EPSON
PX-8

MicroPro®

Portable Calc™
Portable Scheduler™

H8492014-1

This volume contains three manuals in the following order.

1. Portable Calc Training Guide

2. Portable Calc Reference Manual

3. Portable Scheduler Reference Manual

Software that means business™

EPSON PX-8 Portable Calc™ Training Guide

For Release 1.0

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TRADEMARKS

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Introduction

WELCOME

The Portable Calc Training Guide is designed to lead you through the creation of a simple spreadsheet, explaining commands and features of the program as they are used in the exercise. The Training Guide does not cover everything you will need to know about the program, but it does introduce you to the basics by giving you the opportunity to use the program as you learn it.

Your time will be used most productively if you follow the instructions in the three lessons before you begin experimenting with the program. Then read the Reference Manual and practice on your own with the commands and functions you read about.

BEFORE YOU BEGIN

- Is your PX-8 turned on and booted up?
  (If not, see your PX-8 User's Manual.)

- You do not need to install (adapt) Portable Calc for your particular computer. It comes to you already prepared to run on your PX-8.

- Check to see that there is empty space on the drive you will be using to save your practice files. Use an operating system utility program to do this.

LEGENDS, SYMBOLS, AND SIGNPOSTS

A> OPERATING SYSTEM PROMPT

You will see this symbol throughout the Training Guide. It tells you to start at your PX-8 operating system. Your PX-8 may be logged on to another drive. If so, substitute that drive letter for A.

CONTROL COMMANDS

This symbol stands for the CTRL (control) key. To give a control command, hold down the control key while you type the letter that follows this symbol.

RETURN KEY

Press the RETURN key when you see this.

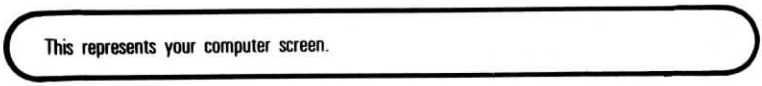
FACT BOXES

Important information is enclosed inside these boxes.

ITALICIZED WORDS

The first time a Portable Calc term or computer term is used it is in *italics*. Usually the term is defined in the text, and it can also be found in the Glossary at the end of the Reference Manual.

AN EXAMPLE ONSCREEN



AN EXAMPLE ON PAPER

BEEPS

If your computer beeps, it means that you have pressed the wrong key or made some other kind of error. Sometimes you will be required to press the ESCape key before you can continue.

Lesson One: Getting Acquainted

BEFORE YOU BEGIN

In this lesson you will create a very simple spreadsheet with Portable Calc, amounting to little more than a column of numbers. The exercise will demonstrate some basic concepts. You'll see how values are stored in memory, then used in calculations. You'll learn a shortcut method for doing a common mathematical operation and you'll be introduced to a couple of Portable Calc's commands.

You are about to discover (even if you have phobias about math and computers) that there is nothing particularly difficult about using this program. So step up and shake hands with Portable Calc, and find out what a spreadsheet program is like up close!

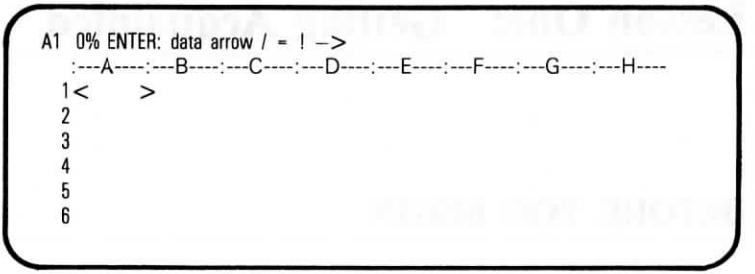
GETTING STARTED

When you turn on your PX-8 it runs a program called CP/M, your operating system. Get Portable Calc running by typing the first part of its file name (CALC.COM) at the CP/M prompt. (See Appendix C of the Reference Manual for an alternate way to enter programs.)

SEE A>

TYPE **CALC** RETURN

SEE Portable Calc copyright message, then the following display:



You have now loaded Portable Calc and you are looking at an empty spreadsheet.

JUST LIKE A CALCULATOR

You can use Portable Calc just as you would a pocket calculator—to do simple arithmetic problems. Watch the top line of the screen (where the *entry cursor* is) as you enter the numbers.

STEP 1 SEE *ENTER: data arrow / = ! ->*

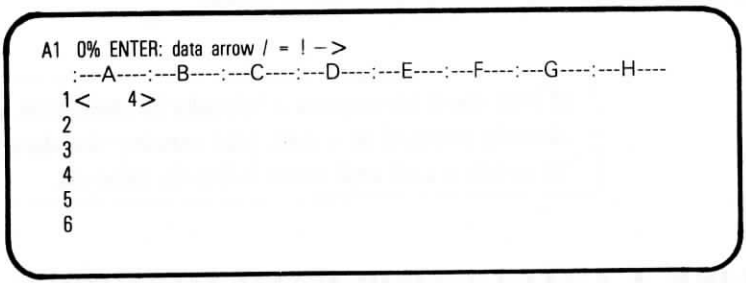
TYPE **2+2**

As soon as you type the first digit, the message on the top line (called a *prompt*) changes to read **ENTER: number or expression ->**.

