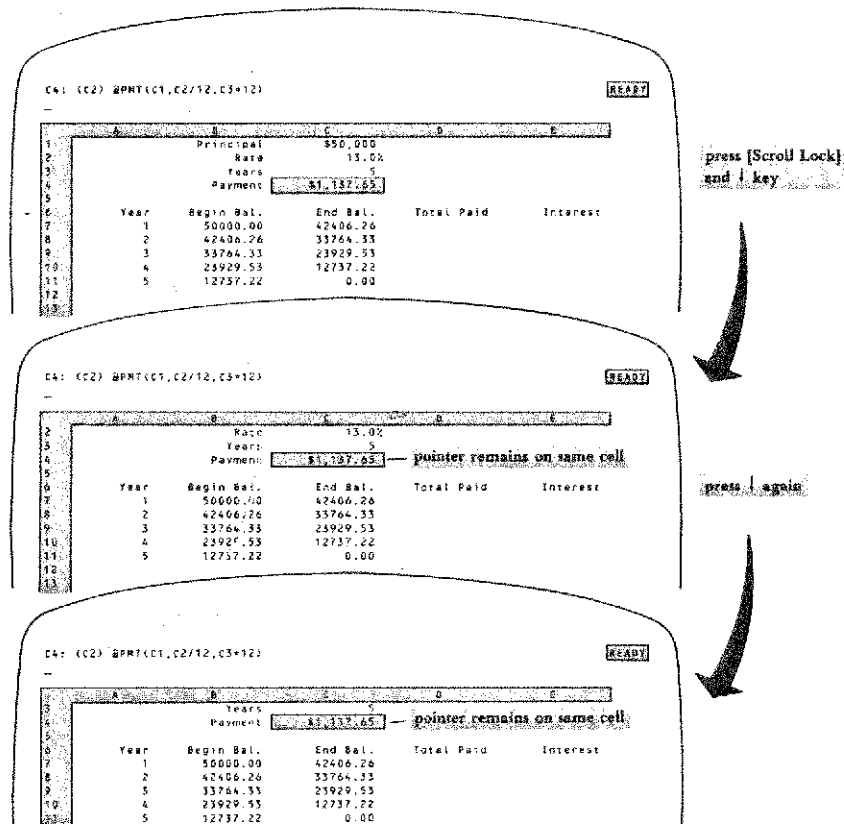
Figure 16.   Using [Scroll Lock]

Notice how the cell pointer creeps toward the top of the screen when you use ↓ in conjunction with [Scroll Lock]. Eventually, the pointer will hit the top of the screen. If you keep moving the window with ↓, the pointer will get "pulled along." So we have a symmetrical situation:

Scroll Lock "on." The arrow keys move the window. When the pointer is at the edge of the window, moving the window "pulls" the cell pointer in the direction of movement.

Scroll Lock "off." The arrow keys move the cell pointer. At the edge of the window, moving the cell pointer "pushes" the window in the direction of movement.

The [End] Key

The [End] key is a pointer-movement facility that uses the *contents* of the worksheet rather than its grid structure as its travel guide. When you use [End] in conjunction with any of the arrow keys, the pointer moves in the direction of the arrow to the next boundary between empty space (blank cells) and filled space (cells with entries).

Figure 17 shows how pressing "[End] ↓" would move the cell pointer in a particular worksheet.
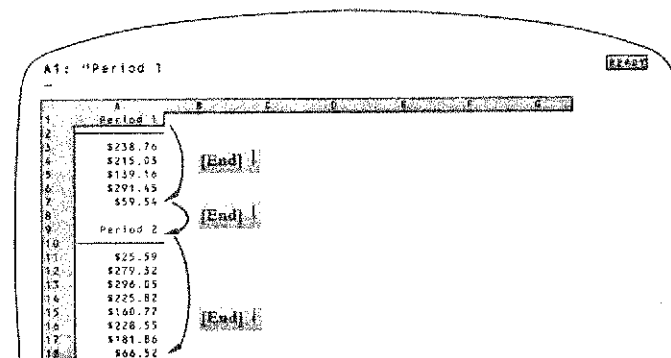
Figure 17.   Using the [End] Key

In general, an [End]-arrow key combination works as follows:

When you press [End] in Ready or Point Mode, an *END* indicator appears in the lower right corner of the screen. If the next key you press is an arrow key, then:

- If the pointer is on a blank cell, it moves in the arrow's direction to the first non-blank cell (or to the edge of the worksheet).

- If the pointer is on a non-blank cell, it moves in the arrow's direction to the last non-blank cell before a blank cell (or to the edge of the worksheet).

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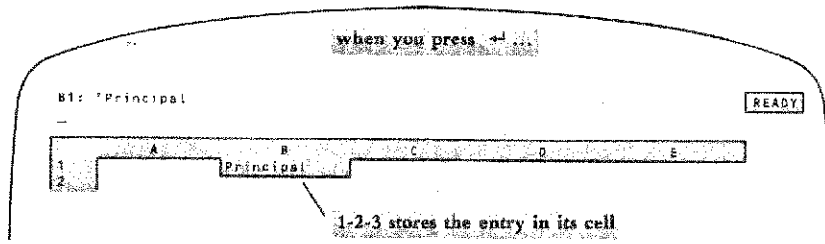235 Department
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And here's what happens if the next key you press is *not* an arrow key:

- [Home]: Pressing [End] then [Home] moves the pointer to the end of the worksheet's "active" area. See the next section for an explanation.
- Other: If you press any other key after [End], 1-2-3 remembers it and keeps displaying the *END* indicator to help *you* remember. You can type an entry, issue a command, and generally proceed with your work. But the next time you press an arrow key to move the cell pointer, 1-2-3 will perform an [End]-type jump rather then move a single cell.

Pressing [End] twice in a row is a special case. The second [End] means "never mind" — it cancels the first one.

Moving to the End of the "Active" Area

At any time, you are using only part of the entire 256-column, 2048-row worksheet. Figure 18 shows what 1-2-3 considers to be the lower right corner of the worksheet's "active area." The active area is always a rectangle with its upper left corner being cell A1 and its lower right corner being the intersection of the furthest right column and the lowest row. Since memory usage is more efficient in a smaller active area, try to keep this area compact.
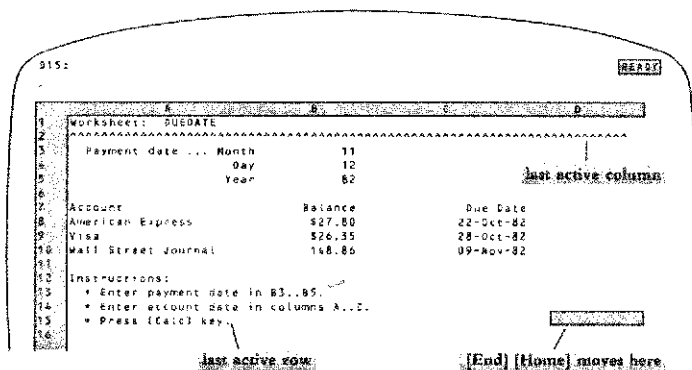
Figure 18. Moving to the End of the "Active Area"

There are many situations in which you might want to move the cell pointer to the end of the active area: printing the entire worksheet, splitting a worksheet into screen-size pages, etc.

1-2-3 allows you to do just that: In Ready or Point Mode, pressing [End] then [Home] moves the cell pointer to the lower right corner of the active area of the worksheet.

Moving the Cell Pointer with Special Windows (Titles, Split-Screen)

In the discussion above, we've used illustrations in which the worksheet is displayed using the standard window. The situation is much the same when you use either (or both) of the alternatives — Titles and Split-Screen.

The **Titles** facility expands the border around the upper left corner of the worksheet to include the first row(s) and/or column(s) (see the "Worksheet Commands" Chapter). In "Ready Mode", this border is impenetrable — trying to move the cell pointer there with the arrow keys just causes a beep.

But 1-2-3 *does* let you move the pointer into the Titles area when you are in Point Mode and in certain other situations. In some cases, more than one copy of the titles will appear on the screen.

The **Split-Screen** facility allows the display screen to provide two independent windows into the worksheet (see the "Worksheet Commands" chapter). The arrow keys and window-movement keys all work the way you'd expect them to — it's just that each window is now smaller.

There's just one new wrinkle to using split-window. To move the cell pointer from one window to the other, press the F6 [Window] key. (This key is active only when the screen is split.)

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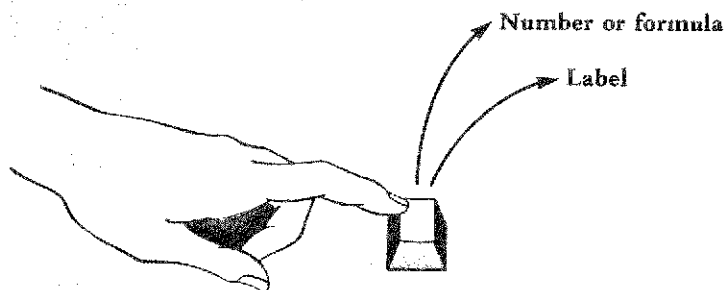Reserves Administration Department

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Typing Cell Entries

When you start a 1-2-3 session, a 1-2-3 logo appears on the screen. Press any key to erase the logo. You are now looking at an empty worksheet. One of your main tasks is to fill in the cells with the numbers, formulas, and labels suitable to the application at hand.

There are three basic ways to make an entry into a cell:

1. Type it yourself.

2. /Copy or /Move an existing entry into another cell in the worksheet.

3. Retrieve data from a disk file — one created with 1-2-3 itself or one created with another program.

In this chapter, we present an overview of these three methods.

Typing Entries

To type an entry into a particular cell, just move the cell pointer there and type the entry, ending with ↵ [Enter]. As you type, each letter appears on the second line of the control panel, above the worksheet (figure 19).
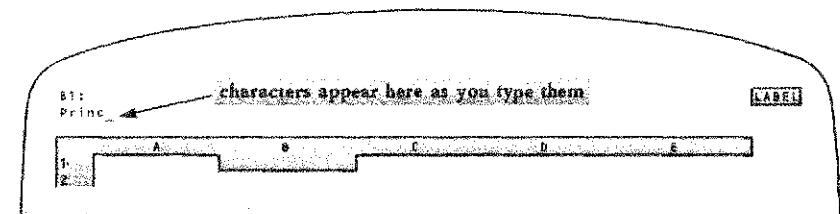
Figure 19. Typing a Cell Entry

As with many computer programs, a blinking **cursor**, the underscore character (__) indicates where the next character you type will appear. This may seem a bit unnecessary, but it *is* important. You'll need to move the cursor to make changes in the middle of an entry. (See "Edit Mode," below.)

To tell 1-2-3 that you're finished typing an entry, press ↵. When you do so, 1-2-3 stores it in the current cell. If something already was stored in the cell, the new entry replaces it. There's no way to recover the old entry. (Moral: Look before you type!)

After you complete an entry, the second line of the control panel is cleared, and 1-2-3 displays the entry on the first line (figure 20).

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Figure 20. Completing an Entry with [Enter]

Long Entries. A cell entry can be up to 240 characters long, quite a few more than 1-2-3 can display on the second line of the control panel. If you fill this line, the characters begin to scroll off to the left as you continue typing, allowing you to see the additional characters.

Using the Pointer-Movement Keys

Chances are that after you finish one entry, you'll want to move the pointer to another cell, perhaps to type another entry. To speed up this process a bit, you can finish an entry by pressing any of the keys that move the cell pointer, instead of pressing ↵ . This single keystroke has the effect of two: (1) it records the entry in the current cell, and (2) it moves the pointer to another cell (figure 21).
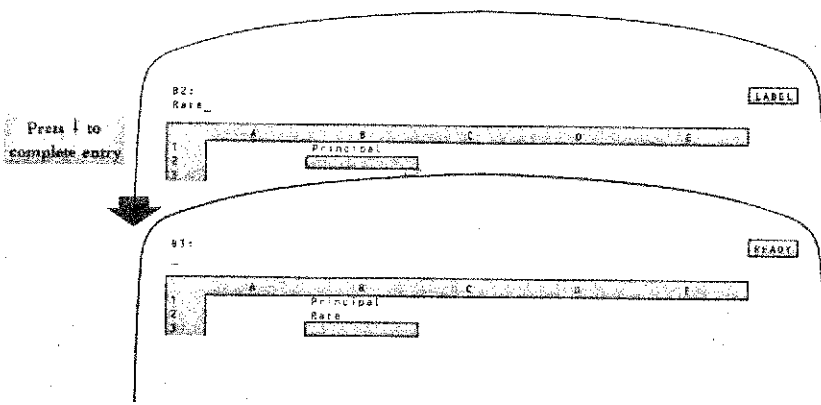
Figure 21. Using a Pointer-Movement Key to Complete an Entry

After You Press ↵ [Enter]

When you complete a cell entry by pressing ↵ or a pointer-movement key, the following things happen:

1. 1-2-3 checks the entry for errors. If the entry passes muster, 1-2-3 stores it in the current cell. If not, 1-2-3 beeps at you, places the cursor at the location of the problem, (or at the end if it isn't sure where the problem is) and switches to Edit Mode. (For a discussion of entry errors, see "Rules for Entering Numbers," below, and the "Entering Formulas" chapter.)

2. If you have left 1-2-3 in its initial Recalculation setting of *Automatic*, 1-2-3 recalculates every formula in the worksheet. The order in which it does so is determined by the Recalculation order setting (see /Worksheet Global Recalculation). It is also possible to have 1-2-3 perform several recalculation passes at once (see /Worksheet Global Recalculation Iteration).

3. 1-2-3 updates the display screen, incorporating the new entry, its effect upon the rest of the worksheet, and the results of the pointer-movement key (if you pressed one).

4. 1-2-3 returns to Ready Mode, displaying the *READY* indicator in the upper right corner of the screen.

When you make a cell entry during a /Range Input command or when using a macro (the Typing Alternative), things work a bit differently. (See the "Range Commands" and "Keyboard Macros" chapters for details.)

Types of Entries

There are three types of entries you can create: numbers, formulas, and labels. How can 1-2-3 tell which type you're entering? Simple — by making an educated guess (figure 22).

Entering Numbers and Formulas

If you start an entry with one of these characters, 1-2-3 thinks that you're entering a number or formula:

0 1 2 3 4 5 6 7 8 9 + − . (@ # $

It's easy to see why 1-2-3 would assume that you're making a numeric entry with the first few of these characters. They are the basic building blocks of numbers and simple arithmetic expressions. The characters @ and # are used to form more sophisticated formulas, those involving functions and logical conditions. $ is used for a similar purpose — to create *absolute* cell addresses in formulas (see the "Entering Formulas" chapter).

1-2-3 announces its decision after you type the first character by changing the *READY* indicator in the upper right corner to *VALUE*.

Rules for Entering Numbers

There are a few rules you must follow when entering numbers. If an entry doesn't follow these rules, 1-2-3 won't accept it: When you press ↵ , it will *beep* and place you in Edit Mode (see below), with the cursor at the location of the problem.

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Date _____

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Figure 22.   The First Key You Press Determines the Entry Type

Here are the rules for entering numbers:

1. A number may begin with a digit (0..9), a plus or minus sign, a period, or $.

2. A number may end with % to indicate *percent*. This character has the same effect as /100 — it divides the preceding number by 100.

3. A number may have at most one decimal point (the period character).

4. You may not use any commas or spaces when entering a number. But you can have 1-2-3 display numbers using commas and other *formatting* characters. (See the "Worksheet Commands" chapter.)

5. You may end a number with a power-of-10 scaling factor — we call it **scientific format**:

$$\text{capital or lowercase E}$$
$$\downarrow$$
$$\text{xxxxxxE} \pm \text{nn}$$
$$\uparrow \qquad \uparrow$$

any number,   any 1- or 2-digit whole number (positive or negative,
positive or   no decimal point). Serves as exponent to the base 10.
negative

The rules for entering formulas are more involved. (For details, see the "Entering Formulas" chapter.)

Two Special Numbers — NA and ERR

Naturally, you'll want the worksheets you construct to faithfully reflect the inter-relationships between cells. Suppose you write a formula that makes the value of cell A15 depend on the value of cell A9. Any of these situations might arise:

* You don't *know* what value to enter into cell A9 — the value is "Not Available".

* Cell A9 contains a formula that defines an impossible calculation (e.g., dividing a number by zero).

* Cell A9 is mistakenly obliterated by a 1-2-3 command: /Move or /Worksheet Delete.

1-2-3 handles these situations by using two special numbers:

NA. You can enter @NA into any cell instead of a number. 1-2-3 displays the cell's value as *NA*, meaning *not available*. When it recalculates formulas, 1-2-3 ripples this lack of data throughout the worksheet: Any cell whose value depends on an *NA* cell also has the value *NA*.

ERR The @ERR function is similar to @NA. 1-2-3 displays the cell's value as *ERR*, meaning *error*. And the *ERR* value ripples throughout the worksheet when 1-2-3 recalculates formulas.

@ERR is useful when you wish to alert the worksheet user that a certain value entered is "out-of-bounds". 1-2-3 itself makes the value of a cell *ERR* whenever the cell contains a formula that defines an impossible calculation. Figure 23 provides an example in which both these situations might occur.
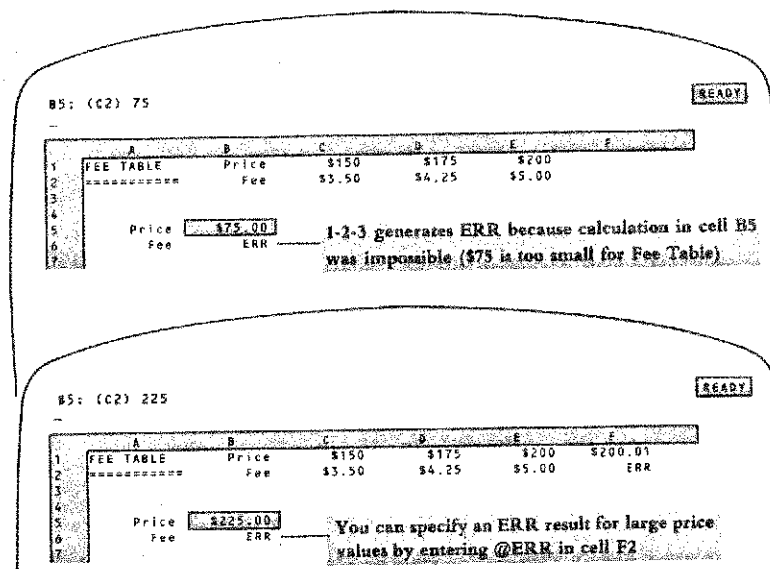
Figure 23.   The Special Number ERR

(The @HLOOKUP function is described on page 281).