> **If you make a mistake when you're entering data, use the DELete key or backspace key to erase it.**

STEP 2 PRESS RETURN

SEE

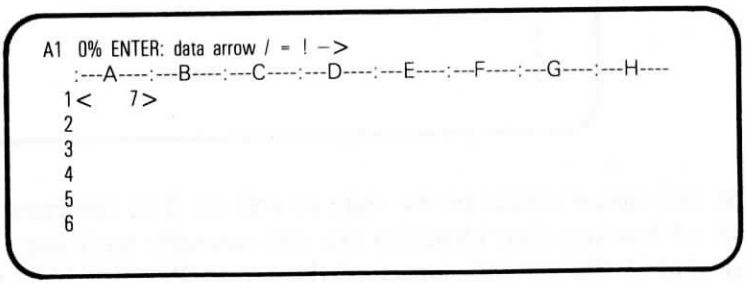


The answer to your problem, 4, is displayed in the upper left corner of the spreadsheet, in row 1 of the column marked A. Each intersection of a column and a row is called a *cell*. You have just entered some data into a cell.

Now, try another calculation.

TYPE **10-3** RETURN

SEE



The answer, 7, replaces the previous answer in cell A1. You can continue doing calculations for as long as you like, pressing RETURN after each entry. The answers will appear in cell A1. You can think of the RETURN key as equivalent to "equals."

> **If you want to correct a mistake in data that you have already entered in a cell, just reenter the data correctly. To erase a cell and leave it blank, type /B.**

LIKE A CALCULATOR WITH MEMORY

Now try moving to a different cell.

STEP 1 PRESS 

SEE

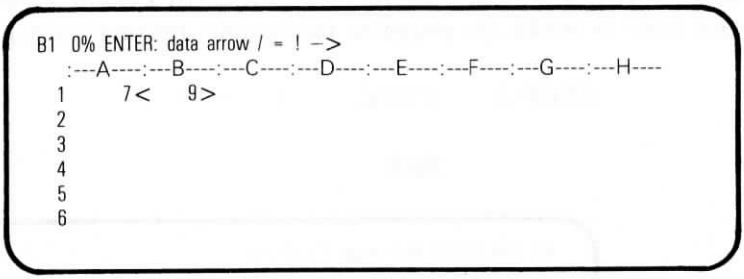
```
(B1) 0% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 1      7<      >
 2
 3
 4
 5
 6
```

The *cell cursor* moves to the right to cell B1. The cell cursor is the pair of brackets that identifies the cell currently receiving entries. Notice that in the top left corner of the screen Portable Calc tells you where the cell cursor is.

Next, make an entry in cell B1 that refers to cell A1.

STEP 2 TYPE **a1+2** RETURN

SEE



You have recalled the value in cell A1 from memory and used it in another calculation. Unlike a calculator, which usually contains only one memory area, Portable Calc has 16,384 memory areas, or cells.

> **You can enter *cell names* with either lower- or uppercase letters.**

A VERY CALCULATING PROGRAM

Now discover one of the most powerful features of Portable Calc.

STEP 1 PRESS ←

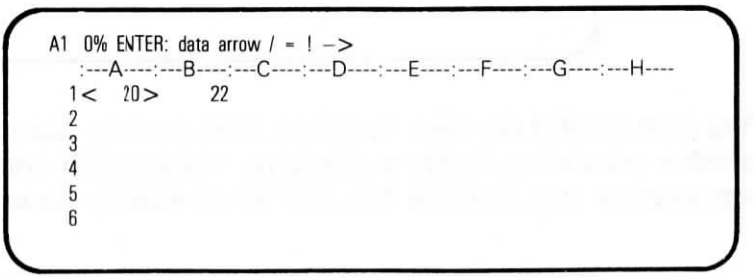
STEP 2 TYPE **20** RETURN

You moved the cell cursor back to cell A1 and entered a number, 20, which replaced the value previously entered there.

Remember that cell B1 contains the expression **a1+2**. Since you have just changed the value of cell A1, the value of B1 should change also. But that doesn't happen automatically. When you enter or change an expression, it's result is calculated immediately. But when you change the value of an expression by changing a cell to which it refers, you must instruct Portable Calc to recalculate. (In Lesson Three you will learn how to make the program recalculate automatically.)

STEP 3 TYPE !

SEE



The Calculate command (!) tells the program to redo every calculation in the spreadsheet. There is only one calculation (or *expression*) in your spreadsheet so far: **a1+2**. Since you have changed the value of cell A1 to 20, Portable Calc recalculates the expression and arrives at the new result, 22, which goes in cell B1.

The expression **a1+2** remains the same in memory, even though its value (displayed in cell B1) changes every time the value of cell A1 changes.

A PROGRAM THAT FUNCTIONS WELL

When creating a spreadsheet, you often work with lists of numbers. To enter numbers in a column, press the **down arrow** key, instead of RETURN, after each entry. This is a shortcut method that completes an entry and moves the cell cursor at the same time. All the arrow keys can be used in this way.

STEP 1 PRESS  twice

The cell cursor should now be in C1. (Check the top left corner of the screen.)

STEP 2 TYPE **11** 

STEP 3 TYPE **−8** 

STEP 4 TYPE **55.7** 

STEP 5 TYPE **21.25** 

SEE

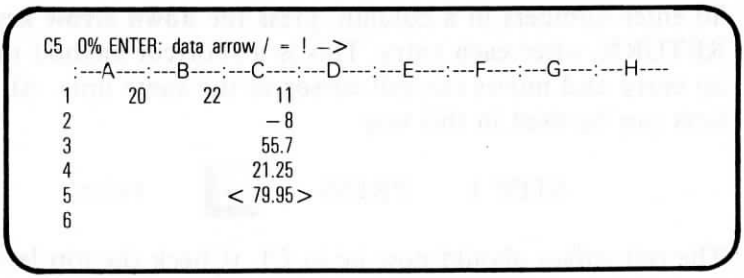
```
C5  0% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 1       20       22       11
 2                          -8
 3                        55.7
 4                       21.25
 5                     <     >
 6
```

To add the list of numbers in column C, use a *function* called **SUM**.

Function names can be entered in upper- or lowercase.

TYPE **+sum(c1:c4)** RETURN

SEE



The function **SUM** adds all the values in the cell range defined by C1:C4. That is the group of cells beginning with C1 and ending with C4. The result of the calculation is placed in the *current cell*, which is C5.

+sum(c1:c4) is an expression. When an expression begins with a function, you must type + or @ (or – for a negative expression) first.

A COMMAND PERFORMANCE

Portable Calc's *commands* can perform wonders for you as you construct your spreadsheets. The Edit command (/E), for example, helps you make changes in your entries. There are eleven commands that begin with a slash (/).

STEP 1 TYPE /

SEE *COMMAND: BDEFGILOQRS ->/*

STEP 2 TYPE **E**

SEE

```
+SUM(c1:c4)
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 1       20       22       11
 2                          -8
 3                        55.7
 4                       21.25
 5                     < 79.95>
 6
```

The prompt on the top line, listing commands, is replaced by the expression you entered in cell C5. (Note that the function name is in uppercase letters even though you entered it in lowercase.)

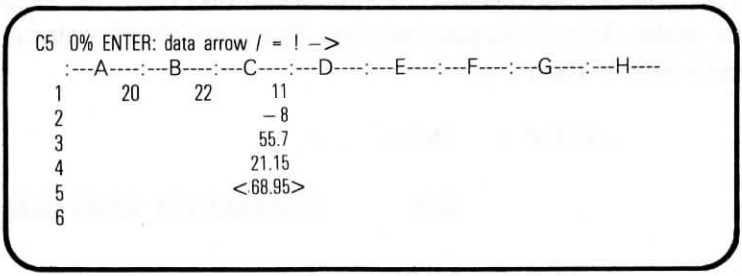
You can change the expression by moving the *entry cursor* (the rectangle or underline at the beginning) with the arrow keys, typing in changes wherever you want them.

STEP 3 PRESS  6 times

SEE Entry cursor over "1"

STEP 4 TYPE **2** RETURN

SEE



You just changed the expression in cell C5 from **+sum(c1:c4)** to **+sum(c2:c4)**. Notice that the value in C5 changed when you pressed RETURN, as a result of the change you made to the expression.

Anytime you want to interrupt a command, press ^U.

A New Look

Portable Calc's Format command gives you a lot of flexibility in designing the way your data will be displayed.

STEP 1 TYPE **/F**

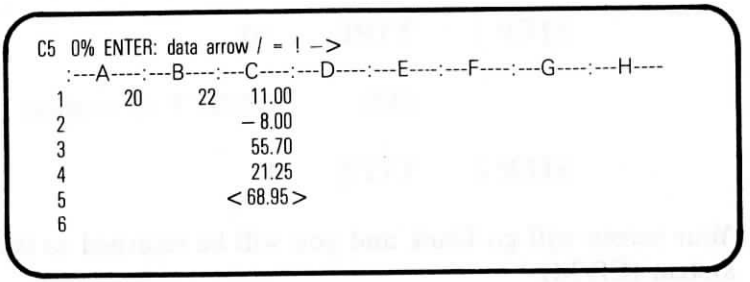
SEE *FORMAT:*
Global Column Field ->/F

STEP 2 TYPE **C**

SEE *FORMAT:*
D E G I $ R L TR TL width.dec ->

STEP 3 TYPE **$** RETURN

SEE



All the figures in column C have been converted to dollars-and-cents format.