Date _____

File # _____

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Entering Labels

If the first character you type is not among those number-indicators listed in the previous section 1-2-3 guesses that you mean to enter a label. It announces its guess after you type the first character by changing the *READY* indicator to *LABEL*.

(Exceptions: The slash character / starts a 1-2-3 command. Function keys **F1** ... **F10** invoke 1-2-3 functions.)

A few of the characters you can use to start a label are special. They tell 1-2-3 how to display the label text in the cell — left-aligned, right-aligned, centered, or repeatedly (figure 24):

| ' (apostrophe) | left-aligned | ^ (caret) | centered |
| " (double-quote) | right-aligned | \ (backslash) | repeating |
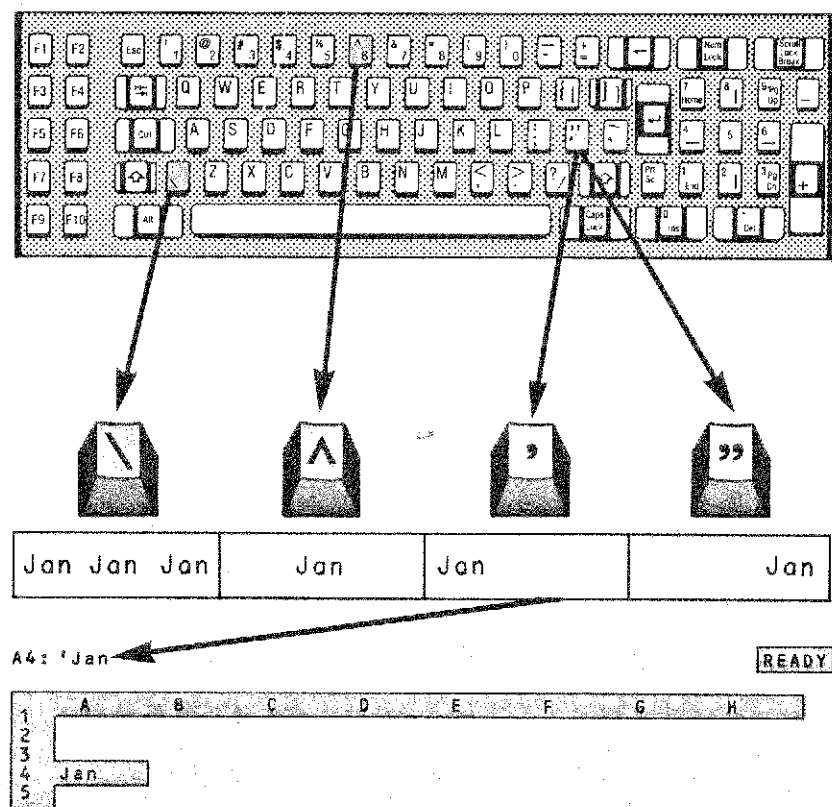
Figure 24. Label-Prefix Characters

These **label-prefix** characters are the answer to a question that may have occurred to you:

If 1-2-3 uses the first character to decide Label vs. Value, how do I enter a label like:

22 Centre Street

The answer is: Start the entry with a label-prefix character. By the way, if you try to make an entry like this without a prefix, 1-2-3 will *beep* and place you in Edit Mode.

At first, these label-prefix characters may seem a bit tricky and elusive. Is the prefix character part of the label? Well, yes and no:

YES — 1-2-3 stores the prefix character you type as part of the cell entry. Once a label has been entered, you can see its prefix character by moving the cell pointer to the cell. (The current cell's contents are displayed on the first line of the control panel.) 1-2-3 uses this character to align the label each time it displays the cell.

NOTE: If you don't enter a prefix character yourself, 1-2-3 automatically supplies one when you press ↵ . (See the Global Label-Prefix command summary.)

NO — The prefix character itself does not appear on the screen when 1-2-3 displays the cell.

Value Mode and Label Mode

Why does 1-2-3 distinguish between the processes of entering a numeric value (Value Mode) and entering a label (Label Mode)? There's a good reason for this. After you complete an entry, 1-2-3 must draw the distinction between a value and a label, since one is an instruction to calculate and the other merely a string of characters to be displayed. But why distinguish the entries while you're typing them?

The answer is that 1-2-3 allows you to do "something extra" when you're entering a number or formula — using the cell pointer to indicate the cells to be used in a formula, rather than typing their addresses. (Pointing is described in the "Entering Formulas" chapter.)

Fixing Mistakes — Changing Your Mind

One of the great advantages of 1-2-3 is the ease with which it allows you to change your mind. You can change an entry while you're in the middle of typing it. Or you can return to it later, either to revise or replace it. The same facilities are also handy on those rare occasions when you make a mistake.

We'll describe the various ways in which you can change entries, proceeding from the simple to the sophisticated.

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Cancellation

Whenever you're in Value Mode or Label Mode, you can cancel your entry and return to Ready Mode just by pressing [Esc]. However, you must do this before pressing ↵ or a pointer-movement key. If you're entering a formula and are in Point Mode when you decide to cancel, you may have to press [Esc] two or more times. As a shortcut, you can *issue a Break* — hold down the [Ctrl] key and press [Scroll Lock/Break]. This always cancels whatever you're doing and returns you to Ready Mode.

Replacement

The easiest way to change a short entry after it has been entered is to replace it with another. Just move the cell pointer to the cell, then type another entry. The cell's original contents are lost, so make sure you're replacing the right cell contents and not losing something valuable.

Erasure

Use the /Range Erase command to erase the contents of one or more cells. Erasing is *not* the same as replacing with a few [Space-Bar] characters. A cell that has been erased contains no characters at all.

These three methods have the virtue of simplicity, but there should also be a way to change an entry character-by-character, rather than simply starting over again. There is.

The [Backspace] Key

Located above ↵ , the [BackSpace] key (←) works very much like the backspace key on a typewriter. In Value or Label Mode, pressing the [Backspace] key erases the last character you typed.

Edit Mode

Sometimes, it's necessary to make a change other than erasing the last character you typed. For instance:

- You are typing the label "Forth Quarter Profits — 1982" and remember that the first word has a "u".

- In reviewing a worksheet you've already created, you decide to replace C3 with C15 in the formula:

    +D4*C3*@HLOOKUP(A7,D6..G14,3)

For this purpose, 1-2-3 has an **Edit Mode**. You can invoke Edit Mode while you're typing an entry. Or you can move the cell pointer to any cell that requires a change and revise its entry.

To enter Edit Mode, press the **F2** [Edit] key. The indicator in the upper right corner changes to *EDIT*. 1-2-3 places you in Edit Mode automatically if you enter a number or formula that it can't understand. For instance, this occurs when you type a label that starts with a digit, but you forget the label-prefix.

In Edit mode, 1-2-3 places a copy of the cell's number, label, or formula on the second line of the control panel. It places the cursor at the end of the entry. You can change the entry by moving the cursor, deleting characters, and inserting characters:

Moving the Cursor. In Edit Mode, these keys have different meanings than in Ready Mode:

←	Move cursor one character to left
→	Move cursor one character to right
←	Move cursor 5 characters to left (hold ⇧ and then press ↹)
→	Move cursor 5 characters to right
[Home]	Move cursor to first character
[End]	Move cursor to last character

Deleting.

[Backspace]	Delete character preceding the cursor
[Del]	Delete character at the cursor

Your personal computer's *auto-repeat* feature is particularly useful with these editing keys. When you hold a key down, it acts once, pauses for a short time, then repeatedly acts at about 2 strokes-per-second.

Inserting. Just type new characters to be inserted at the cursor position. 1-2-3 always inserts new characters in Edit Mode. There's no way to "overstrike" or "replace" characters.

The F9 [Calc] Key. In Ready Mode, pressing the F9 [Calc] key causes 1-2-3 to perform a recalculation pass on all formulas in the worksheet. But you can also use [Calc] in Edit Mode, when you are editing a formula. It converts the formula into a number — the formula's current value. No general recalculation takes place.

Be careful — there's no way to convert the number back into the formula!

Getting Out of Edit Mode

When you are finished editing any entry, you can press ↵ to store the revised entry in the cell. 1-2-3 treats it exactly like any other new entry.

Date _____

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If you want to get fancy, there are a couple of alternatives. The vertical-motion pointer-movement keys — ↑, ↓, [PgUp], [PgDn] — all store the edited entry and move the pointer, as described above. Be careful, though — the other pointer-movement keys have different meanings in Edit Mode.

If you invoked Edit Mode from Value (or Label) Mode, you can return there by pressing the F2 [Edit] key again. You can use the [Edit] key repeatedly while making a single entry to switch back and forth between Edit Mode and Value (or Label) Mode.

Transferring Entries from Other Cells

Two of 1-2-3's most powerful commands — /Copy and /Move — transfer one or more entries between cells. The /Copy command saves you the trouble of typing the same thing over and over again. It's particularly useful in building worksheets that use similar formulas in many different cells. For instance, /Copy can quickly turn a one year projection into a five year projection (figure 25).
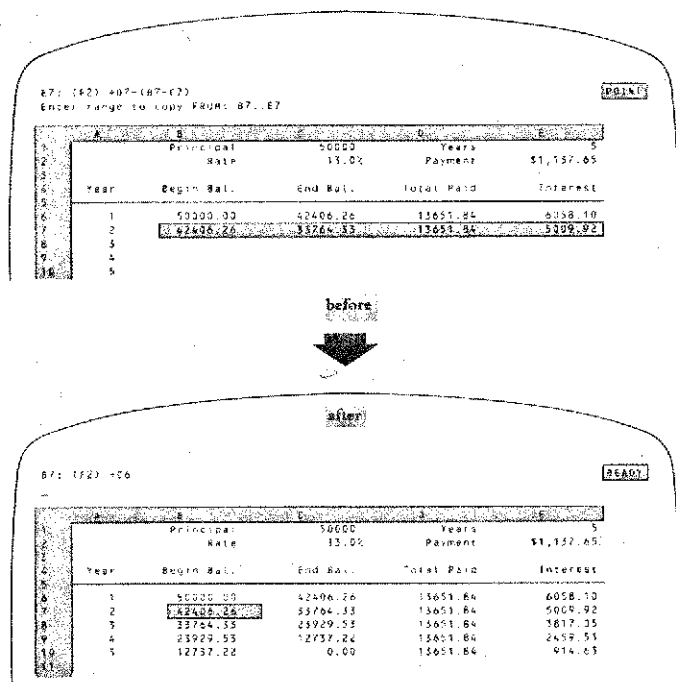
Figure 25.   Creating New Entries with the /Copy Command

The /Move command helps you to redesign a worksheet without having to retype formulas. A few /Moves alone — no formula retyping — can quickly transform the appearance of a worksheet (figure 26).
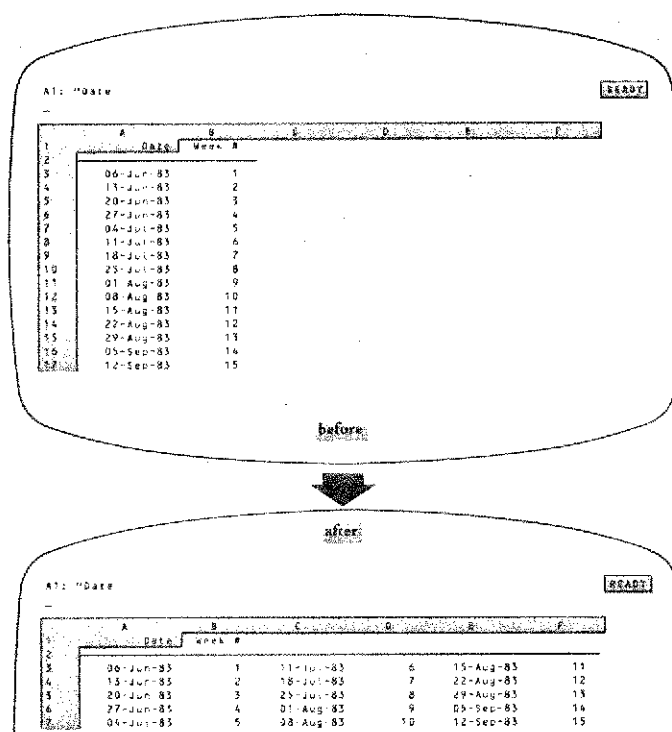
Figure 26.   Transferring Entries with the /Move Command

Retrieving Entries from Files

Since storage in the computer's main memory is temporary — your work disappears when you end program execution or when you shut off the machine — 1-2-3 has a flexible and sophisticated system for using data stored in disk files.

You can load data from disk storage into a worksheet as numeric entries and/or label entries. The most common usage is to reload a worksheet that you created previously and stored (/File Save and /File Retrieve). But you can also perform more sophisticated data retrieval operations, such as combining worksheets (/File Combine), loading partial worksheets (/File Combine again), and importing data produced by other programs (/File Import).

(For details on using 1-2-3 to process information in files, see the "File Commands" chapter.)

Date _____

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Appendices

Contents

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Contents

Configuring 1-2-3

Now that you've bought 1-2-3, what do you need in the way of hardware to get it up and running, and how do you tell 1-2-3 what your computer system looks like? This appendix covers both of these questions.

What You Need to Run 1-2-3

Your dealer should have provided you with an explanation of the minimum hardware needed to run 1-2-3, but if he or she didn't, here are the facts.

Required Hardware

1. A Personal Computer with at least 128K memory installed.
2. A pair of double-sided, double-density diskette drives or 1 double-sided diskette drive and a hard disk.
3. A Personal Computer Monochrome Display or Color/Graphics display.

That's the bare-bones system and 1-2-3 will run on it. But, to realize 1-2-3's full power, some other hardware will be necessary.

Optional Hardware

1. Additional memory up to a total of 544 kilobytes.
2. Printer and interface.
3. Plotter or graphics printer.
4. Both a monochrome and a color/graphics display.

See "Using the GRAPH Program" appendix for a list of supported graphics devices.

1-2-3's "Default" Configuration

Every time you start 1-2-3, it "reads" a startup configuration file, called "123.CNF" from the 1-2-3 System disk, which makes certain assumptions about the equipment you're using, how you want your printouts to look, and which disk drive you will use to store your data. These assumptions are called the **default configuration.** The default configuration is:

Printer:

Interface: Parallel	Bottom margin: 2
Auto Line-Feed: No	Page length: 66
Left Margin: 5	Pause at end of page: No
Right margin: 75	Setup string: (none)
Top margin: 2	

Disk: B

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This means that 1-2-3 assumes that your computer has a "parallel printer interface card" installed inside the computer, that your printer does not issue a "line feed" character after a "carriage return" character in order to begin a new print line, that the left and right margins will be set to 5 characters and 75 characters respectively, that the top and bottom margins of the printed page will be 2 lines each, that the page length will be 66 lines, that no pause will occur at the end of the printed page, that your printer does not require any special setup string, and that you will store your 1-2-3 worksheet files on a "data disk" located in drive B. If that assumption is correct, then you will not want to change 1-2-3's default configuration.

What if you want to change the default configuration? There are two ways to do it. The first, using the /Worksheet Global Default commands described below, alters the configuration file stored on the 1-2-3 System disk. Once the default configuration is altered *and* saved (Updated), 1-2-3 will read the new default configuration every time 1-2-3 is started. In that sense, you might want to think of the default configuration as being "permanent"; although it can be altered again by using the same /Worksheet Global Default commands.

Changes to some of 1-2-3's configuration options may also be made during the course of a 1-2-3 session by using the /Print Printer Options, the /Print File Options, or /File Disk commands. Using these commands causes the default configuration to be "overridden" for the duration of the current session or until a /Print Printer Options Clear command is given, at which time the configuration settings return to the default configuration (see the "Worksheet Commands" chapter).

Note: while we recommend always leaving your 1-2-3 System Disk in drive A, the other configuration options can be changed to suit the requirements of your system or your personal taste.

Changing 1-2-3's Default Configuration

The /Worksheet Global Default command will put 1-2-3 in its Default configuration menu. The Default menu presents you with the following options:

Printer   Specifies printer interface and other printer characteristics.

Disk   Specifies initial "current disk," the disk drive where 1-2-3 will, by default, store and retrieve data.

Status   Displays configuration settings.

Update   Stores configuration settings in the configuration file on the 1-2-3 Program disk.

Quit   Ends a configuration session.

As with all 1-2-3 menus, options are selected by moving the pointer to the option using the left or right arrow keys and pressing ↵ [Enter], or by typing the first letter of the option. As you select each option, a list of configuration choices will appear under the command line.

Notice that the current system configuration can always be displayed with the /Worksheet Global Default Status command.

The following list gives all the possible configuration choices for printers and the disk drive to be used for file storage. (Numbers or letters in parentheses indicate the menu selections; default options are shown in boldface.)

Default Menu Items	Related Options	Configuration Choices
Printer	Interface	(1) **Parallel** (2) Serial (3) Second Parallel (4) Second Serial
	Auto-LF	**No** Yes
	Left Right	**5** (characters) **75** (characters)
	Top	**2** (lines)
	Bottom	**2** (lines)
	Page-Length	**66** (lines)
	Wait	**No**
	Setup	
Disk		**None** A B C D E F G

Printer Options

Selecting Printer from the Default menu allows you to change the default printer interface, the linefeed option, the default left and right margins, the default top and bottom margins, the default page length, and the printer setup string.