Save It for a Rainy Day

When you have completed your work, use the Save command to place it in a file where you can get back to it later.

STEP 1 TYPE **/S**

SEE *SAVE: file ->*

Choose an available drive that has space for a small file and type the drive name (*a* in the example), a colon, then the file name.

STEP 2 TYPE ***a:*practice** RETURN

The *entry prompt*, which you have seen many times now, returns to the top line of the screen, and your figures remain displayed on the spreadsheet. The only thing that has changed is that your work is now stored in a file called PRACTICE, on the drive you have selected.

Calling It Quits

When you're ready to leave Portable Calc, use the Quit command.

STEP 1	TYPE	**/Q**
	SEE	*QUIT: Y to confirm ->/Q*
STEP 2	TYPE	**Y**

Your screen will go blank and you will be returned to the operating system (CP/M).

Exiting from the program with the Quit command is the best way to clear a spreadsheet from the screen so you can begin work on another one. There is another way that erases the contents of the cells but not the format settings that you make with the Format command (such as the dollars-and-cents format you used in this lesson). That method uses the Blank and Replicate commands, which you will learn about later. To get a completely clean slate, you must leave the program and enter it again.

Just remember to save any work you will want to return to by using the Save command before Quit. Otherwise, your work will vanish without a trace when you exit from Portable Calc.

FINISHING UP

You have just created and saved a practice spreadsheet. It doesn't convey any meaningful information, but you have learned a number of things in creating it. You know how to load the Portable Calc program, how to use it to do simple calculations, and how to create expressions that refer to other cells. You've used the function **SUM** and the Edit, Format, Save, and Quit commands.

In the next lesson you'll work on a spreadsheet with practical applications, which should help you get a feel for how you can make use of Portable Calc.

Lesson Two: Getting Practical

BEFORE YOU BEGIN

The example used in this chapter is meant to illustrate some of Portable Calc's features in the context of a (somewhat) realistic application. You would not necessarily use the same methods or sequence of operations to construct your spreadsheet if you had a similar application, but you will learn some basic concepts here and will be the wiser for encountering a few pitfalls.

GETTING STARTED

Your company, Harmony House Inc., makes musical instruments, and you have been asked to do a report on flute sales. You have some figures representing sales for the first six months of the year that you want to enter in a spreadsheet.

STEP 1 SEE A>

TYPE **CALC** RETURN

SEE Portable Calc copyright message

STEP 2 PRESS SPACE

SEE An empty spreadsheet

Pressing the space bar (or any key) skips you quickly past the copyright message.

STEP 3	TYPE	**79**	
STEP 4	TYPE	**126**	
STEP 5	TYPE	**103**	
STEP 6	TYPE	**158**	
STEP 7	TYPE	**188**	
STEP 8	TYPE	**215**	
	SEE		

```
A7  0% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 2      126
 3      103
 4      158
 5      188
 6      215
 7 <     >
```

Notice that when you pressed the **down arrow** key in cell A6, row 1 disappeared from view and row 7 became visible. Your view of the spreadsheet moved down with the cell cursor. Whenever the cursor moves beyond the borders of the portion of the spreadsheet displayed on the screen, a new portion is displayed so that the cursor always remains in view.

Making More Room

Now you have a column of numbers, but nothing to indicate what they mean. They need to be labelled. But before you can enter a label, you need to make some space at the top of the column.

STEP 1	TYPE	=
	SEE	*GOTO: cell ->*
STEP 2	TYPE	**a1** RETURN

The cell cursor jumps to cell A1, and the displayed portion of the spreadsheet changes to include row 1. The Goto command is a short-cut method for moving the cell cursor more than one cell at a time.

STEP 3	TYPE	**/I**
	SEE	*INSERT: Row Col -> /I*
STEP 4	TYPE	**R**
	SEE	

```
A1  0% ENTER: data arrow / = ! ->
    :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
  1<       >
  2        79
  3       126
  4       103
  5       158
  6       188
```

You have inserted a row at the row where the cell cursor was located. The contents of row 1 and all those below were pushed down to make room.

STEP 5 TYPE **Unit Sales** RETURN

SEE

```
A1  0% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
  1<Unit Sales>
  2        79
  3       126
  4       103
  5       158
  6       188
```

You can enter text as well as numbers and expressions. As you can see, text entries can overflow to the next column if the space is available.

You also want to label each row with the month it represents, so you need to insert a column.

STEP 1 TYPE **/IC**

STEP 2 PRESS ↓

STEP 3 TYPE **Jan** ↓

STEP 4 TYPE **Feb** ↓

STEP 5 TYPE **Mar** ↓

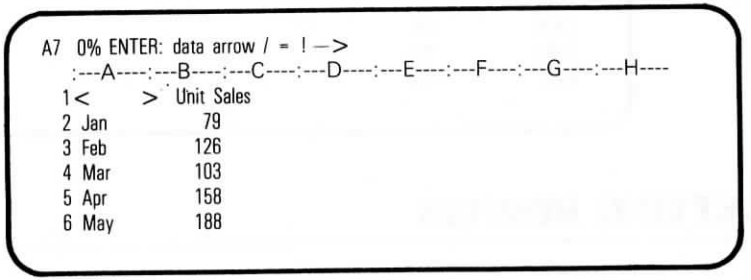
STEP 6 TYPE **Apr** ↓

STEP 7 TYPE **May** ↓

STEP 8 TYPE **Jun** RETURN

STEP 9 PRESS HOME

SEE



Pressing the HOME key is a shortcut for getting to cell A1, since you so frequently want to go there.

When you take a look at what you've got, you decide to label column A and separate the labels from the rest of the column with a line.

STEP 1 TYPE **Months** ↓

STEP 2 TYPE **/IR**

Typing an apostrophe (or right single quote) at the beginning of an entry tells Portable Calc that the next character you type should be repeated throughout the row.

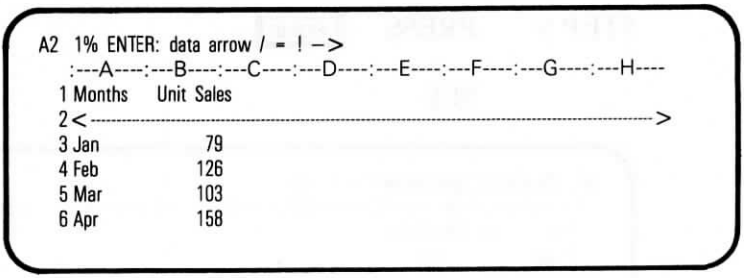
STEP 3 TYPE '

SEE *ENTER: repeat text ->*

Now type a hyphen to create the line you want.

STEP 4 TYPE — RETURN

SEE



GETTING RESULTS

So far, you have a nice-looking spreadsheet that tells you the monthly sales figures for flutes for the first half of the year. But you already knew what they were. You need to find out more about flute sales, and these figures can help you discover it.

To get the total number of flutes sold in the six-month period you can use SUM, the function you learned in Lesson One. First, label the row where the total will go.

STEP 1 TYPE **=a10** RETURN

STEP 2 TYPE **TOTAL** →

STEP 3 TYPE **+sum(**

You're stuck. You want to fill in the expression with the *cell range* that contains your figures, but you can't remember which cell the first figure is in. Here's a trick to help you out:

STEP 4 PRESS ESC

Pressing the ESCape key puts Portable Calc in an exploration mode that allows you to use the arrow keys to look for the cell you want. If you pressed an arrow key while making an entry, without pressing ESCape first, it would terminate the entry.

STEP 5 PRESS  7 times

This is the cell you were looking for, cell B3.

STEP 6 PRESS 

When you press ESCape a second time, the cell you're in is entered into your expression automatically.

STEP 7 TYPE **:b8)** 

SEE

```
B10 1% ENTER: data arrow / = ! ->
 :---B----:---C----:---D----:---E----:---F----:---G----:---H----:---I----
10< 869>
11
12
13
14
15
```

The sum of cells B3 through B8, 869, is placed in cell B10. When you used the Goto command, the screen view changed so that cell B10 is now located in the *home position* (the top left corner of the sheet), where cell A1 is when you first enter Portable Calc.

GETTING AROUND

You have already learned three ways to move the cell cursor: the arrow keys, the Goto command (=), and the HOME key. You have one other option—you can move the cell cursor with CTRL commands. These are the same cursor movement commands used in Portable WordStar:

←	=	^S
→	=	^D
↑	=	^E
↓	=	^X

Any of these cursor movement keys—the CTRL commands or the arrow keys—can be held down to move the cell cursor repeatedly along a row or column.

From now on, the instructions in this Training Guide will simply tell you where to move the cell cursor, without specifying how. You can choose between the various methods you have learned. You will probably want to use the arrow keys or CTRL commands for short hops and the Goto command for longer distances.

Note: The portion of the spreadsheet displayed on your screen may no longer agree exactly with the one shown in this guide if different methods were used to move the cursor. For example, the Goto command sometimes moves your destination cell into the home position.

IN ROUND FIGURES, PLEASE

What do your numbers mean in dollars and cents? Well, you know that a Harmony House flute wholesales for $152.85. So, you need to set up a third column, labelled "Dollar Sales," containing expressions that multiply the figures in column B by the cost of a flute.

You want the figures rounded to the nearest dollar for a more concise display, so you must use the Format command (/F). This does not change the way the numbers are stored in memory, only the way they are displayed.