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Interface

To connect a printer to a computer, some type of interface card and cable is required. Computers communicate with printers using two different means: parallel or serial. You don't necessarily have to understand the method of communication being used, but you must tell 1-2-3 what kind of interface is connected or it will not communicate correctly with the printer.

To change the printer interface type, select Interface from the menu. You can choose one of four interface types:

(1) **Parallel.** The parallel interface supplied as part of the IBM Monochrome Display or Printer Adapter.

(2) **Serial.** The serial (RS232C-compatible) interface supplied as part of the IBM Asynchronous Communications Adapter (optional).

(3) **Second Parallel.** An optional second parallel interface.

(4) **Second Serial.** An optional serial interface.

1-2-3 supports only devices which are IBM-compatible. Check with your dealer or with the device manufacturer to be sure that the device you have selected is compatible.

Auto-LF

Most printers do not automatically linefeed after every carriage return. 1-2-3 indicates this condition with a default Auto-LF setting of No. You may change the setting to Yes, indicating that your printer does linefeed after a carriage return.

An easy test to see if this option should be changed is to print something out on your printer from 1-2-3. If the printing comes out double-spaced, then you should set Auto-LF to Yes; if the print is normally spaced, then the Auto-LF is set correctly. If the printer does not advance the paper at all, then set Auto-LF to No. If you're not an experimenter, check the literature that accompanied your printer or ask your dealer to tell you whether your printer requires this option to be changed. Auto-LF is frequently a switch-selectable printer option.

Left and Right Margin

Selecting the Left or Right options allows you to enter a new value for the printed left or right margin. Once this new value is recorded using the Update option (see below), it will be used as the default left (or right) margin every time 1-2-3 is started, although the value may be temporarily overridden using the /Print Printer Options Margins Left or the /Print Printer Options Margins Right command (see the "Print Commands" chapter). Override may also occur when you /File Retrieve a worksheet. The default value for Left is 5 characters. The default value for Right is 75 characters.

Top and Bottom Margin

Selecting the Top or Bottom option allows you to enter a new value for the margin to be printed at the top or bottom of the page, as appropriate. Once this new value is recorded using the Update option (see below), it will be used as the default top (or bottom) margin every time 1-2-3 is started, although the value may be temporarily overridden using the /Print Printer Options Margins Top or the /Print Printer Options Margins Bottom command (see the "Print Commands" chapter). Override may also occur when you /File Retrieve a worksheet. The default value for Top and Bottom is 2 lines.

Page-Length

Selecting the Page-Length option allows you to enter a new value for the printed page length. You may enter a page length from 20 to 100 lines. Once this new value is recorded using the Update option (see below), it will be used as the default page length every time 1-2-3 is started, although the value may be temporarily overridden using the /Print Printer Options Page Length command (see the "Print Commands" chapter). Override may also occur when you /File Retrieve a worksheet. The default value is 66 lines.

* If your printer has a wide carriage or you select compressed printing with a setup string (see below) you must increase the right margin.

* If your printer is set to automatically skip over the paper perforations, set the top and bottom margins to zero.

* If your printer is set to automatically skip over the paper perforations, you must reduce the page length. This may require some experimentation, but a value of 60 is typical.

Wait

Selecting the Wait option allows you to insert a pause at the end of each printed page to change paper in single-sheet-feed printers. Your choices are:

Yes. pause between each page of printed output

No. do not pause between each page of printed output

The default value for Wait is No.

Setup

Some printers may require that a string of "control characters" be sent to the printer before printing can begin or to set printer option. The Setup option allows you to enter a default setup string to "initialize" your printer. This setup will then be used every time you issue the /Print Go command, although it can be temporarily altered in the Print menu (see the "Printer Control Codes" chapter). See p. 309 for a description of how to enter printer setup strings. The default setup string is blank.

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account pays benefits to your children:

Name _____ Social Security # _____
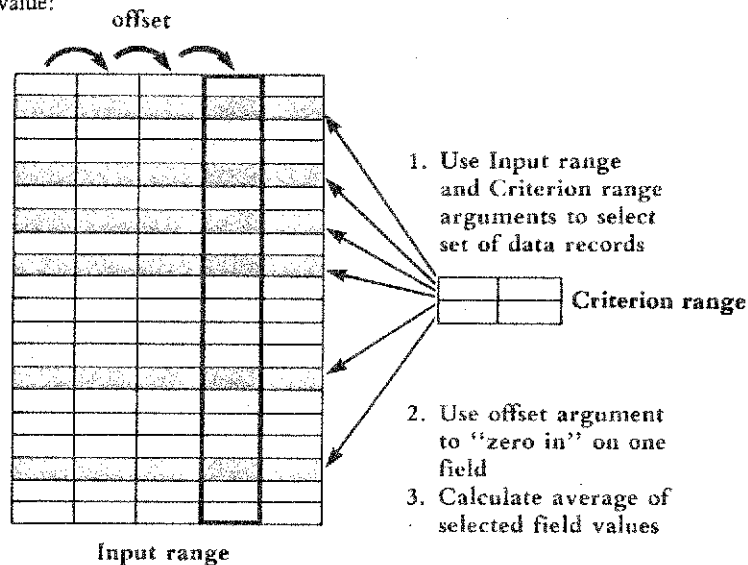
For (Child) _____ Social Security # _____

If you need additional space to answer any of the above requests, please
use the back of this letter.

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Quit

Selecting the Quit option returns 1-2-3 to the Default menu.

Disk Options

The standard personal computer system has two disk drives (A and B). The "boot" or startup drive for 1-2-3 is drive A. Unless you tell 1-2-3 otherwise, 1-2-3 will Save and Retrieve worksheet and picture files on drive B. Selecting the Disk option allows you to designate a different disk drive for file storage, while keeping your 1-2-3 Program Disk in drive A.

Normally the Disk option is set to B. Your choices are:

None A B C D E F G

Selecting a disk drive sets the current disk. You can temporarily change the current disk with the /File Disk command or override the current disk by using a disk specifier at the beginning of your filename.

Status

Selecting Status from the Default menu allows you to view the current configuration settings. The configuration is displayed in the worksheet area of the screen. Pressing any key clears the screen and returns 1-2-3 to the Default menu.

Update

If you have changed the default configuration and want to make those changes permanent, you should choose Update. The new configuration will then be recorded and 1-2-3 will use the new configuration the next time it starts up. If you made no changes, or if you do not want your changes recorded, choose Quit (see below). Once the configuration is recorded, 1-2-3 returns to Ready Mode.

Note: Remember to remove the write-protect tab before updating, and replace it when through.

Quit

If you have not changed the default configuration, or if you simply wish to exit the Default menu, select Quit. You will then be returned to the worksheet in Ready Mode.

1-2-3 Function Reference

This appendix describes the entire set of 1-2-3 functions.

You can think of functions as "built-in" formulas. Like formulas, a function has a numeric or logical value (or *ERR* or *NA*). This value usually depends on its **arguments**: numbers, cell or range references, or even other functions.

Use functions by typing the function name, followed by its arguments, if any. The function name always begins with an @ sign; the rest of the name can be typed in upper or lowercase or any combination. The arguments follow the name in parentheses, separated by commas:

@functionname(arg1,arg2,..,argN)

Depending on the function an argument can be either a single value or a range.

If Function requires:	**single value**	**range**
Allowable arguments:	number	cell address...cell address
	cell-address	range name
	function	
	one-cell range name	
	formula	

For a function to work, there must be the correct number of arguments, in the correct order, and of the correct type, either a single value or a range. *You can specify cell and range references either by pointing or by typing.*

Note that some functions, such as @ERR, do not take an argument. Other functions may take a variety of arguments, as indicated below.

In the reference, some functions are shown with the argument *list*. In this case, the argument can be a single cell, a range, or a list of cells and ranges, with the entries separated by commas. Blank cells in a range argument are ignored.

See **Functions** (page 101) for a more complete description of how to use functions.

Summary of 1-2-3 Functions

1-2-3 functions fall into the following general categories. Detailed descriptions are in the following section.

Mathematical Functions

@ABS(x)	absolute value
@ACOS(x)	arc cosine
@ASIN(x)	arc sine
@ATAN(x)	2-quadrant arc tangent
@ATAN2(x,y)	4-quadrant arc tangent
@COS(x)	cosine

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Mathematical Functions (Cont.)

@EXP(x)	exponential
@INT(x)	integer part
@LN(x)	log base e
@LOG(x)	log base 10
@MOD(x,y)	x mod y
@PI	pi (π)
@RAND	random number between 0 and 1
@ROUND(x,n)	round a number to n decimal places
@SIN(x)	sine
@SQRT(x)	square root
@TAN(x)	tangent

Logical Functions

@FALSE	the value 0 (*FALSE*)
@TRUE	the value 1 (*TRUE*)
@ISNA(x)	the value 1 (*TRUE*) if expression x has the value *NA*
@ISERR(x)	the value 1 (*TRUE*) if expression x has the value *ERR*
@IF(cond,x,y)	the value x if cond is *TRUE* the value y if cond is *FALSE*

Note that @FALSE and @TRUE take no argument.

Special Functions

@NA	the value *NA* (not available)
@ERR	the value *ERR* (error)
@CHOOSE(x,v_0,v_1,..v_n)	select argument value
@HLOOKUP(x,range,offset)	horizontal table lookup
@VLOOKUP(x,range,offset)	vertical table lookup

Financial Functions

@IRR(guess,range)	internal rate of return
@NPV(x,range)	net present value
@FV(pmt,int,term)	future value
@PV(pmt,int,term)	present value
@PMT(prn,int,term)	payment

Date Functions

@DATE(year,month,day)	number of days since 31-Dec-1899
@DAY(date)	day number
@MONTH(date)	month number
@YEAR(date)	year number
@TODAY	today's date

Statistical Functions

@COUNT(list)	counts the number of all items in list
@SUM(list)	sums the values of all items in list
@AVG(list)	averages the values of all items in list
@MIN(list)	minimum of all items in list
@MAX(list)	maximum of all items in list
@STD(list)	standard deviation of all items in list
@VAR(list)	variance of all items in list

Database Statistical Functions

These functions operate on the values in particular fields of a database whose records fit the criterion.

@DCOUNT(input,offset,criterion)	counts the number of all items in list
@DSUM(input,offset,criterion)	sums the values of all items in list
@DAVG(input,offset,criterion)	averages the values of all items in list
@DMIN(input,offset,criterion)	minimum of all items in list
@DMAX(input,offset,criterion)	maximum of all items in list
@DSTD(input,offset,criterion)	standard deviation of all items in list
@DVAR(input,offset,criterion)	variance of all items in list

Alphabetical Function Reference

@ABS(x)

The value of the function is the *absolute value* of x.

Examples: @ABS(1.258) = 1.258
@ABS(−6.2) = 6.2
@ABS(B1) = absolute value of cell B1

@ACOS(x)

The value of the function is the *arc cosine* of x, the angle in radians whose cosine is x. If x is not between −1 and +1, the value is *ERR*. The value of the function is always between 0 and π.

Examples: @ACOS(−.3) = 1.8754889 (radians)
@ACOS(B1) = arc cosine of value at cell B1

@ASIN(x)

The value of the function is the *arc sine* of x, the angle in radians whose sine is x. If x is not between −1 and +1, the value is *ERR*. The function value is always between −π/2 and +π/2.

Examples: @ASIN(−.3) = −.3046926 (radians)
@ASIN(B1) = arc sine of value at cell B1

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@ATAN(x)

The value of the function is the *arc tangent* of x, the angle in radians whose tangent is x. The function value is always between $-\pi/2$ and $+\pi/2$.

Examples: @ATAN(-.3) = -.2914567 (radians)
@ATAN(B1) = arc tangent of value at cell B1

@ATAN2(x,y)

The value of the function is the *arc tangent* of y/x, the angle in radians whose tangent is y/x. It differs from @TAN(y/x) in that it considers separately the signs of x and y so that it takes on values for all 4 quadrants, from $-\pi$ to π. If x = y = 0, the value is *ERR*.

Examples: @ATAN2(1.258,-.3) = -.2341014 (radians), but
@ATAN2(-1.258,.3) = 2.90749128
@ATAN(-.3/1.258) = @ATAN(.3/-1.258) = -.234104
@ATAN2(B1,B2) = arc tangent of value (B2/B1), taking into
    account the sign of each argument

@AVG(list)

The value of the function is the *average* of all items in the list. The equivalent of the @AVG (list) is equivalent to: @SUM(list) divided by @COUNT(list). If the argument list contains no items, the result is *ERR*. If the list includes a range, then @AVG ignores blank cells within the range.

Examples:

	A
1	1.89
2	10.00
3	2.70
4	.05

@AVG(A1..A4) = 3.66

@CHOOSE(a,V_0,V_1,..,V_n)

The @CHOOSE function may be used to test logical expressions or to perform short table lookups.

The first argument, a, is evaluated and converted to an integer, i. If this integer is less than 0 or greater than n, the function returns the result *ERR*. Otherwise, the value of the function is V_i. In other words, this function selects and returns an argument based on the first argument.

Examples: @CHOOSE(3,42.6,-4.2,B1,1.17,@NA) = 1.17
@CHOOSE(A7,B1,C1,D1) = if value of formula in cell A7 is 2,
    function returns the value in cell D1

@COS(x)

The value of the function is the *cosine* of x, where x is interpreted as an angle in radians.

Examples: @COS(1.258) = .30772048
@COS(B1) = cosine of value at cell B1

@COUNT(list)

The value of the function is the *number of items* in list. If list includes a range, then @COUNT counts all non-blank cells within the range. All single value arguments count as 1 each, even a single cell reference to a blank cell.

Examples:

	A
1	1.89
2	10.00
3	
4	.05

@COUNT(A1..A4) = 3
@COUNT(A3) = 1

@DATE(year,month,day)

This function calculates the *number of days* elapsed between the date specified in the argument and December 31, 1899 (see Date Arithmetic, page 104). A value of *ERR* will be returned if the arguments do not fall within the specified ranges:

year = 00 to 99   month = 1 to 12   day = 1 to last day of month

The value of the function will be a number. To display such a value as a date, use the Date formats (see command summaries of /Worksheet Global Format and /Range Format).

Examples: @DATE(82,9,27) = 30221 or 27-Sep-82 (Date format)
@DATE(B1,B2,B3) = date value of B1, B2, and B3

@DAY(date)

The @DAY function extracts the *day of the month* from a given date. The date must be expressed in the form of the number of days elapsed since December 31, 1899 (see Date Arithmetic, page 104).

Examples: @DAY(30221) = 27
@DAY(B4) = day number of the date at cell B4

@DAVG(input,offset,criterion)   @DSTD(input,offset,criterion)
@DCOUNT(input,offset,criterion)   @DSUM(input,offset,criterion)
@DMAX(input,offset,criterion)   @DVAR(input,offset,criterion)
@DMIN(input,offset,criterion)

These functions are database counterparts to the statistical functions @AVG, @COUNT, etc. The @AVG operation (for instance finds the average value of a

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list of arguments. The @DAVG function selects certain records from a database. Then, it *zeroes in* on one field (column) of the selected records and calculates the average value:

1. Use Input range and Criterion range arguments to select set of data records

2. Use offset argument to "zero in" on one field

3. Calculate average of selected field values

All the database statistical functions work in this same way:

1. *1-2-3 uses the criteria stored in a* Criterion *range to select certain records from a database* (input *range)*. In specifying these ranges as arguments to the function, you type cell addresses or range names just as you would in a /Data Query command.

2. *Using the* offset *argument, 1-2-3 focuses its attention on a certain field (column) of the selected records. If* offset = 0, *1-2-3 uses the leftmost column; if* offset = 1, *it uses the second column; etc.*

3. *1-2-3 performs the statistical operation (average, sum, maximum, etc.) on the single column of selected values.* For details on these statistical operations, consult the descriptions of @AVG, @COUNT, @MAX, etc. in this appendix.

Examples: Consider this small database (i.e. Input range) A1..C5, to which the range name DATAB has been assigned. In addition, the ranges containing selection critiera have been names as follows: E1..E2 has been named CRIT__1, and F1..F2 has been named CRIT__2.

	A	B	C	D	E	F
1	Item	Quantity	Type		Type	Item
2	1001	2	nut		nut	+A2>1001
3	1002	4	bolt			
4	1003	0	nut			
5	1004	17	bolt			

@DAVG(DATAB,0,CRIT__1) = @AVG(1001,1003) = 1002

The label-match criterion "nut" causes the records in rows 2 and 4 to be selected. The average of the values in column 0 (Item field) of the selected records is 1002.

@DAVG(DATAB,1,CRIT__1) = @AVG(2,0) = 1

The same records are selected. The average of the Quantity field items is 1.

@DMAX(DATAB,1,CRIT__2) = @MAX(4,0,17) = 17

The formula criterion in cell F2 causes the records in rows 3-5 to be selected. In these records, the largest Quantity field value is 17.

@ERR

The value of the function is *ERR* (error).

Example: @IF(B14>3.2,@ERR,B14)

@EXP(x)

The value of the function is e raised to the x power. The value is *ERR* if x is greater than about 230.

Examples: @EXP(1.258) = 3.5183776
@EXP(B1) = e raised to the power of the value in cell B1

@FALSE

The value of the function is 0.0.

Example: @CHOOSE(A5,@FALSE,@TRUE,@FALSE,@FALSE,@TRUE)

@FV(payment,interest,n)

The @FV function calculates the *future value* of an annuity given a payment per period, an interest rate per payment period, and a number of periods (n). The formula is:

$$FV = payment * \frac{(1 + interest)^n - 1}{interest}$$

Examples:

	A	B
1	Payment	1000
2	Interest	.1
3	Term	12

@FV(1000,.1,12) = 21384.283
@FV(B1,B2,B3) = 21384.283

@HLOOKUP(x,range,offset)

The @HLOOKUP function performs a *horizontal table lookup* where the comparison values are in the first row of the range. These comparison values must be in increasing order, with no duplicates. The result of the function is determined by locating the first comparison value in the range which exceeds the test value, x. If this is the first cell in the range, the result is *ERR*. Otherwise the result is the value of the cell below the previous comparison value in the range. The third argument, offset, deter-

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mines how many rows below the comparison row to look (see also @VLOOKUP). If the value of offset is negative, or is greater than or equal to the number of rows in the range, the result is *ERR*.