The figures are going to go in column D. First, insert a row at the top of the spreadsheet to make room for the column heading.

STEP 1	MOVE	To cell D1	
STEP 2	TYPE	**/IR**	
STEP 3	TYPE	**Dollar**	
STEP 4	TYPE	**Sales**	
STEP 5	TYPE	**/FCI**	

You have just selected the Integer option (I) of the Format command, which causes numbers to be rounded off so that no decimal places are displayed. You also selected the Column option (C), which restricts the format change to the column the cell cursor is in.

STEP 6	MOVE	To cell D4	
STEP 7	TYPE	**b4 * 152.85**	

Multiplication is indicated by the symbol *. The result of the expression you just entered, 12075, appears in cell D4. Note that Portable Calc does not put commas in numbers.

To get the proper variation of this expression into the remaining cells in the column, use the Replicate (/R) command, one of Portable Calc's most exciting features.

STEP 8 TYPE **/R**

SEE *REPLICATE: from, to ->*

STEP 9 TYPE **d4,d5:d9** RETURN

SEE

```
D4  1% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 1                                 Dollar
 2 Months   Unit Sales             Sales
 3 ------------------------------------------------------------------------
 4 Jan            79             < 12075 >
 5 Feb           126                19259
 6 Mar           103                15744
```

Pretty nifty, wasn't it? You just replicated the expression in cell D4 to cells D5 through D9. The expression was adjusted for each cell to fit its new location and the results of the new expressions were calculated—all automatically. Move the cell cursor to one of the cells in the range D5 to D9 and use the Edit command (/E) to examine the contents of the cell. You will see that the cell named in the expression is the cell in column B that's in the same row as the one you're in. Press ^**U** to leave the expression unchanged.

One more thing. The heading "Dollar Sales" would look better if it were flush against the right of the cell, like the numbers below it. Portable Calc automatically displays text left-justified and numbers right-justified unless you change the format setting. To change the heading to **T**ext **R**ight justified for this column, follow this step:

TYPE **/FCTR** RETURN

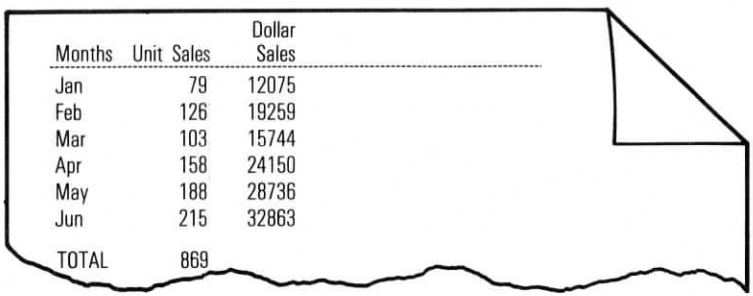
GOING TO PRESS

You have completed your first exercise in learning Portable Calc. Would you like to see your work in print? The Output command makes it possible with a few keystrokes.

First, make sure your printer is hooked up, turned on, and ready.

STEP 1	TYPE	**/O**
	SEE	*OUTPUT: Printer or File ->*
STEP 2	TYPE	**P**
	SEE	*OUTPUT BLOCK: range ->*
STEP 3	TYPE	**a1:d11** RETURN

The block of cells you have defined will be printed, beginning with cell A1 and ending with cell D11. This block includes the entire sample spreadsheet for this lesson. Here is what it should look like:



Months	Unit Sales	Dollar Sales
Jan	79	12075
Feb	126	19259
Mar	103	15744
Apr	158	24150
May	188	28736
Jun	215	32863
TOTAL	869	

FINISHING UP

Now do you feel like you're getting the hang of this? You've used Portable Calc to perform calculations as well as to generate

expressions, and those are an electronic spreadsheet's primary jobs. Of course, there are many more elaborations of this basic capacity (some of which you will learn in the next lesson), such as comparing two values to arrive at a third, or discovering the smallest, largest, or average value in a range.

In the next lesson you will be building on the work you did in this one, so save the file.

STEP 1	PRESS	HOME	
STEP 2	TYPE	**/S**	
STEP 3	TYPE	***a:*sales.sst**	RETURN

You don't have to move the cursor to cell A1 before saving, but you might want to. Portable Calc saves the cell cursor position along with the data and formatting, so when you load the file again your cursor will be wherever it was when you saved.

Now, exit from Portable Calc.

TYPE **/QY**

Lesson Three: Getting Down to Business

BEFORE YOU BEGIN

By the time you finish this lesson, you will have a spreadsheet that presents the information on Harmony House flute sales in several ways. Throughout the lesson, you will be asked to observe how Portable Calc handles the relationships between the various pieces of information. As spreadsheets get more complex, these relationships can get more involved. But if you understand the principles, you will have no more difficulty creating a 3,000-cell spreadsheet than you will creating a 30-cell sheet.

GETTING STARTED

Load Portable Calc (refer to previous lessons if you need instructions), then load the file SALES.SST that you created in Lesson Two.

STEP 1	SEE	The Portable Calc entry prompt
	TYPE	**/L**
STEP 2	SEE	*LOAD: file ->*
	TYPE	***a*:sales.sst** RETURN

Your spreadsheet on flute sales appears on the screen.

COUNTING THE PROFITS

You want to add to your spreadsheet by analyzing the figures you have so far with the help of some more information. The manufacturing division of the company has provided you with the cost of producing a flute for each of the months you are analyzing. The cost varies due to changing costs of materials, wages, advertising, etc. You will use that information to arrive at the total profit in flute sales for each month.

First, you must enter the cost information.

STEP 1	MOVE	To cell E1
STEP 2	TYPE	**/FCTR** RETURN
STEP 3	TYPE	**Unit** ↓
STEP 4	TYPE	**Cost** ↓

Now go to cell E4 and enter the following numbers in cells E4 through E9, using the **down arrow** key to complete each entry:

72.39
60.62
57.14
65.90
75.88
79.35

What happened to the 0 in 65.90? It was not entered in the cell because it is not necessary—it doesn't contribute any information about the value of the number. Later on we'll change the format of the column so that the decimal points line up.

To calculate profit you require an expression that multiplies the number of flutes sold by the cost per flute, then subtracts that figure from the income derived by selling the flutes.

STEP 1	MOVE	To cell F2
STEP 2	TYPE	**/FCTR** RETURN
STEP 3	TYPE	**Profit** ↓
STEP 4	PRESS	↓
STEP 5	TYPE	**d4-(b4 * e4)** RETURN

Harmony House Inc. made a profit of $6,356.34 on flutes in January.

Now replicate the expression in cell F4 to cells F5 through F9.

STEP 7	TYPE	**/Rf4,f5:f9** RETURN
	SEE	

```
F4  5% ENTER: data arrow / = ! ->
 :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
  4 Jan        79          12075    72.39<6356.34>
  5 Feb       126          19259    60.62  11620.98
  6 Mar       103          15744    57.14   9858.13
  7 Apr       158          24150     65.9   13738.1
  8 May       188          28736    75.88  14470.36
  9 Jun       215          32863    79.35   15802.5
```

AN AVERAGE MONTH FOR FLUTE SALES

Next, you want to find out the average monthly profit. Use the function **AVG**.

STEP 1	MOVE	To cell A13	
STEP 2	TYPE	**AVERAGE**	→
STEP 3	MOVE	To cell F13	
STEP 4	TYPE	**+avg(f4:f9)**	RETURN
	SEE		

```
D13  5% ENTER: data arrow / = ! ->
  :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 8 May          188             28736    75.88  14470.36
 9 Jun          215             32863    79.35   15802.5
10
11 TOTAL        869
12
13 AVERAGE                                      <1.1974E4>
```

The number you see in cell F13 is the sum of the values in cells F4 through F9, divided by 6. It is expressed in *scientific notation* rather than decimal notation, which is the method of representing numbers that you are probably more used to. In decimal notation the number would be 11974.4016666, which has too many digits to fit in the cell. Numbers can't overflow into the next cell the way text can, so Portable Calc converts the number to scientific notation.

Scientific notation compresses very large or very small numbers by using powers of ten. The power of ten is represented by "E" and the number following it. Therefore,

$$1.1974E4 = 1.1974 \times 10^4 = 1.1974 \times 10{,}000 = 11974.$$

What happened to the numbers that were to the right of the decimal point (4016666)? There is not enough space to display them, but they reside in Portable Calc's memory as a part of the number in cell F13 and will be used in any calculations involving that number.

Making More Room Again

You can change the width of a column, or of all the columns in your spreadsheet, with the Format command (/F). To see how changing column width can affect the display of your data, make column F wider.

TYPE **/FC15** RETURN

Now that there is more room, the value in cell F13 displays as 11974.4016666. Scientific notation is no longer needed.

Now set the column width back to 8, which is the *default setting* (the one already in effect when you began your work).

TYPE **/FC8** RETURN

FLASH!

An administrative assistant in the Sales Department calls to tell you that one of the figures you were given was incorrect. There were 110 flutes sold in March, not 103. Correct the error with the following steps:

STEP 1 MOVE To cell B6

STEP 2 TYPE **110** RETURN

A New Approach

Before recalculating the spreadsheet to get the results of the change you just made, you decide to experiment a little with the layout. You try putting the figure for average sales per month in a column by itself. The result of this exercise will teach you something important about *expression adjustment*.

STEP 1	MOVE	To cell H1	
STEP 2	TYPE	**Average**	↓
STEP 3	TYPE	**Profit**	↓
STEP 4	TYPE	**/FCTR**	RETURN
STEP 5	PRESS	↓	
STEP 6	TYPE	**+avg(f4:f9)**	RETURN

The number that appears in cell H4, is 1.1974E4, the same as the one in cell F13. Neither cell reflects the correction in unit sales for March, because you haven't instructed Portable Calc to recalculate yet. Recalculation should change the figures in cell F6 (monthly profit for March), as well as H4, F13 (average monthly profit) and B11 (total unit sales).