Examples:

	A	B	C	D
4	1	2	3	4
5	12.92	13.67	14.42	15.17
6	1.75	3.85	5.95	8.05

@HLOOKUP(3,A4..D6,1) = 14.42
@HLOOKUP(A1,A4..D6,B1) = 14.42 *(if A1 = 3.4, B1 = 1)*

@IF(a,vtrue,vfalse)

This function tests the first argument, a, for non-zero (*TRUE*) or zero (*FALSE*). The value of the function is vtrue if true, vfalse if false.

Examples: @IF(B1 > B2,J9/J20,@FALSE) = The value in cell J9 divided by the value in cell J20 if the value in cell B1 is greater than the value in cell B2

@INT(x)

The value of the function is the *integer portion* of x.

Examples: @INT(1.258) = 1
@INT(−1.258) = −1
@INT(B1) = integer portion of the value at cell B1

@IRR(guess,range)

This function calculates an approximate *internal rate of return* for a series of cash payments made at regular intervals, starting with an initial guess at the correct answer. The internal rate of return is defined as the discount rate such that the net present value of the the cash flow is zero. An iterative scheme is used for calculating the internal rate of return and the result *ERR* is returned if convergence to within .0000001 does not occur within 20 iterations.

In some cases the internal rate of return is multi-valued. In these cases, different answers may result from using different initial guesses. If there is only one sign change in the series of payments and @IRR converges to a result, then there is only one answer and that answer is the correct one. Normally, an initial guess between 0.0 and 1.0 will yield a result.

Example:

	A	B
1	Payments	Guess
2	−1000	.14
3	500	
4	400	
5	200	
6	100	

@IRR(B2,A2..A6) = .10212

@ISERR(x)

The value of the function is *TRUE* (1.0) if x = *ERR*; otherwise it is *FALSE* (0.0).

Example: @ISERR(B1) = 1 if the value of cell B1 is *ERR*
0 if the value of cell B1 is not *ERR*

@ISNA(x)

The value of the function is *TRUE* (1.0) if x = *NA*; otherwise it is *FALSE* (0.0).

Example: @ISNA(B1) = 1 if the value of cell B1 is *NA*
0 if the value of cell B1 is not *NA*

@LN(x)

The value of the function is the *natural logarithm* or *logarithm base e* of x. If x is zero or negative, the value is *ERR*.

Examples: @LN(1.258) = 0.2295236
@LN(B1) = logarithm base e of the value at cell B1

@LOG(x)

The value of the function is the *logarithm base 10* of x. If x is zero or negative, the value is *ERR*.

Examples: @LOG(1.258) = 0.09968064
@LOG(B1) = logarithm base 10 of the value at cell B1

@MAX(list)

The result of the function is the *maximum* of the values of all the entries in list. If there are no entries in the list, the function returns the result *ERR*. If a range is included in the list blank cells in the range are ignored.

Example:

	A
1	1.89
2	10.00
3	2.70
4	.05

@MAX(A1..A4) = 10

@MIN(list)

The result of the function is the *minimum* of the values of all the entries in list. If there are no entries in the list, the function returns the result *ERR*. If a range is included in the list blank cells in the range are ignored.

Example:

	A
1	1.89
2	10.00
3	2.70
4	.05

@MIN(A1..A4) = .05

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@MOD(x,y)

The value of this function is the modulus (or remainder) of x divided by y. This is calculated as: $x - (y*@INT(x/y))$. If y is zero, the value is *ERR*.

Examples: @MOD(15,7) = 1
@MOD(B1,B2) = value at cell B1 modulo value at cell B2

@MONTH(date)

The @MONTH function extracts the *month number* from a given date. The date must be expressed in the form of the number of days elapsed since December 31, 1899 (see ''Date Arithmetic,'' page 104).

Examples: @MONTH(30221) = 9
@MONTH(B4) = month number of date at cell B4

@NA

The value of the function is *NA* (not available).

Example: @IF (B14>3.2, @NA, B14)

@NPV(x,range)

This function calculates the *net present value* of a series of cash flows at equal intervals, assuming an interest rate per period, x. The range must be a segment of a row or a column, not a full rectangular block.

If $V_0...V_n$ are the values in the range, then: $NPV = \sum_{i=0}^{n} \frac{V_i}{(1+x)^i}$

Examples:

	A	B
1	Cash Flows	Interest Rate
2	− 1000	.1
3	400	
4	400	
5	400	

@NPV(.1,A2..A6) = 243.59
@NPV(B2,A2..A6) = 243.59

@PI

The value of the function is π (3.141592653589794). Note that @PI does not take an argument. Use @PI to convert degrees to radians for arguments to the @COS, @SIN, and @TAN functions (1 degree = @PI/180 radians).

Examples: @PI = 3.141592 ...
@SIN(30 *(@PI/180)) = .5

@PMT(principal,interest,n)

The @PMT function calculates the *mortgage payment per period* for a given principal, interest rate per period, and number of periods (n). The formula used is that for an ordinary annuity:

$$PMT = principal* \frac{interest}{1-(1+interest)^n}$$

This function gives correct results even if interest = 0.

Examples:

	A	B
1	Principal	1000
2	Interest	.1
3	Term	12

@PMT(1000,.1,12) = 146.76332
@PMT(B1,B2,B3) = 146.76332

@PV(payment,interest,term)

The @PV function calculates the *present value of an ordinary annuity* given a payment per period, an interest rate per payment period, and a number of periods. The formula used is:

$$PV = payment* \frac{1-(1+interest)^{-n}}{interest}$$

Example:

	A	B
1	Payment	100
2	Interest	.1
3	Term	12

@PV(100,.1,12) = 681.36918
@PV(B1,B2,B3) = 681.36918

@RAND

The value of the function is a *random number* uniformly distributed between 0.0 and 1.0. Note that @RAND does not take an argument.

Example: @RAND = .87320723

@ROUND(x,ndigits)

The result is the first argument, x, *rounded* to the number of digits specified by the second argument, ndigits. The second argument is converted to an integer and must be in the range from − 15 to + 15, inclusive. If ndigits is zero, then x is rounded to an integer. If ndigits is 1, then x is rounded to the nearest tenth. If ndigits is − 1, then x is rounded to the nearest multiple of 10.

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The @ROUND function may be used to perform accurate calculations on rounded currency amounts. A typical problem is totalling a column of numbers accurate to fractions of a cent but formatted as integers. Due to the accumulation of the cents and fractions of cents, the displayed total appears wrong. This problem may be avoided by rounding the numbers using the @ROUND function, thus yielding a correct total.

Examples: @ROUND(145.258, − 2) = 100.000
@ROUND(145.258, − 1) = 150.000
@ROUND(145.258,0) = 145.000
@ROUND(145.258,1) = 145.300
@ROUND(145.258,2) = 145.260
@ROUND(145.258,3) = 145.258
@ROUND(B1,B2) = value at cell B1 rounded to number
of digits at cell B2

@SIN(x)

The value of the function is the *sine* of x, where x is interpreted as an angle in radians.

Examples: @SIN(1.258) = .95147680
@SIN(B1) = sine of value at cell B1

@SQRT(x)

The value of the function is the *square root* of x. If x is negative, the value is *ERR*.

Examples: @SQRT(1.258) = 1.1216060
@SQRT(B1) = square root of value at cell B1

@STD(list)

The result of the function is the *standard deviation* of the values of all the entries in the list. If @COUNT(list) is zero, the function returns the result *ERR*. Blank cells in the range are ignored.

1-2-3 calculates the @STD value by taking the square root of @VAR(list). See page 287. For many statistical calculations, you may want a "sample" standard deviation. This can be easily computed:

sample std = @SQRT(@COUNT(list)/(@COUNT(list) − 1)) * @STD(list)

Example:

	A
1	1.89
2	10.00
3	2.70
4	.05

@STD(A1..A4) = 3.7842502

@SUM(list)

The result of the function is the *sum* of the values of all cells in the list. Blank cells in the range references are ignored.

Example:

	A
1	1.89
2	10.00
3	2.70
4	.05

@SUM(A1..A4) = 14.64

@TAN(x)

The value of the function is the *tangent* of x, where x is interpreted as an angle in radians. If $x = \pi/2 + \pi*n$ (where n = any integer), the value is *ERR*.

Examples: @TAN(1.258) = 3.0920165
@TAN(B1) = tangent of value at cell B1

@TODAY

The @TODAY function returns *today's date* in days since December 31, 1899 (see Date Arithmetic, page 104). The resulting number of days is in a form suitable for use with other date functions.

Example: @TODAY = 30249

@TRUE

The value of the function is 1.0. Note that @TRUE takes no argument.

Example: @TRUE = 1

@VAR(list)

The result of the function is the *variance* of the values of all the entries in the list. If @COUNT(list) is zero, the function returns the result *ERR*. Blank cells in cell range references are ignored.

$$\frac{n\Sigma x^2 - (\Sigma x)^2}{n^2}$$ n = @COUNT(list)
Each x is an element in the list.

Note that this is a "population" variance, calculated with n in the denominator rather than n − 1. For many statistical calculations, you may want a "sample" variance. This can be easily computed:

sample var = (@COUNT(list)/(@COUNT(list)-1)) * @VAR(list)

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Example:

	A
1	1.89
2	10.00
3	2.70
4	.05

@VAR(A1..A4) = 14.32055

@VLOOKUP(x,range,offset)

The @VLOOKUP function performs a *vertical table lookup* where the comparison values are in the first column of the range. These comparison values must be in increasing order, with no duplicates. The result of the function is determined by locating the first comparison value in the range which exceeds the test value, x. If this is the first cell in the range, the result is *ERR*. Otherwise the result is the value of a cell to the right of the comparison value in the range. The third argument, offset, determines how many columns to the right of the comparison column to look. If the value of offset is negative, or is greater than or equal to the number of columns in the range, the result is *ERR* (see also @HLOOKUP).

A common use of @VLOOKUP is in tax tables, with the comparison column being the income ranges.

Examples:

	A	B	C
1	3	1	
2	2	2	
3			
4	1	12.92	1.75
5	2	13.67	3.85
6	3	14.42	5.95
7	4	15.17	8.05

@VLOOKUP(3,A4..C7,1) = 14.42
@VLOOKUP(A1,A4..C7,B1) = 14.42
@VLOOKUP(2,A4..C7,2) = 3.85
@VLOOKUP(A2,A4..C7,B2) = 3.85

@YEAR(date)

The @YEAR function extracts the *year number* from a given date. The date must be expressed in the form of the number of days elapsed since December 31, 1899 (see Date Arithmetic, page 104).

Example: @YEAR(30221) = 82
@YEAR(B4) = year number of date at cell B4

Using the GRAPH Program

GRAPH is the program that allows you to print or plot graphs saved as files using the 1-2-3 command: /Graph Save. GRAPH allows you to control the way your graphs are printed. Graphing parameters such as the colors used in the graphing, the fonts (character styles), and orientation (position on the paper) may be adjusted to fit the needs of the graph(s) you want to print. GRAPH also allows you to "queue" a series of graphs; that is, you can select a series of graphs to be printed and GRAPH will print them in the order you define. And, as with 1-2-3, Help is never more than a keystroke away. Pressing the F1 [Help] key gives you a Help screen appropriate to your current action.

Like 1-2-3, GRAPH needs to know what graphics device is connected to your computer. Often you will be using the same printer to reproduce both worksheets and graphs, but you will still need to give GRAPH that information. Chances are, though, that you'll only need to specify that information to GRAPH once, when you first "configure" GRAPH; after that GRAPH will "remember" the configuration of your system.

This appendix will show you how to configure GRAPH for your system, and how to use GRAPH to print the graphs produced by 1-2-3.

Note: Not all printers can be used to create 1-2-3 graphs. If in doubt, consult your dealer.

Note: if you are using GRAPH with a hard disk drive, see the "Using 1-2-3 and GRAPH With a Hard Disk" appendix.

How to Start GRAPH

Because GRAPH is supplied on its own Program disk, you will need to put the GRAPH disk in Drive A before you can start GRAPH. If you are in DOS, then put the GRAPH disk in drive A, type "GRAPH," press ↵ [Enter] and the GRAPH menu will appear.

If you are in 1-2-3, you must exit the worksheet, using the /Quit Yes command. Remember to /File Save your current worksheet and /Graph Save your graphs before quitting! You will now see the LOTUS Access System menu (see page 13). Select GRAPH from the Access System menu by pointing to the command and pressing ↵ , or type the letter G. You will then be prompted to change disks. Remove the 1-2-3 System disk from drive A, insert the GRAPH Program disk, and press any key. The GRAPH menu will appear.

The GRAPH menu presents you with a series of options. They are:

Select	Select a graph or series of graph files for printing.
Options	Select printing options (colors, orientation, fonts).
Go	Print the selected graphs.

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Configure	Change the default GRAPH configuration.
Align	Set the current page position as "top of page".
Page	Advance the printer paper to the top of the next page.
Quit	Quit GRAPH.

Each of these options will be described in greater detail in the following sections.

Changing GRAPH's Default Configuration

GRAPH's current configuration is always displayed in the main area of the screen, below the control panel. As you make changes to GRAPH, the display will be updated to reflect the changes.

Just as with 1-2-3 configuration, GRAPH initially assumes that you have certain hardware connected to your system (the "default" configuration). The first time you start GRAPH, the default configuration will be:

DRIVES
    Pictures: B
    Fonts: A

GRAPHICS DEVICE
    Epson MX single

INTERFACE
    Parallel

PAGE SIZE
    Length: 11.000
    Width: 8.000

That is, GRAPH assumes that your graph files are stored on drive B, that your typeface styles (fonts) are stored on drive A (the GRAPH disk), that you are using an Epson MX-80 in single-density mode as your graphics device (printer), that the printer is connected to the parallel port, and that your page size will be 8" × 11". Note that the default page width is set to 8" because the Epson MX-80's maximum page size is 8". If these assumptions are correct, then you will not need to change anything. If your system is different, read on.

Since we are immediately concerned with changing GRAPH's default configuration, you should select Configure from the GRAPH menu. As with all 1-2-3 menus, options are selected by "pointing" to the option name with the menu pointer using the ← or → arrow keys and pressing ↵ , or by typing the first letter of the option. As you select each option, a list of configuration choices will appear under the command line.

The summary of configuration options shown below gives all the possible configuration choices. Default options are shown in boldface.

Option:	Configuration:
Files	Pictures: A, B, C...
	Fonts: A, B, C,...
Device	**1 Epson MX-80/100, single density (120 × 72) dots** (per inch)
	2 Epson MX-80/100, double density (120 × 144) dots (per inch)
	3 IDS Prism Printer (84 X 84) dots
	4 HP 7470A pen plotter
Page	Length **11.000**
	Width **8.000**
Interface	**1 Parallel**
	2 Serial
	3 Second Parallel
	4 Second Serial
Save	**Cancel**
	Replace
Reset	
Quit	

Summary of GRAPH Configuration Options

Files Option

Selecting this option allows you to specify which drive(s) will be searched for graph and font files when you are selecting graphs to be printed, and when you issue the Go command to print the graph files. Your choices are:

Pictures	Select drive containing graph files.
Fonts	Select drive containing fonts.
Quit	Return to the Configure menu.

Initially, Pictures is set to drive B (typically, using 1-2-3, you would /Graph Save your graphs to drive B) and Fonts is set to drive A. For either option, you will be prompted to enter the letter of the drive on which the respective files are stored. For example, if you want to tell GRAPH that your graph files are on drive A, you would select Pictures and type the letter "A" in response to the prompt. Selecting Quit will return you to the Configure menu. Notice, as always, that the status area of the screen has been updated to reflect your choice.

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Device Option

To change the graphics device, select Device from the Configure menu. You can choose between the following printers or plotters:

1   Epson MX-80/100, single density (120 × 72) dots (per inch)
2   Epson MX-80/100, double density (120 × 144) dots (per inch)
3   IDS Prism Printer (84 × 84) dots (per inch)
4   HP 7470A pen plotter

To choose a device, type the number that corresponds to the device or point to the number and press ↵ . That device will be selected and you will be returned to the Configure menu.

Notice that the printer names are accompanied by "dot resolution" numbers. These numbers indicate the relative graphics resolution (how accurately the printer can duplicate the graph) for each printer listed. For Epson printers, the question of which device to choose depends on your preference; any Epson equipped to handle graphics will work in either single or double density mode. The second choice, double density, will increase the density of the dot matrix to twice that of the first selection. Producing much higher quality results will more than double the time to print a graph. For the IDS printer and the HP plotter, only one choice is presented. If you are still confused by the printer designations, you might want to ask your dealer for advice. Your dealer or the manual that accompanied your printer are the best sources of information.

Page Option

The Page option allows you to control the default page length and height in inches. The options are:

Length   Length of printed page in inches (default = 11 inches)
Width   Width of printed page in inches (default = 8 inches)
Quit   Return to the Configure menu

Note that for Epson MX-80 printers, the default page width should be set to 8" (8.000). For an Epson MX-100 printer, the page width should be set to 13.600.

Depending on your selection, you will be prompted to enter a length or width in inches. The current values for length and width are always displayed in the status area of the screen. Selecting Quit returns you to the Configure menu.

Interface Option

To connect a printer to a computer, some type of interface card and cable are required. Computers communicate with printers using two different means: parallel or serial. You must tell the computer what kind of interface is connected or it will not communicate correctly with the printer.

To change the printer interface type, select Interface from the menu. You can choose one of four interface types:

1   Parallel. The parallel interface supplied as part of the IBM Monochrome Display and Printer Adapter.

2   Serial. The serial (RS232C-compatible) interface supplied as part of the IBM Asynchronous Communications Adapter (optional).

3   Second Parallel. An optional parallel interface.

4   Second Serial. An optional second serial interface.

Selections from the interface list are made by pointing to the choice and pressing ↵ . Once the choice is made, GRAPH returns to the Configure menu. The status screen will be updated to reflect the change.

The Parallel Port is the "standard" place where a printer would be connected for a personal computer, but your system may differ. If you are confused about interface types and ports, you might want to read the "IBM Technical Reference" that accompanied your computer, or you might want to check with your dealer to find out the exact configuration for your system.

GRAPH supports only devices which are IBM-compatible. Check with your dealer or consult the device literature to be sure that the device you have selected is compatible.

Save Option

If you made any changes in the configuration they will immediately take effect (as reflected on the status screen). However, these changes will be "forgotten" at the end of the current GRAPH session unless you Save them to disk. GRAPH will then use the new configuration in subsequent GRAPH sessions. You are given two choices:

Cancel   cancels the Save and returns you to the configuration menu.
Replace   causes the current configuration to be written to disk.

Reset Option

This menu selection allows you to cancel a GRAPH configuration that was altered during the current session. Once Reset has been selected, all newly entered GRAPH configuration options will be reset (1) to the configuration that was "read" from disk when GRAPH was started, or (2) to the configuration that was "saved" during the current session.

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Quit Option

Selecting Quit allows you to exit the Configure menu and return to the main GRAPH menu. If you have changed GRAPH's configuration and want to save that change, you should select Save before selecting Quit.

Using GRAPH to Output Graph

GRAPH's main function, of course, is to print graphs generated with 1-2-3 on a printer or other graphics device. To do this, GRAPH "reads" a 1-2-3 graph file (a ".PIC" or "picture" file) and formats it according to various options which you specify. GRAPH then outputs this graph to the graphics device.

The various format options are selected from the GRAPH menu just as you would select an option from any 1-2-3 menu. However, because GRAPH allows you to "queue" a list of graph files for printing, you may also select from lists of graph files on your storage diskette. Selections from lists are made by pressing [Space-Bar]. An example of this type of selection appears below.

The GRAPH menu options which affect the formatting and printing of graph files are:

Select   Select a graph or series of graphs for printing.

Options   Select graphics printing options (colors, orientation, fonts) before printing.

Go   Print the selected graphs.

Align   Set the current paper position as "top of page"

Page   Advance the printer paper to the top of the next page

Quit   Quit GRAPH.

The following sections will describe each of the major GRAPH commands in greater detail.

Selecting Pictures for Printing

The first option on the GRAPH menu, Select, allows you to specify the graph files you want to print. When you choose Select, a list of graphs is retrieved from the disk specified in the GRAPH configuration (see above) and displayed on the screen.

Use the ↑ and ↓ keys to move through the list of graphs. When you want to choose a graph, press [Space-Bar] and the graph name will be "marked" or selected. For example, suppose your data disk contained the following .PIC files: EXPENSE, INCOME, MONTHLY, and YEARLY. You want to choose MONTHLY as your first graph to be printed, so you use the ↑ and ↓ keys to move the pointer down the graph list to MONTHLY and press [Space-Bar]. An indicator will appear next to MONTHLY to show that it is selected:

        EXPENSE
        INCOME
    >>MONTHLY
        YEARLY

Any graphs that were selected during the current GRAPH session, but prior to the current Select, will also be marked with the indicator. While in the selection list, you may press the **F10** [Graph] function key at any time and the graph on which the pointer is resting will be displayed on the graphics monitor, allowing you to "preview" graphs before printing them.

Note: Do not be surprised if a "previewed" graph appears to have more detail than the graph as originally displayed in 1-2-3. In fact, the smaller lines of text in a previewed graph may appear to be unreadable. This is because the picture file (.PIC file) generated by 1-2-3 actually contains more detail than can be displayed by 1-2-3's /Graph View command. However, GRAPH is capable of printing this detail, and the hard copy will be similar to the graph that was displayed in 1-2-3, except more precise.

Other selections can be made from the graph list in the same way. If you want to remove a graph from the currently selected list, move the pointer to the graph name, press [Space-Bar] once again, and the indicator mark will be removed. Pressing [Esc] cancels the graph list and any new selections that were made from it (selections made prior to the current selections are kept), and returns you to the GRAPH menu. Pressing ↵ selects the currently highlighted graph and causes the currently selected list of graphs to be "saved" (don't confuse this with GRAPH configuration; picture selections are kept only for the duration of the current GRAPH session). You are returned to the main GRAPH menu and the list of selected graphs is displayed on the status screen in the order in which you selected them.

Choosing Other GRAPH Options

Selecting Options from the main GRAPH menu allows you to set or change various aspects of a graph or series of graphs before printing. Remember that Options apply to the entire set of selected graphs, so that if you intend to change options between graphs, you should select only those graphs to which the options will apply.

When you select Options, you are offered the following choices:

    Color   Font   Size   Pause   Eject   Quit

Color option

The Color option allows you to assign colors to various parts of the graph. The available colors and their possible uses are shown below. Note that the default color for the grid and the data ranges is black.

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REALTORS ■ MORTGAGE BANKERS ■ INSURANCE ■ PROPERTY MANAGERS
2850 Telegraph Avenue, Berkeley, California 94705
(415) 845-0200

Date _____

File # _____

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For (Child) _____ Social Security # _____

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Very truly yours,

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Reserves Administration Department

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Use	Color
Grid (grid, axes, scale)	Black
A (data range A)	Red
B (data range B)	Orange
C (data range C)	Yellow
D (data range D)	Blue
E (data range E)	Purple
F (data range F)	Brown

Color selections are made by first selecting the appropriate menu item (Grid, A, B, C, D, E, or F) and then selecting a color for that item from the list displayed in the control panel. The list of colors displayed in the status area of the screen will be continuously updated to reflect changes. The color option has no effect unless you are using a color graphics device (Prism printer or HP 7470A plotter).

Font option

This option allows the selection of fonts to be used in printing the text portions of the graph. Font 1 is only used for the first line of the graph title; Font 2 will be used for the rest of the graph. If no selection is made for Font 2, then Font 1 will be used for the entire graph.

Font selections are made in the same way as graph selections (see above) from the list of fonts displayed in the status area of the screen.

The fonts currently supplied on the GRAPH Program disk are:

SCRIPT1	ITALIC1
SCRIPT2	ITALIC2
BLOCK1	ROMAN1
BLOCK2	ROMAN2

The numbers after each font indicate how "bold" or dark the font is. For example, Script2 is bolder than Script1. The current selections for Font 1 and Font 2 are displayed on the status area of the screen at all times. The bold font produces high quality graphs only with high resolution printers and plotters.

Size option

The Size option allows you to choose the size and orientation of the graph on the paper. Each choice controls the values for margin, graph height, width, and rotation. The choices are:

Full — the graph will occupy the full page with normal margins. All variables are automatically adjusted. An indicator will appear on the screen.

Half — the graph will occupy half of a page. All variables are automatically adjusted.

Manual — each variable of graph placement can be adjusted manually (see below).

Figure 129.   GRAPH Fonts

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Selecting Manual from the Size options menu allows you to select each of the aspects of graph placement. These aspects are:

Height   adjusts height of the graph (vertical page length) in inches.

Width   adjusts the width of the graph (horizontal page width) in inches.

Left   adjusts the size of the left margin in inches.

Top   adjusts the size of the top margin in inches.

Rotation   adjusts the number of counter-clockwise degrees of rotation. Zero degrees of rotation will orient the X axis along the width of the page. Ninety degrees of rotation will orient the X axis along the height of the page.

Do not be alarmed if what you type for a value is not exactly what appears on the status screen (GRAPH uses the correct value, but displays a "rounded" value).

A Technical Note. A graph will be stretched or compressed to exactly fit the specified height and width after rotation of the graph. The degree of distortion depends on the relationship between the graph's X axis and Y axis scale values (called the "aspect ratio"). All 1-2-3 graphs are produced with an aspect ratio of approximately 1.385 to 1. Therefore, the ratio of height to width should be maintained at the same aspect ratio.

Pause Option

Selecting the Pause option causes GRAPH to pause between printing graphs. A pause might be required to change paper or switch settings on a printer, or to change pens on a plotter (in addition to the automatic pause to change pens on an HP plotter). The two Pause options are:

Yes   pause between the printing of each graph. GRAPH will signal the pause with a continuous beeping. Pressing [Space-Bar] causes GRAPH to continue.

No   GRAPH will not pause between printing graphs

As always, the current setting of Pause is displayed on the status area of the screen.

Eject option

Selecting Eject allows you to control whether GRAPH will automatically advance the paper to the next page between printing graphs. The Eject settings are:

Yes   advance (eject) the paper between printing of graphs. On a printer (a continuous paper-feed device), the paper will be advanced to the top of a new page before printing resumes. On a plotter, you will be prompted to put a new sheet of paper on the plotter before printing will resume.

No   no paper will be advanced between printing of graphs, unless GRAPH determines that the next graph to be printed is too "long" for the current page, in which case the paper will be advanced to the top of the next page automatically. Otherwise, you will have to use the printer's controls to advance paper.

As always, the current setting of Eject is displayed on the status area of the screen.

Readying the Printer

Before GRAPH does any printing, you should be sure that your printer is ready for printing. Two GRAPH options allow you to position the paper correctly:

Align   sets the current paper position to be the "top of page"

Page   advances the printer paper one page

The printer's controls can be used to advance the paper until the print head is located at the top of a new page. You should then select Align, to tell GRAPH that the current paper position is the top of form. Once the paper is Aligned, all subsequent Pages will cause the printer to advance exactly one page (to the top of form on the subsequent page).

The Page option works only after a graph has been printed (so that you can "page" ahead to the next page). If you need to advance the paper to Align it, use the printer's controls to do this.

Printing the Graph

Now you are ready to print your graph(s). Select Go from the GRAPH menu. GRAPH will then use the options you have selected in formatting and printing the graph on your printer and plotter. As GRAPH works, it will display messages in the status area of the screen letting you know what it is currently doing. During the printing process your printer may stop for a few seconds. This is normal. Please be patient. When all graphs have been printed, you will be returned to the GRAPH menu.

Leaving GRAPH

When you are finished using GRAPH, select Quit from the GRAPH menu. You will be prompted to confirm your Quit by selecting Yes or No. Selecting No will return you to the GRAPH menu. If you started GRAPH from the Access System menu, selecting Yes will return you to the Access System. You will be prompted to remove the GRAPH disk and reinsert your 1-2-3 System disk. If you started GRAPH from DOS, selecting Yes will return you to DOS.

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A Sample GRAPH Session: Printing Two Graphs

Suppose that you have two graphs that you want to print, PROJECT and EXPENSE, which are stored on a data disk in drive B. You normally use your Epson MX-80 printer as the graphics printer, but today you want to use an IDS Prism printer borrowed from a friend. What do you do next? Let's follow through a sample session with GRAPH.

First, we want to get GRAPH running. If we're still in 1-2-3, we need to save the current worksheet and graph(s) if we haven't already done so (using the /File Save and /Graph Save commands) and then exit 1-2-3 (using /Quit Yes). We are now in the Access System menu. We should select GRAPH from the menu, at which time we will be prompted to remove the 1-2-3 System disk from drive A and insert the GRAPH disk into the same drive. This done, the GRAPH menu and status screen will be displayed, showing us the current GRAPH configuration.

(If the DOS prompt A> had been displayed on the screen, we would have put the GRAPH disk in drive A and typed:

    GRAPH ↵

and the GRAPH menu and status screen would have been displayed after a few seconds.)

The first thing we should do is tell GRAPH where the pictures and fonts we want to use are stored. Notice that the status screen gives us the current configuration:

DRIVES
    Pictures: B
    Fonts: A

Is that correct? Our data disk is located in drive B, so we don't need to change Pictures. Usually fonts are located on the GRAPH Program Disk in drive A, so that won't need to be changed either. If that wasn't the case, we could:

1. Select Configure Files Pictures or Configure Files Fonts from the menu.

2. When prompted, we would type the letter for the drive where pictures or fonts are stored. In either case, we would press ↵ following the entry.

The status screen would immediately show the new configuration. If we wanted to make the drive change permanent, we would also have to select Configure Save Replace to record the change in GRAPH. Remember, we can always change the configuration at any time. In computers, at least, nothing is forever.

One more thing. A quick check of the status screen tells us that the current GRAPHICS DEVICE is an "Epson MX single," which is set to use as its INTERFACE, the "Parallel." Since our system will use an IDS Prism printer (for the moment, anyway), we need to change the device. We should select Configure Device 3 from the menu, which will update the status screen accordingly. The Interface option remains the same.

Should we Save the new printer configuration? Probably not, since the IDS printer is temporary. The next time we start the GRAPH Program, it will read the startup configuration stored on the GRAPH Program disk, and our "default" printer will again be the Epson.

Now we should select the graphs we want to print from the files stored on our data disk. When we choose Select from the GRAPH menu, the available picture files on the data disk will be displayed in the status area of the screen:

    EXPENSE
    MONTHLY
    NEWCHART
    PROJECT
    YEARLY

The graphs we want to print are PROJECT and EXPENSE, so we should select these graphs from the list of pictures by using the ↑ and ↓ keys to move the highlighted pointer to the pictures we want to select. When we reach PROJECT and EXPENSE, we should press [Space-Bar] to select the pictures. An indicator will appear next to the selected pictures, like this:

    > >EXPENSE
    MONTHLY
    NEWCHART
    > >PROJECT
    YEARLY

The [Space-Bar] key acts as both a "selector" and a "deselector" for pictures (it's also called a "toggle," because it "toggles" between two choices). So if we make a mistake, we can deselect, or select, a picture as many times as we want. When the highlight is on each name, we should press the **F10** [Graph] key to produce a rough sketch of the graph on the screen. This allows us to verify our graph choices — EXPENSE and PROJECT. When we've finished selecting pictures, we should press ↵ , and the status screen will be redisplayed with the selected pictures listed at the left in the exact order in which we selected them. The selection order will also be the order in which the pictures are printed. But we're not quite ready for printing yet.

We have a few more choices that we could make. We could select different colors and fonts to be used in printing the graphs. We could also change the size and alignment of the graphs on the page, whether GRAPH pauses between printing graphs, and whether each graph should be printed on a new page. As always, GRAPH's status screen shows the currently selected fonts and colors, and the current size and alignment settings for the soon-to-be-printed graphs.

Date _____

File # _____

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Checking the status screen, we find that the currently selected colors for the graph are:

COLORS

Grid:	Black
A Range:	Red
B Range:	Orange
C Range:	Brown
D Range:	Green
E Range:	Blue
F Range:	Purple

Since our hypothetical printer has a (hypothetical) black and red ribbon, we could keep the current color assignment (orange, or course, will print as black), but we've decided to print the graphs entirely in black. EXPENSES and PROJECT each involve only two data ranges. So here's how we can specify the colors for those data ranges:

1. Select Options Color A Black from the menu. The status screen will be immediately updated to reflect the change.

2. Now, since we haven't left the Color menu, choose B Black and the color for the B Range will also be changed to black. Again, the status screen will reflect this.

3. To exit the Color menu, we should select Quit and we'll be returned to the Options menu. Another Quit will put us back in the GRAPH menu.

Finally, we have decided to print our graphs using the ROMAN2 font. We select Options Font from the GRAPH menu, and a list of available fonts will be displayed on the status screen. Selections from this list are made in exactly the same way as selections from the Pictures list. We're allowed to pick one font each time. The first font selected will automatically become "Font 1" and will be used on graph titles; the second choice will become "Font 2" and will be used on graph legends. If we don't make a separate selection for Font 2, the font we selected for Font 1 will be used for the whole graph. As a font is selected, we are returned to the Options menu. Once we have selected the fonts, we are ready to do some graph printing.

Did you manually change the position of the printer paper? If so, reposition it at the top of the next page and Align from the GRAPH menu. Nothing will happen (so it appears), but GRAPH will "know" where the top of the paper is. If the paper isn't at top of page, use the printer's controls to advance the paper until it is, then select Align.

Before printing, we have one more thing to do: Instruct GRAPH to "page-eject" between graphs. To do this, we select the Eject Yes option.

To print the graphs, we should select Go from the GRAPH menu. As GRAPH processes the graphs and prints them, it will inform us of its progress by displaying these messages:

Loading Font A: ROMAN2

Loading Picture B: PROJECT

Generating Picture B: PROJECT

The message "WORKING" will also be displayed in the upper right corner of the control panel. Incidentally, do not be dismayed if your graphics printer seems to run slower than usual, or pauses to think, when printing graphs; the fine resolution required to print graphs causes the print head to move much slower than normal. When the graphs are done printing, we can select Page and the paper will advance to the top of the next page.

Voila! Our two graphs are printed the way we wanted them. We can now "fine tune" the graphs by altering some of the other GRAPH parameters. That's the best thing about GRAPH; if you don't exactly like the way things look, you can electronically change them until they're just right.

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Error Messages

There are some things that 1-2-3 just cannot do. When you ask for the impossible, it *beeps*, shows an "error message" at the bottom of the screen, and changes the Mode Indicator to *ERROR*. The message is a brief explanation of what is wrong.

To continue working with 1-2-3, press [Esc] or ↵ [Enter]. Until you do this, 1-2-3 won't let you do anything: give a command, type something into the worksheet, anything. It just *beeps* with each keystroke.

After you press [Esc] or ↵, you are back in 1-2-3 in Ready Mode. No data will have been lost. Sometimes the worksheet will have changed, as when you run out of memory; the command will stop when the memory is filled.

Then, before trying the same command again, fix whatever it was that caused the error. This depends on the error message. This section contains suggestions of what to do.

Here is an alphabetical list of error messages:

Cannot create file. This error message usually means you are trying to store too many files on your disk.

Cannot delete file. This error usually means you are trying to erase a file that does not exist.

Cannot read help file. An error has occurred while trying to read the Help file.

Disk drive not ready. You have tried to access a disk that is not ready; the disk drive door is probably open, or there is no disk in the drive.

Disk error. 1-2-3 has tried to read or write on a disk and an error occurred. 1-2-3 will try again automatically; if it again gets the error, it gives you this message. Probably, the disk is damaged; sometimes, the drive is at fault.

Disk full. The available disk space is exhausted. Try another diskette. You can find out how much space is left on a disk with the /File List command. To save a worksheet that is too large to fit on one disk, you must use /File Xtract to save portions of the worksheet.

Disk is write protected. You have tried to write (/File Save or Xtract, /Print File, /Graph File or /Worksheet Global Default Update) on a write protected disk or diskette (one with a tab covering the notch). Check the disk and try again.

File close error. This error should never occur; if it does, something may be wrong with your computer or system disk.

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File does not exist. The requested input file does not exist. You can find out what files are on the current disk with the /File List command.

Formula computation error. You should never get this error message. If you do, something may be wrong with your computer or system disk.

Formula too long. The formula just entered is too long or contains too many levels of nested parentheses. Break the formula down into two or more components, writing each one into a separate cell.

Illegal cell or range address. You have given 1-2-3 a set of cell coordinates or a range name which it can not interpret. This is usually a typing error; legal coordinates are A1 .. IV2048. It can also happen if you have deleted an endpoint of a named range, which sets the named range to *ERR*.

Illegal character in filename. You can only use letters, numbers and the underscore (__) in filenames.

Illegal disk name. You have tried to use a disk prefix letter not in range A..P; this is probably a typing error.

Illegal file format. The file you attempted to /File Retrieve or /File Combine is not a valid worksheet file. Only files created with /File Save or /File Xtract can be brought into the worksheet using /File Retrieve or /File Combine. If one of these files causes this error, the disk has been damaged.

Illegal menu. Using the /X Menu command (used only in Keyboard Macros), you have specified more than 8 items, or all your prompts, taken together, have too many characters, or you have failed to specify any items.

Illegal number input. You provided an invalid number in response to a command prompt. This could be a typing error, or a number larger or smaller than the command can accept (see the "Typing Cell Entries" chapter). Type the number again.

Illegal "\nnn" code in setup string. The "nnn" code is the decimal representation of the ASCII code. All three characters must be digits, and the number they represent cannot exceed 255. (See the 'Printer Control Codes" appendix.)

Input line too long. You have tried to /File Import a text file with a line longer than 240 characters. Since 1-2-3 expects lines to end with a carriage return, this can happen when importing files from a program that doesn't use carriage returns at the end of each line.

Justify range is full. In /Range Justify, there's not enough room in the specified range for the labels after justification. After pressing [Esc], 1-2-3 will show what justification it could do. Make more room for the labels and try again.

Key column is outside of sort range. While using /Data Sort, you specified as a key a column outside the range of cells being sorted. Respecify the key column and try again.

Memory Full. The available worksheet storage space is full. You can sometimes save some space by /File Saving the file on a disk and then /File Retrieving it; this is particularly effective if you have been inserting and deleting columns and/or rows.

The biggest factor in memory usage under your control are the positions of the non-blank cells farthest to the right and toward the bottom of the worksheet. By pressing the [End] key followed by the [Home] key, you can see the lower right corner of the active area of the worksheet. The best way to save memory is to rearrange your worksheet so that it can be contained in the smallest possible rectangle, the top left corner of which is cell A1.

Missing or illegal configuration file. 1-2-3 could not find the file named 123.CNF that has your configuration data. After you press [Esc], 1-2-3 will continue to operate with default choices. Use /Worksheet Global Default to specify your equipment and Update the configuration file.

Named range not found in worksheet file. You have attempted to /File Combine a named range that was not in the worksheet file you specified. Respecify the file or the named range; if it still doesn't work, /File Save your present file, /File Retrieve the file from which you wanted a copy of the range, and check the range names.

No files of specified type on disk. You have tried to /File List files on a disk on which there are no files of the type you requested.

No unprotected cells in range. You selected /Range Input, but there are no unprotected cells in the input range for the pointer to rest on.

Not a valid worksheet file. The file you attempted to /File Retrieve or /File Combine is not a valid worksheet file. Only files created with /File Save or /File Xtract can be brought into the worksheet using /File Retrieve and /File Combine. If one of these files causes this error, the disk has been damaged.

Number stack full. You should never get this error message; if you do, please contact Lotus customer support. See the Customer Service Booklet.

Part of file is missing. A file being read has been truncated. This error should be rare since any partial file is deleted when you get a "Disk Full" error. If it does happen, probably as a result of physical damage to your disk, you must rebuild the file. This error can also appear if the end-of-file character (Control Z) is missing from an Imported file.

Printer error. There are problems with your printer. This may be as simple as being out of paper or having a loose cable.

Protected Cell. You tried to change the contents of a protected cell while protection was enabled. You can /Range Unprotect the cell or /Worksheet Global Protection Disable for the entire worksheet.

Range name does not exist. You have specified a named range that does not exist.

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System error. 1-2-3 has detected an internal inconsistency in the operating system. Reboot the system immediately.

Too many fields. In /Data Query, you have specified a criterion or output range with more than the maximum of 32 fields.

Too many records for output range. In /Data Query Retrieve, the output range did not contain enough rows for the number of records that fit the criteria. Therefore, the output range does not contain all the selected records.

Unrecognized key name in braces. In a Keyboard Macro, you have typed a name in {braces} that is not the name of key. This is usually a typing mistake.

Worksheet full. You have tried to shift non-blank cells off the right or bottom edges of the worksheet. This frequently happens when trying to /Worksheet Insert a Row in a full column or a Column into a full row. It may also happen during a /Copy or /Move where part of the target range falls off the end of the worksheet.

Printer Control Codes

Printers often require special characters, called "ASCII control codes" to be sent to them to accomplish particular tasks. Control codes aren't usually required for regular printing, but if your printer is capable of special functions (using compressed type sizes, printing in color, etc.) then it probably requires control codes to do the trick.

Each printer recognizes its own set of control codes, and *only* its own. Be sure to consult your printer's user manual for a list of control codes.

1-2-3 will allow you to send *any* character or characters to your printer as a **setup string**, using the /Print Printer Options Setup or /Printer File Options Setup commands. (see the "Print commands" chapter).

In 1-2-3, the first *thirty-two* ASCII codes, representing "control" characters (holding down the [Ctrl] key and typing the letter), must be entered in the form:

\nnn

where nnn = the three-digit ASCII code for the character.

The rest of the codes may be entered either as a typed character (see below) or in their ASCII form preceded by a backslash.

Example 1. The setup sequence: **[Ctrl]O [Esc]4** which on an Epson printer turns on compressed print and italics would be entered as: **\015\0274**.

Example 2. The setup sequence: **ESC,Q,2,$** which on an IDS Prism printer selects the magenta color on a process ribbon could be entered as: **\027,Q,2,$**, or alternately, **\027,\081,\050,\036**. In this example, the commas (,) must be inserted between each "character" of the setup code because IDS requires commas to separate command characters.

The following table shows the standard ASCII codes, their character equivalents, their 1-2-3 equivalents, and their alternate meanings, if any. The [Ctrl] key is represented by ^ followed by the typed character, e.g. ^A is the same as [Ctrl]-A.

Decimal ASCII code	Character	1-2-3 Setup String	Alternate Meaning
0	^@	\000	
1	^A	\001	
2	^B	\002	
3	^C	\003	
4	^D	\004	
5	^E	\005	
6	^F	\006	
7	^G	\007	(bell)
8	^H	\008	
9	^I	\009	(tab)
10	^J	\010	(line feed)
11	^K	\011	
12	^L	\012	(form feed)
13	^M	\013	(carriage return)

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attached instructions.)

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address of your income source in the upper left hand corner.)

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form. They have stated that you are not employed by them. Please
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_____ Name and social security number of the person whose social security
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Name _____ Social Security # _____

For (Child) _____ Social Security # _____

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14	^N	\014
15	^O	\015
16	^P	\016
17	^Q	\017
18	^R	\018
19	^S	\019
20	^T	\020
21	^U	\021
22	^V	\022
23	^W	\023
24	^X	\024
25	^Y	\025
26	^Z	\026
27	[ESCAPE]	\027
28	FS	\028
29	GS	\029
30	RS	\030
31	US	\031
32	[SPACE]	\032
33	!	\033
34	,,	\034
35	#	\035
36	$	\036
37	%	\037
38	&	\038
39	'	\039
40	(	\040
41	)	\041
42	*	\042
43	+	\043
44	,	\044
45	—	\045
46	.	\046
47	/	\047
48	0	\048
49	1	\049
50	2	\050
51	3	\051
52	4	\052
53	5	\053
54	6	\054
55	7	\055
56	8	\056
57	9	\057
58	:	\058
59	;	\059
60	<	\060
61	=	\061
62	>	\062
63	?	\063
64	@	\064
65	A	\065
66	B	\066
67	C	\067
68	D	\068
69	E	\069
70	F	\070
71	G	\071
72	H	\072
73	I	\073
74	J	\074
75	K	\075
76	L	\076
77	M	\077
78	N	\078
79	O	\079
80	P	\080
81	Q	\081
82	R	\082
83	S	\083
84	T	\084
85	U	\085
86	V	\086
87	W	\087
88	X	\088
89	Y	\089
90	Z	\090
91	[	\091
92	\	\092
93	]	\093
94	^	\094
95	—	\095
96	`	\096
97	a	\097
98	b	\098
99	c	\099
100	d	\100
101	e	\101
102	f	\102
103	g	\103
104	h	\104

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105	i	\105
106	j	\106
107	k	\107
108	l	\108
109	m	\109
110	n	\110
111	o	\111
112	p	\112
113	q	\113
114	r	\114
115	s	\115
116	t	\116
117	u	\117
118	v	\118
119	w	\119
120	x	\120
121	y	\121
122	z	\122
123	{	\123
124	¦	\124
125	}	\125
126	~	\126
127	DEL	\127

A Note to Experienced Electronic Spreadsheet Users

If you're used to other spreadsheet programs like VisiCalc™, be prepared for some pleasant surprises. 1-2-3 not only significantly expands the worksheet capability you're already familiar with, it also adds graphing and data management facilities.

Other sections of this manual describe all the various features and capabilities of 1-2-3. The following should give you a glance at some of the major differences and features that separate 1-2-3 from the other guys.

Major Differences

When 1-2-3 is first loaded, the screen will probably look pretty much like what you're used to, but the resemblance will end there. When you type the slash (/) key to access a command, 1-2-3 will display a series of command words, not just a series of letters representing commands. You can select any command by "pointing" the cursor (we call it the *pointer*) at the command using the left or right arrow keys and then pressing ↵ [Enter], or you can just type the first letter of the command word. Notice that the line under the command words displays a short description of what each command does (see the "Using Commands" chapter).

Some of the commands which directly affect worksheet operation will perhaps look the same as those you're used to, but their implementation will differ. 1-2-3 distinguishes between global operations affecting the entire worksheet and range operations affecting a single cell or group of cells. Command options involving deletion or insertion of columns or rows, erasing the worksheet, setting column widths, etc., are grouped under the /Worksheet (/W) command. Operations which affect an individual cell or range of cells are grouped under the /Range (/R) command.

The /Copy (/C) command allows you to copy a single cell or range of cells to a target cell or range of cells. /Copy replaces the Replicate function found on many spreadsheet programs. In other programs, replication typically requires formula references to cells to be specified as "relative" or "no change" at the time of replication. In 1-2-3, this information is specified in the formula itself, rather than at the time of copying. Copying is not restricted to a single row or column, and 1-2-3's expandable pointer lets you "highlight" the area of the worksheet you are defining for the copy. The /Move (/M) command is fundamentally different. It lets you "pick up" a range of cells in the worksheet and "put it down" at another location, automatically adjusting all cell references. And because of expandable pointer highlighting, you can see the block you are moving.

Date _____

File # _____

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Summary of Command Differences

The table below shows the major VisiCalc commands and their 1-2-3 equivalents. (See the "1-2-3 Command Tree" appendix for a complete description of 1-2-3 commands.)

VC Command	VC Meaning	1-2-3 Command	1-2-3 Meaning
/B	Blank (cell)	/RE	Erase a cell or range of cells
/C	Clear (worksheet)	/WE	Erase Worksheet
/D	Delete Row/Column	/WD	Delete Rows or Columns
/E	Edit Entry	F2 [Edit]	Edit Entry
/GF	Format (global)	/WGF	Formats the worksheet (global)
/F	Format a Cell	/RF	Formats a cell or range
/G	Global	/WG	Sets global worksheet parameters
/I	Insert Row/Column	/WI	Insert Rows or Columns
/M	Move	/M	Moves a cell or range of cells (not directly equivalent)
/P	Print	/P	Prints contents of worksheet to printer or file
/R	Replicate	/C	Copies a cell or range of cells to a target cell or range of cells. Absolute cell references are specified before copying.
/S	Storage	/F	File Commands
/T	Titles	/WT	Titles
/V	Version	none	Displayed at startup
/W	Window	/WW	Window
/-	Repeating Label	none	Use label prefix "\"

Other Features of 1-2-3

Worksheet Size. The worksheet is 256 columns by 2048 rows. 1-2-3 can use 544K of memory, if installed.

Graphing Facilities. 1-2-3 allows you to make line, bar, pie, stacked bar, and XY charts using data from the worksheet. The graph data and formats are saved along with the worksheet, or as separate picture files. New graphs can be made each time you change the worksheet by using the dedicated Graph function key, **F10**.

Database Facilities. From within the worksheet, data records are entered using the familiar column/row format (1-2-3 allows up to 2047 records with 256 fields). Commands are provided to manipulate records, including the ability to search for and extract records that meet your defined criteria. In addition, you may sort, build data tables, and calculate distributions for statistical analysis of the records in the database. Data contained in the database can be used in worksheet calculations, or graphing, or both.

Speed of Execution. 1-2-3 is the fastest spreadsheet program currently available for the IBM Personal Computer.

Natural Recalculation Order. Automatically eliminates all forward references.

On-line HELP Facility. 1-2-3 gives you assistance when you need it most. If you can't remember what a command does, if you're stuck for what to do next, or if you simply don't like reading reference manuals, you can press the dedicated [Help] function key, **F1**, and receive instant help on the current problem. The Help function can be invoked at any time, even during data entry. Not only do you get help on the current command, you can access related topics and even an index of all Help topics by simply pointing at the name of the item you need help with.

Dedicated Function Keys. Frequently used 1-2-3 commands such as Graph, Calc, GoTo, etc., can be executed with one press of a function key. A template showing these special functions is provided to fit over the function keypad. All the standard keyboard functions such as [Home], [PgUp], PgDn], [End], →, and ← are available.

Extended Mathematical Functions. 1-2-3 extends the mathematical functions usually found in spreadsheet programs. Besides the familiar array of mathematical and logical operators, 1-2-3 provides additional functions such as future value, payment, and date functions. Statistical functions such as standard deviation and variance are also included. A complete summary of these functions will be found in the "1-2-3 Function Reference" appendix.

Printer Control. 1-2-3 allows extensive formatting of a worksheet before it goes to the printer. You may print selected portions of a worksheet and add headings, footings, margins, borders, page numbers, titles, and even the date and page numbers to make your printed worksheet into a final report.

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Macro Capability. 1-2-3 further extends your ability to manipulate the worksheet by allowing you to create command macros using the "Typing Alternative." This powerful feature allows you to "tie" a series of frequently used keystrokes to a single [Alt]-letter. And, 1-2-3 will save the macro along with the worksheet so that it's ready to use the next time you need it.

Importing and Exporting Files. 1-2-3 can import and export standard ASCII text files, so that no special file translation programs are necessary to read data from, or send data to, other programs.

Of course, we've barely scratched the surface of 1-2-3's capabilities. Since you're already an experienced spreadsheet user, you might want to jump right in and get started, but we also hope you'll take a glance at the 1-2-3 Electronic Tutorial. The new world of 1-2-3 is at your fingertips. Enjoy!

Using 1-2-3 and GRAPH with a Hard Disk

This appendix details the installation and use of 1-2-3 and GRAPH with hard disk drives. The information given here is preliminary; the literature that accompanied the hard disk and your dealer are your best resources in the event of difficulties. We feel that using hard disk drives requires a slightly higher level of technical awareness than using a floppy disk, and so we urge you to be cautious when using the hard disk.

When using a hard disk, the 1-2-3 System Disk must reside in drive A at all times.

Preparation of the Hard Disk

You should use the hard disk manufacturer's instructions for installing the hard disk. In particular, if the manufacturer provides a special or altered version of DOS, then you must use it. Many hard disks also require "formatting" before use — check the manufacturer's literature.

Preparation of the Lotus Program disks

Follow the intructions in the "Read This First" section at the front of this manual. The version of DOS that runs your hard disk must be installed on the 1-2-3 system disks before transferring any files to the hard disk.

> **Note.** If you are using only a single floppy disk drive, you will not be able to use the INSTALL.BAT file provided as part of the Lotus disk package. You must boot the standard DOS disk and use the SYS command to make the Lotus disks bootable. In addition, COMMAND.COM must be copied to all disks using the DOS Copy command. Finally, use the DOS Copy command to transfer the following files to the 1-2-3 System disk and the Backup disk:
>
> DISKCOPY.COM
> DISKCOMP.COM
> CHKDSK.COM
> FORMAT.COM
>
> If you are using a computer with more than 320K of memory, and you have not "patched" DISKCOPY.COM and DISKCOMP.COM to fix the errors in version 1.10 of DOS, then with the System disk in drive A, type:
>
> FIXDOS ↵

Repeat this procedure for the System Backup disk.

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Transferring Files to the Hard Disk

Copy the following files to the hard disk using the DOS Copy command.

	Copy	Do Not Copy
1-2-3 Program disk	LOTUS.COM 123.EXE 123.CNF 123.HLP LTSLOAD.COM FILEMGR.COM	COMMAND.COM AUTOEXEC.BAT INSTALL.BAT FIXDOS.COM
GRAPH Program disk	GRAPH.EXE GRAPH.CNF GRAPH.HLP BLOCK1.FON BLOCK2.FON ROMAN1.FON ROMAN2.FON ITALIC1.FON ITALIC2.FON SCRIPT1.FON SCRIPT2.FON TRANSLAT.COM VCWKS.EXE DIFWKS.EXE WKSDIF.EXE	COMMAND.COM Can also be done with *.FON
Optional Files (from DOS disk)	DISKCOPY.COM DISKCOMP.COM CHKDSK.COM FORMAT.COM	

Using 1-2-3 and GRAPH

Now that 1-2-3, the Lotus Access System, and GRAPH are on the hard disk, you should be able to use the programs as usual, keeping the following notes in mind.

1. To start the Lotus Access System, type: **LOTUS** ↵ as usual.

2. To start 1-2-3 from the Lotus Access System, point to the menu choice and press ↵ . *Note that the original 1-2-3 Program disk or backup disk must be installed in drive A (the first floppy disk drive).* If not, 1-2-3 will terminate immediately after displaying its logo.

3. Modify 1-2-3's configuration as required to store worksheet, print, and graph files on the hard disk (see the "Configuring 1-2-3" appendix).

4. GRAPH can also be run without any further alteration. You will want to modify GRAPH's configuration to retrieve Picture and Font files from the correct disk (see the "Using the GRAPH Program" appendix.)

Transferring Files Between Programs

Transferring a file between 1-2-3 and GRAPH is nearly automatic; all you have to do is use the /Graph Save command and 1-2-3 does the rest of the work for you. GRAPH can "read" a graph picture (.PIC) file generated by 1-2-3 without any difficulty.

Some files, such as text files (ASCII text files) from word processing or Basic programs, can be transferred to and from 1-2-3 through the use of the /File Import or /Print File commands.

Unfortunately, the rest of the computer world doesn't always work that way. While we hope you'll be using 1-2-3 and GRAPH to do most of your computing, we know that you may have data generated by other programs that you'd like to transfer to 1-2-3. This appendix describes the use of the Translate Utility, the program which can help you move data between other programs and 1-2-3.

What can be Translated?

Translate will transfer files between the following file formats.

Source	Destination
VisiCalc	1-2-3
DIF (Data Interchange Format)	1-2-3
1-2-3	DIF

It should be noted that dBASE-II files are not transferred directly, but require several translation steps, as detailed below. The other files are transferred directly by the Translate Utility.

Using the Translate Utility

1. Before performing any file translations, you must append the appropriate file extension to the file to be translated, if the extension is not already present. Use the Lotus Access System File-Mgr Program, or the DOS RENAME command, to add the correct extension as shown below:

Source of File	Extension Needed	Resulting Filename
VisiCalc	.VC	filename.VC
DIF	.DIF	filename.DIF

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2. Select Translate from the Lotus Access System menu. You will be prompted to insert the GRAPH Program disk in drive A (that disk contains the Translate Utility). When the Utility has loaded you will see a menu listing the various types of translations. Your choices are:

Menu Choice	Function
VC to WKS	Translate VisiCalc .VC file to 1-2-3 worksheet file
DIF to WKS	Translate .DIF data file to 1-2-3 worksheet file
WKS to DIF	Translate 1-2-3 worksheet to .DIF data file
Quit	Exit Translation Program

3. After selecting one of the menu choices, you will be prompted to enter the "source drive," the disk drive containing the disk with the files you wish to translate.

4. Once the source drive has been selected, the area of the screen beneath the control panel will clear and a list of files with the correct file extension for the transfer you have selected will be displayed. For example, if you had selected .VC to .WKS, the screen might display the following:

FILE1.VC
FILE2.VC
FILE3.VC

Select one of the files by moving the pointer through the list using the Pointer-Movement keys. Press ↵ [Enter] when the file you want to select is highlighted. You may only select one file for transfer at a time.

5. Next, you will be prompted to enter the destination drive for the transfer.

6. You will now be asked to confirm the file transfer, by indicating Yes, No, or Quit. A message showing the source drive, destination drive, and filename will also be displayed. If, for example, you had selected FILE2.VC, above, the following message would be displayed:

Translate s:FILE2.VC   To d:FILE2.WKS

where: s = source drive   d = destination drive

7. If you want the translation to proceed, enter Yes in response to the confirmation prompt. You will not be able to use the computer's keyboard while the transfer is in progress. If you selected a .DIF to .WKS translation, you will be prompted to indicate whether the translation should be Rowwise or Columnwise before the translation begins. For a .WKS to .DIF translation, use *only* worksheet files created by 1-2-3.

8. If you do not want to translate the file indicated, enter No in response to the confirmation prompt. You will be returned to the file selection list (step 4).

9. If you want to quit using Translate, enter Quit in response to the confirmation prompt. You will be returned to the Translate menu (step 2).

Transfer of Data from dBASE-II to 1-2-3

dBASE-II has a facility for producing text output. The dBASE-II COPY command combined with the DELIMITED and WITH modifiers will produce a file of printable text in which the database fields are "delimited" (separated) by commas and characters are delimited by quotation marks. Each record in the database will occupy one line of text.

1-2-3 can read a file that is constructed of strings (labels) delimited by quotes, and numbers. Each line of the text file corresponds to a row in the worksheet. Strings are interpreted as labels and numbers are interpreted as constants.

The records in the original dBASE-II file might look like this:

Plotter	HP7470A	2.0	1.0
Printer	Epson MX-80	2.0	1.0
Printer	Epson MX-100	1.0	5.0
Printer	IDS Prism 80	0.0	1.0

Issuing the dBASE-II command: COPY file.prn DELIMITED WITH ", would cause a file called FILE.PRN to be written, which would look like this:

"Plotter ","HP7470A	", 2.0, 1.0
"Printer ","Epson MX-80	", 2.0, 1.0
"Printer ","Epson MX-100	", 1.0, 5.0
"Printer ","IDS Prism 80	", 0.0, 1.0

The file can now be read into 1-2-3, using the /File Import Numbers command, producing a worksheet four columns wide:

	A	B	C	D
1	Plotter	HP7470A	2.0	1.0
2	Printer	Epson MX-80	2.0	1.0
3	Printer	Epson MX-100	1.0	5.0
4	Printer	IDS Prism 80	0.0	1.0

Note that columns A and B are interpreted as labels, while columns C and D are interpreted as numeric constants.

Several problems may occur in this translation. dBASE-II supports three field types: character, numeric, and logical. Numeric and logical fields may contain no data, but when they are listed (using the dBASE-II LIST command), empty numeric fields are displayed as "0.0" and empty logical fields are displayed as ".F.". However, empty logical fields are written to the text file as " ".

An empty character field contains a string of blanks. There are at least two methods to get empty fields into the database: (1) the dBASE-II APPEND BLANK command specifically appends a record to the database in which all fields are empty, and (2) when the APPEND command is used to reformat a file and the new file has fields which do not exist in the old file, the new fields are initialized as empty.

The problem comes when 1-2-3 reads these empty fields. An empty field is interpreted

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(Verification was returned by Post Office.)

_____ Confirmation of the income source circled on attached copy of your form. They have stated that you are not employed by them. Please check for the correct address or notify us if there has been a job change.

_____

_____

_____ Name and social security number of the person whose social security account pays benefits to your children:

Name _____ Social Security # _____

For (Child) _____ Social Security # _____

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preted as just that, an empty field, and will cause misalignment of fields on the worksheet. For example, if two of our fields in the example used above were empty, the resulting worksheet would look like this:

	A	B	C	D
1	Plotter	HP7470A	2.0	1.0
2	Printer	2.0	1.0	
3	Printer	Epson MX-100	1.0	5.0
4	Printer	0.0	1.0	

The only way to prevent this from happening is to be sure that none of the dBASE-II fields in the records to be transferred are empty.

Transfer of Data from 1-2-3 to dBASE-II

dBASE-II has the ability to read text files produced by 1-2-3. Using the example given in the previous section, the /Print File Options Unformatted command would produce the following text file:

Plotter	HP7470A	2.0	1.0
Printer	Epson MX-80	2.0	1.0
Printer	Epson MX-100	1.0	5.0
Printer	IDS Prism 80	0.0	1.0

It is then necessary to define a file structure in dBASE-II that will accept the columnar data as fields. The following database could be CREATEd:

Field	Name	Type	Length	Decimals
001	Category	char	009	
002	Item	char	027	
003	Priority	number	005	001
004	Time	number	005	001
	TOTAL		046	

Using the above structure, dBASE-II will then accept 1-2-3's text file with the command: APPEND FROM file.PRN SDF. The keyword SDF instructs dBASE-II to accept columnar data in text form.

There are no problems in transferring data from 1-2-3 to dBASE-II. It is important, however, that the Left margin be set to zero and the Unformatted option of 1-2-3 be used to generate the text file. Otherwise, the resulting indentation and pagination will cause blank spaces lines to be output in the text file, which dBASE-II will interpret as blank field entries records.

Glossary

Absolute Cell Reference. In a formula, an absolute cell address is one whose column and row specifiers are preceded by dollar signs (A4 or BK210, for example). An absolute cell reference in a formula will always refer to the same cell in the worksheet, even if the formula is /Copied to another location. In the following example:

	A	B	
1	10	+ A1 + 10	◀— actual cell contents
2	10	20	◀— displayed values

Placing a copy of cell B1 in cell C1 would produce the following result:

	A	B	C	
1	10	+ A1 + 10	+ A1 + 10	◀— actual cell contents
2	10	20	20	◀— displayed values

(For more information, see the "Entering Formulas" chapter. See also "Relative Cell Reference," below.)

[Abs] Key. The F4 [Abs] function key is used to change a *relative* cell address to *absolute* or *mixed* while pointing to a cell or range address during formula entry. The [Abs] key has no effect under any other circumstances.

Access System. See LOTUS Access System below.

Address. The location of a particular cell on the worksheet, referenced by its column and row. Examples of addresses: A10, BK201, etc.

Alt Feature. See Typing Alternative below.

[Alt] Key. The key used to implement the Typing Alternative, see below (also called keyboard macros).

Argument. Information provided to a function. Arguments, separated by commas, are placed in parentheses following the function name. An argument may include one or more numbers, cell references, or other functions. Examples of arguments:

@SUM(B1..B10)
@SUM(@MIN(B1..B10) + @MAX(D5..D25))

(See the "Entering Formulas" chapter. See also the "1-2-3 Function References" appendix.)

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Date _____

File # _____

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formation is provided.

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       form.)

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[Backspace] Key. This key has two functions in 1-2-3: (1) it acts like an "eraser" during entry or editing by removing characters in back of the cursor, and (2) it can be used to cancel a *remembered* range in a command which requires ranges to be defined (such as the **/Print Printer Range** or **/Graph X** commands). When used with these commands, the ← [Backspace] key causes the pointer to return to the cell where the pointer was located before you began the command.

← [Backtab] Key. The [Backtab] function is accessed by pressing the ⇆ key (located just below the [Esc] key) while holding down the ⇧ [Shift] key. The [Backtab] key allows you to move to the left through the worksheet a screen at a time towards column A. Its action is similar to repeated use of the ← [Left] arrow key. (See also " → [Tab] Key," below.) In edit mode, the backtab key moves the cursor five characters to the left in the line being edited.

Border. There are two types of borders in 1-2-3: (1) the area of the 1-2-3 screen display which contains the column letters, A through IV (horizontal border), and the row numbers, 1 through 2048 (vertical border); and (2) the "repeating borders" used with the **/Print Printer Options Borders** command.

[Break] Key. In 1-2-3, holding down the [Ctrl] key then pressing the [Scroll Lock/Break] key cancels the current command or entry. It can also be used to "break" a graph printing operation when you are using the GRAPH Program.

[Calc] Key. Pressing the F9 [Calc] function key in Ready mode causes the current worksheet to be recalculated. Pressing the F9 [Calc] key in Value or Edit mode replaces the current input line with its value.

Cell. A single location on the worksheet, defined by its column and row address.

Cell Pointer. (See "Pointer," below.)

Clear. To erase a previously specified setting, range, or value.

Column. The vertical component of a cell address. Column B, for example, contains cells B1 through B2048.

Column-Width. The width in characters of a column. The initial column-width is 9 characters. This can be changed for an individual column by using the **/Worksheet Column-Width** command, or for all columns not individually set using the **/Worksheet Global Column-Width** command.

Command. An instruction to 1-2-3 to perform a task, preceded by a slash (/). **/Worksheet Status** is an example of a command. (See the "Using 1-2-3 Commands" chapter.)

Configuration. Specific instructions about the way 1-2-3 communicates with printers and disk drives, or about various aspects of formatting for screen or printer. 1-2-3 is initially "configured," for example, to always save and retrieve worksheet files from a data disk in Drive B.

Control Panel. The first three lines of 1-2-3's screen. It displays (1) information about the current cell and the current Mode, (2) your entries as they are typed or edited, (3) menus and menu choice explanations, and (4) command prompts and your replies to those prompts.

/Copy Command. The 1-2-3 command which allows you to copy a cell or range of cells to other locations on the worksheet. The effect of /Copying upon formula cell-references depends on whether they are *absolute* or *relative* references. (See the "Copy Command" chapter.)

Criterion. The "test conditions" used in **/Data** commands. You must define a "Criterion Range" (a range of cells which define the "tests" to be applied to the Input range) before executing a /Data Query Find, Extract, Unique, or Delete command. (See the "Data Commands" chapter.)

Current Worksheet. The 1-2-3 worksheet currently displayed on the screen. All entries, calculations, and commands are performed on the current worksheet.

Cursor. When making an entry, or when editing an entry (in Edit Mode) the blinking underline (__) is called a cursor.

Database. The general term used to describe the section of a worksheet that contains data records. 1-2-3's set of data manipulation commands (the **/Data** commands) and data functions operate on the database. (See the "Data Commands" chapter. See also "Fields" and "Records," below)

/Data Commands. The set of 1-2-3 commands which allow you to manipulate data in tabular form such as a data base. (See the "Data Commands" chapter.)

Data Disk. The disk used to store data (files). Also called the current disk, the file disk, or the storage disk. (See "Program Disk," below.)

Data-Labels. Data-labels may be attached to data points on a graph using the **/Graph Options Data-Labels** command. Data labels may be aligned with respect to their data points (above, below, centered, left, or right). (See the "Graph Commands" chapter.)

Date Format. Dates are stored as numbers in 1-2-3 (the numbers represent the number of days since the beginning of this century). Date numbers can be displayed in three date formats, using the **/Worksheet Global Format Date** or **/Range Format Date** commands, or left as unformatted numbers:

1. day-month-year = 12-Nov-82
2. day-month = 12-Nov
3. month-year = Nov-82

Date numbers generated by the @DATE function are *not* automatically displayed in a date format.

Default. The initial or original setting, which 1-2-3 will use unless you specify a different one.

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Name _____ Social Security # _____

For (Child) _____ Social Security # _____

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Default Configuration. The "startup" or original configuration. 1-2-3's default configuration is displayed and/or changed by using /Worksheet Global Default commands (see the "Configuring 1-2-3" appendix). The GRAPH Program's default configuration is changed with the Configure command in the GRAPH menu (see the "Using the GRAPH Program" appendix).

Disk or diskette. The basic storage medium for microcomputers, also called a *floppy disk* or *diskette.*

Disk drive. The device into which disks are placed for use. Normally, the 1-2-3 Program disk is inserted in disk drive A, while files are Saved and Retrieved on a data disk in drive B. (See the "File Commands" chapter.)

Display screen. (See "Monitor," below.)

Display Format. The way cell contents are displayed on the monitor. In 1-2-3, what is displayed on the monitor may differ from the actual contents of the worksheet.

DOS. The Disk Operating System.

[Edit] Key. The F2 [Edit] function key may be used to edit an entry or a formula. The F2 [Edit] key also alternates between Ready Mode and Edit Mode. (See the "Typing Cell Entries" chapter. See also "Edit Mode," below.)

Edit Mode. Edit Mode allows you to edit entries or formulas on the worksheet. When in Edit Mode, the mode indicator in the upper right corner of the screen will read "*EDIT*," and the pointer movement keys (←, →, [Home], [End], ⊢, ⊣) may be used to position the cursor for deleting or inserting characters into the entry as necessary. If 1-2-3 detects an error in an entry or formula, you will automatically be put into Edit Mode. Pressing the F2 [Edit] function key allows you to go into and out of Edit Mode manually. (See the "Typing Cell Entries" chapter.)

[End] Key. Pressing the [End] key followed by an arrow key causes the pointer to move in the direction of the arrow to the "end" of the row or column of blank or non-blank cells it is currently in. Pressing [End] followed by [Home] moves the pointer to the end of the "active area." The [End] key also plays a role in Edit Mode and menu selection.

↵ [Enter] Key. The key used to "enter" a cell entry, a highlighted menu choice, or a response to a command prompt. Also called *carriage return* or *return.*

Entry. A general term for a number, formula, or label stored at a location on the worksheet.

Error Message. Messages which appear in the lower left corner of the screen accompanied by a *beep* from the computer when one of 1-2-3's "rules" is violated, or if you ask 1-2-3 to perform an impossible task. Pressing [Esc] or ↵ [Enter] will clear the error message and return you to Ready Mode. (See the "1-2-3 Error Messages" appendix.)

[Esc] Key. Pressing the [Esc] key allows you to "back up" one step. In command menus, pressing [Esc] causes you to be returned to the previous menu or to Ready Mode. While making an entry, pressing [Esc] has the effect of cancelling the current entry and returning you to Ready Mode. [Esc] also cancels remembered ranges. (See "Remembered Command Ranges" page 77.)

Field. A labeled column in a 1-2-3 database. For example, if the first row in the second column of a database contained the word "Name," then that column would be the "Name" field of the database. (See the "Data Commands" chapter. See also "Record," in this chapter.)

File. All information stored on disk is kept in what are called *disk files* or just *files.*

Filename. The name you select for Saving or Retrieving worksheet, print, or graph disk files. Filenames may be up to eight characters long and contain either letters (A..Z) or numbers (0..9), but may not contain spaces. The underscore character (__) is also permitted. Filenames longer than eight characters will be truncated to eight characters. All filenames are stored as uppercase letters. Some samples:

Valid	Not Valid
MYFILE	MY FILE
TestFile	Te@#fil
NEW__FILE	NEW-FILE

In addition, 1-2-3 automatically attaches a three-letter suffix to filenames during /File Save or /Graph Save operations. 1-2-3 uses these extensions:

Worksheet files: filename.WKS
Graph (picture) files: filename.PIC
Print files: filename.PRN

1-2-3 will only recognize these extensions; any other extensions will cause a "File does not exist" error message. (See the "File Commands" chapter.)

/File Commands. The set of 1-2-3 commands which allow you to Save, Retrieve, and perform a variety of other operations on files stored on disk. (See the "File Commands" chapter.)

Font. A typeface (character set) used by the GRAPH Program in printing or plotting graphs. The GRAPH Program disk comes with a number of fonts. (See "Using the GRAPH Program" appendix.)

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Format. The way a cell's contents are displayed on the screen. The /Worksheet Global Format commands change the overall appearance of cells on the worksheet; the /Range Format commands can be used to change the way a specific cell or range of cells is displayed (page 153).

Formula. An instruction for 1-2-3 to calculate a number. Formulas are usually preceded by plus (+) or minus (−) (as in the case: + B1*A1), or may use 1-2-3's built-in functions such as: + B1 − @SUM(A10..A20). (See the "Entering Formulas" chapter.)

Function. Built-in "formulas" to perform particular calculations. For example, a column of numbers could be summed by adding each cell to the previous cell (i.e., B1 + B2 + B3, etc.) or by using the function @SUM(B1..B3). Functions are always preceded by an @ sign and take the form @functioname (arg1, arg2, ..., argN). (See the "1-2-3 Function Reference" appendix. See also "Argument," above.)

Function Call. Using a function by typing @functioname (argument) is described as "making a function call". (See the "Entering Formulas" chapter.)

Function Keys. The ten function keys located on the left of the keyboard have special 1-2-3 functions assigned to them, as follows:

F1: [Help]	Display Help screen
F2: [Edit]	Switch to/from Edit Mode for current entry
F3: [Name]	In Point Mode, display menu of range names
F4: [Abs]	In Point Mode, make cell addresses "absolute"
F5: [GoTo]	Move cell pointer to a particular cell
F6: [Window]	Move cell pointer to other side of split screen
F7: [Query]	Repeat most recently specified Data Query operation
F8: [Table]	Repeat most recently specified Data Table operation
F9: [Calc]	Recalculate worksheet
F10: [Graph]	Draw the most recently specified graph

Global. A global setting is one that affects the entire worksheet. The /Worksheet Global menu gives you a number of worksheet parameters such as column-width and number format which can be changed for the entire worksheet instead of for an individual cell or range of cells.

[GoTo] Key. The F5 [GoTo] function key allows you to move the pointer to a specific location on the worksheet, by typing that cell's location in response to the prompt. For example, pressing F5, typing "A21", and pressing ↵ [Enter] will move the pointer to cell A21.

GRAPH Program. The program which prints graph files created with 1-2-3. (See "Using the GRAPH Program" appendix.)

[Graph] Key. Pressing the F10 [Graph] function key redraws a graph using the most recently entered /Graph command specifications, even if cell contents have been changed. Also, the F10 key [Graph] can be used in the GRAPH Program to preview a selected picture prior to printing.

/Graph Commands. The set of 1-2-3 commands which create and display graphs using data contained in the worksheet. Other /Graph commands store graphs on a disk as ".PIC" (picture) files for printing with the GRAPH Program. (See the "Graph Commands" chapter.)

Hard Disk. An alternative method of storage to the usual floppy disk, often containing more than 20 times the storage capacity of a single floppy disk. 1-2-3 permits the use of a hard disk drive, but requires at least one floppy disk drive to be in use. (See the "Using 1-2-3 and GRAPH with a Hard Disk" appendix.)

Help. 1-2-3's on-line reference manual. Pressing the F1 [Help] function key at any time while using 1-2-3 provides instant information about the operation currently in progress. (A complete description of Help appears in the "Using the Help Facility" chapter.)

[Help] Key. Pressing the F1 [Help] function key at any point in 1-2-3 will cause a Help screen to be displayed relevant to the operation currently in progress. [Esc] ends the Help break and returns you to the worksheet, exactly where you left off. (See the "Using the Help Facility" chapter.)

[Home] Key. Pressing the [Home] key returns the pointer to the upper left corner (usually, cell A1) of the worksheet. In Edit Mode, pressing [Home] moves the cursor to the left side of the edit line. The [Home] key can also be used in Help to return to the top of a list of Help screens, or in the GRAPH Program to move to the top of a list of selected pictures. Pressing [End] then [Home] moves the pointer to the bottom right corner of the "active area" of the worksheet. In Menu Mode, [Home] moves the pointer to the first menu choice.

Justification. Rearrangement of a column of labels to a particular width, with the /Range Justify command.

Keyboard Macro. (See the "Typing Alternative," below.)

Label. Any entry that starts with a letter or a "label-prefix" (alignment) symbol. Labels entered without a label-prefix will use the global label-prefix set with /Worksheet Global Label Prefix. Initially, this is for "left-aligned" labels. Individual labels may have their alignment altered by editing their label-prefixes, or with the /Range Format Label-Prefix command. Labels may also be individually formatted at the time of entry by prefixing the label as follows:

Date _____

File # _____

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Prefix	Result	Worksheet
,	left-aligned	LABEL
^	centered	LABEL
,,	right-aligned	LABEL
\	repeating label	LABELLABE

A label that begins with a number, or +, −, $, (, #, or @, such as "1-2-3 Skidoo", is interpreted as a Value entry (and usually causes an error), but can be entered as a label by prefixing the number with one of the prefix characters shown above: e.g. ^1-2-3 Skidoo. (See the "Typing Cell Entries" chapter.)

Label Prefix Character. A character used to indicate that the entry being typed is a label. A label-prefix character *must* be used on labels that begin with a number or with +, −, $, (, #, or @. (See "Label," above.)

Logical Operators. Logical operators are used to evaluate the "truth" of "arguments." For example, the formula +B1 > B2 (meaning: the contents of cell B1 is "larger" than that of cell B2) will have a value of "1" if the formula is "true" (if B1 is greater than B2), or a value of "0" if the formula is "false." (See the "Entering Formulas" chapter.)

Long Labels. Labels that extend past their cell's width. The entire label will be displayed in the control panel if the pointer is moved to the cell containing the long label, and in the worksheet if there are empty cells to the right of the long label cell. The long label is there, even though you can't always see all of it. (See the "Typing Cell Entries" chapter.)

LOTUS Access System. The "umbrella" program supplied with 1-2-3 that allows you to move easily between 1-2-3 and GRAPH, and which provides various support functions. The LOTUS Access System functions are selected from menus in the same way as 1-2-3 commands. (See the "Using the Lotus Access System" chapter.)

Main Memory. Your personal computer's memory capacity. 1-2-3 requires at least 128 Kilobytes of memory, but you may increase internal memory up to the "limit" of 544K.

Menu. A series of command choices which appear in the control panel after a slash (/) has been typed. Menus are used throughout 1-2-3 and GRAPH to access the program command functions. Menu choices are selected by "pointing" to the choice and pressing ↵ [Enter], or by typing the first letter of the choice. In addition, lists of named ranges displayed with the F3 [Name] function key can be selected as menu choices. (See the "Using 1-2-3 Commands" chapter.)

Menu Pointer. (See "Pointer," below.)

Mixed Cell Reference. A mixture of *absolute* and *relative* cell references. (See the "Entering Formulas" chapter.)

Mode Indicator. The Mode Indicator, located in the upper right corner of the screen, always tells you what Mode 1-2-3 is in. 1-2-3 uses these indicators:

Indicator	Meaning
READY	Waiting for command, value, or label
VALUE	Entering a number or formula
LABEL	Entering a label
EDIT	Editing an entry
POINT	Pointing to a cell or range
MENU	Selecting a menu item
HELP	In the Help facility
ERROR	Waiting for [Esc] or ↵ [Enter] to acknowledge an error
WAIT	1-2-3 is calculating and cannot process commands
FIND	1-2-3 is in a /Data Query Find operation.

Note: CMD appears in front of these indicators during execution of a Macro.

Monitor. The display screen of your Personal Computer. You may have two monitors: a worksheet monitor and a graphics monitor.

Move Command. The 1-2-3 command which moves a cell or block of cells from one location on the worksheet to another. Cell references in formulas are preserved during /Moves. (See "The Move Command" chapter.)

Named Range. A single cell or range of cells that have been assigned a name using the /Range Name Create command. The name of a range can be substituted for the usual beginning and ending cell addresses of a range. For example, the range B1..F1 might be named "HEADINGS," in which case the following function calls would be equivalent:

@COUNT(B1..F1) = @COUNT(HEADINGS)

(See the "Indicating Cell Ranges" chapter.)

[Name] Key. In Point Mode during formula entry, pressing the F3 [Name] function key will cause a menu of the worksheet's currently named ranges to appear.

Number. (See "Value," below.)

[Num Lock] Key. Use of the [Num Lock] key turns the Pointer-Movement Keypad into a numeric keypad. Pressing [Num Lock] again cancels this function. (See "Numeric Keypad," below.) Use of this key is not recommended.

Numeric Keypad. Also called the "Pointer-Movement Keypad." The nine numeric keys located to the right of the main keyboard. These keys are primarily used for pointer movement, but can be used as numeric keys after pressing the [Num Lock] key. (See "Pointer-Movement Keys," below.)

Pointer-Movement Keys. The keys used to move the pointer around the worksheet. The keys are used as follows:

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(415) 845-0200

Date _____

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Making /Copy of cell B1 in cell C1 would produce the following result:

	A	B	C	
1	10	+ A1 + 10	+ B1 + 10	◄— actual cell contents
2	10	20	30	◄— displayed values

(For more information, see the "Entering Formulas" chapter. See also "Absolute Cell Reference," above.)

Repeating Label. A label starting with a backslash (\) will repeat across the entire width of the current cell. For example, typing: \- ↵ [Enter] will cause a row of dashes to fill a cell.

Reset. Cancel a previous setting. In some cases this causes 1-2-3 to return to a *global* or *default* setting.

Row. The horizontal component of a cell's address. Row 4, for example, contains cells A4..IV4.

Screen. The currently displayed window on the worksheet (see "Window," below). Also, the computer's display monitor is sometimes referred to as the "screen."

[Scroll Lock] Key. When the [Scroll Lock] key is pressed, subsequent pressing of arrow keys move the screen, dragging the pointer along if it hits an edge. A *SCROLL* indicator appears on the lower right corner of the screen. Pressing [Scroll Lock] again disables this function. See also "[Break] Key".

Scrolling. Moving through the worksheet using the pointer-movement keys is called "scrolling."

Setup String. A series of characters used to set-up or "initialize" a printer during print operations. (See the "Print Command" chapter.)

→ [Tab] Key. The → key (located just below the [Esc] key) allows you to move to the right across the worksheet by "screenfulls" towards column IV. Its action is similar to repeated use of the → [Right] arrow key. (See also "[Backtab] Key," above.) In edit mode, [Tab] moves the cursor five characters to the right of the edit line.

[Table] Key. The F8 [Table] function key repeats the most recently specified /Data Table operation, even if cell contents in the worksheet have changed. (See the "Data Commands" chapter.)

Title. Title has two meanings in 1-2-3: (1) rows (horizontal titles) or columns (vertical titles) can be "frozen in place" on the worksheet display using the /Worksheet Titles command (such titles always remain on the screen during scrolling); and (2) graphs can be titled using the /Graph Options Titles command.

Tutorial. The "1-2-3 Electronic Tutorial," found on the Tutorial disk, gives you step-by-step lessons on how to use 1-2-3. (See the "1-2-3 Electronic Tutorial" chapter.)

Typing Alternative. A series of 1-2-3 keystrokes or commands "tied" to a single ALT-shifted key. Also called a keyboard macro. For example, a number entered in a particular cell might be copied to other cells using the following simple keyboard macro:

	A	B	C
1	20		
2			
3	{GOTO}A1~		
4	/C ~ {RIGHT}.{RIGHT} ~		

Now, if this macro were tied to [Alt]-K, by using the /Range Name Create or /Range Name Label commands to assign the name \K (Backslash K) to cell A3, every time the letter K was typed while holding down the [Alt] key, the macro would be executed, giving the following results:

	A	B	C
1	20	20	20
2			
3	{GOTO}A1~		
4	/C ~ {RIGHT}.{RIGHT} ~		

(See the "Keyboard Macros: The Typing Alternative" chapter for a more complete description of this facility.)

Value. Any number or formula entered in the worksheet.

Window. The currently displayed portion of the worksheet. The "standard" window size is 7 columns by 20 rows, though the number of columns displayed can be altered using the /Worksheet Global Column-Width or /Worksheet Column-Width commands. In addition, the window may be spoit into two smaller windows, either horizontally or vertically, using the /Worksheet Window commands. (See the "Worksheet Commands" chapter.)

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[Window] Key. When 1-2-3's display screen has been split (using the /Worksheet Window command, the F6 [Window] key allows you to switch the pointer between the two windows on the worksheet. (See the "Worksheet Commands" chapter.)

Worksheet. 1-2-3's electronic representation of a ledger sheet, divided into columns and rows. Also called a "spreadsheet." (See the "Current Worksheet," above.)

/Worksheet Commands. The set of 1-2-3 commands that affect the current worksheet as a whole. /Worksheet commands include Global formatting commands, Insertion and Deletion of columns and rows, and commands to set configuration and recalculation order and method, plus many others, including column widths, titles, window, status, etc. (See the "Worksheet Commands" chapter.)

/X Commands. The set of commands, only usable within a Keyboard Macro, that control the processing order of those instructions, including the creation of user-defined menus. (See the "Keyboard Macros Using the Typing Alternative" chapter.)

1-2-3 and GRAPH Command Trees

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↑ [Up]	moves pointer one row up
← [Left]	moves pointer one column to the left
↓ [Down]	moves pointer one row down
→ [Right]	moves pointer one column to the right
[Home]	moves pointer to upper left corner of worksheet
[End]	moves pointer to "end" of block of cells
[PgUp]	moves pointer up by one screenful or page
[PgDn]	moves pointer down by one screenful or page
⇤	moves pointer left by one screenful or page
⇥	moves pointer right by one screenful or page

Several other keys also accomplish pointer movement. The F5 [GoTo] function key allows you to move the pointer to a specific location; the F6 [Window] function key moves the pointer between split screens. Use of the [Scroll-Lock] key causes the arrow keys to move the *window* instead of the cell pointer. (See the "Moving Around the Worksheet" chapter.) These keys have a different meaning in Edit mode. See "Edit Mode".

Pointer. The reverse-video bar which always highlights a cell and/or menu item on the worksheet. Also called the "Cell Pointer" or "Menu Pointer." In many commands, the cell pointer can be "expanded" to highlight the area of the worksheet (the *range*) that will be affected by these commands. (See "Pointer-Movement Keys," above.)

/Print Commands. The set of 1-2-3 commands which print the worksheet on a printer or to disk as a text file for later use. Other /Print commands allow extensive formatting of the printed output. (See the "Print Commands" chapter.)

Program Disk. The disks containing LOTUS programs, i.e., the 1-2-3 Program disk and the GRAPH Program disk. (See also "Data Disk," above.)

Prompt. A message displayed by 1-2-3 during the execution of a command. Your entries must be terminated by ↵ [Enter] after the required information has been supplied, or by [Esc] if you wish to "escape" from the command in progress. (See the "Using 1-2-3 Commands" chapter.)

Protect. Use of the /Range Protect or Range Unprotect commands allows defined ranges of cells to be protected against inadvertent modification. The /Worksheet Global Protectection Enable or /Range Input commands must be issued to utilize the protection facility. (See the "Worksheet Commands" and the "Range Commands" chapters.)

[Query] Key. The F7 [Query] function key repeats the most recently specified /Data Query operation even if new data has been entered in the worksheet. (See the "Data Commands" chapter.)

Quit. In most command menus, selecting Quit will return you to the next highest command level.

/Quit Command. The command to exit 1-2-3. If you started 1-2-3 from DOS, /Quit will return you to DOS. If you started 1-2-3 from the LOTUS Access System, you will be returned to the Access System menu.

Range. A cell or rectangular group of cells on the worksheet. Ranges may be "defined" by expanding the pointer, or by typing the cell addresses of the opposite corners of the range. (See the "Indicating Cell Ranges" chapter.)

/Range Commands. The set of 1-2-3 commands which affect single cells or ranges of cells. (See the "Range Commands" chapter.)

Recalculation. Every time the worksheet is modified, 1-2-3 recalculates the worksheet in what is called a "natural" order of recalculation. That is, 1-2-3 does not require cell or formula references to be in a specific row or column order for recalculation. The Worksheet Global Recalculation command allows you to change the following aspects of recalculation:

Automatic	— worksheet recalculates after every change
Manual	— worksheet recalculates only when the F9 [Calc] function key is pressed
Natural	— the order of recalculation is "natural"
Columnwise	recalculation starts in column A and proceeds down each column of the worksheet, e.g., Column A, column B, etc.
Rowwise	— recalculation starts in row 1 and proceeds across each row of the worksheet, e.g., row 1, row 2, etc.
Iteration	— the number of times 1-2-3 cycles through the recalculation process

(See the "Worksheet Commands" chapter.)

Record. A data record in a database section of a 1-2-3 worksheet. Each row in the database is called a record. A database may contain up to 2047 records (rows). (See the "Data Commands" chapter. See also "Field," above.)

Relative Cell Reference. In a formula, a relative cell address will change when /Copied. A /Copied formula that referred to a cell a certain number of rows and columns away will now refer to another cell that is the *same relative distance* away from its new location. Relative cell references are *not* preceded by $. In the following example:

	A	B	
1	10	+ A1 + 10	◄— actual cell contents
2	10	20	◄— displayed values

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Functional Index

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Alphabetical Index

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Sincerely,

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Product Support Manager

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