STEP 7	TYPE	**!**

Now look at your sheet. Why wasn't the value in cell H4 updated? It's still 1.1974E4. Go to cell F13 and see if there's any change there:

STEP 8	TYPE	**=F13**	RETURN

Yes, there is! According to the figure in cell F13, the average monthly profit is 1.2086E4.

What happened? Well, first you must understand that the entire spreadsheet is recalculated row by row from left to right, starting with row 1, unless you specify with the Global command that it be done column by column. The expression in cell H4 refers to F6, but when the program got to cell H4 in its recalculation, cell F6 had not yet been recalculated to reflect the change in B6. Therefore, the value in H4 was left unchanged.

By the time the program got down to cell F13, F6 had been updated, so the value of F13, which depends on the values in cells F4 through F8, was recalculated correctly.

To avoid incorrect expression evaluation, make sure that cell references do not refer to cells that are evaluated later if those cells contain references to cells that are also evaluated later. For row-by-row evaluation, such referenced cells should not be in higher numbered rows or further in the same row. For column-by-column evaluation, the referenced cells should not be in higher lettered columns or further in the same column.

Setting a Global Option

As mentioned in Lesson One, you can tell Portable Calc to recalculate the entire spreadsheet each time you make a new entry or change an existing one. Do this by setting the Global Calculation option to YES with the following steps:

STEP 1	TYPE	**/G**
	SEE	*Adjust=ALL Border=YES* *Calc=NO Order=ROW* *Scroll=YES ->/G*
STEP 2	TYPE	**C**

ANOTHER FLASH!

The same administrative assistant calls to say that the sales figure for July has just come in. You take the information and plug it into your spreadsheet.

STEP 1	MOVE	To cell A10
STEP 2	TYPE	**Jul** 
STEP 3	TYPE	**227** 
STEP 4	TYPE	**/IR**
	SEE	

```
B11  5% ENTER: data arrow / = ! ->
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H----
 8 May          188             28736   75.88  14470.36
 9 Jun          215             32863   79.35   15802.5
10 Jul          227
11
12 TOTAL        876
13
```

That looks fine, except for one thing: the total in cell B12 hasn't changed. You know the sheet has been recalculated, because you set the Global Calculation option to YES. So why wasn't the figure updated? To find out, check on the expression in B12.

STEP 1	MOVE	To cell B12
STEP 2	TYPE	**/E**

The expression has not changed—it still refers to the range of cells from B4 to B9. So the value in cell B12 is correct as far as Portable Calc is concerned. The expression was not adjusted because nothing changed within the cell range to which it refers. You must change the expression to include the cell you've added.

STEP 3	PRESS		9 times
	SEE	Entry cursor over "9"	
STEP 4	TYPE	**1**	
STEP 5	PRESS		

When you're editing the contents of a cell with the Edit command, pressing the up arrow has the effect of inserting a space.

STEP 6	TYPE	**0**	

Now the figure in cell B12 changes to 1103, because sales for the month of July have been added in to the total.

If you had inserted a row somewhere between rows 4 and 9 and had entered a figure in column B of the new row, then the expression that totals that column would have been adjusted automatically to include the new cell.

MORE PRACTICE

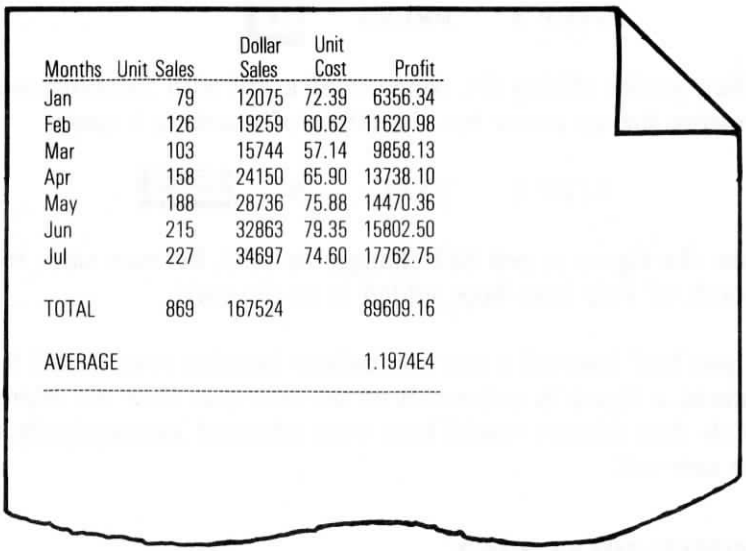
To practice using what you've learned, you might want to complete the Harmony House spreadsheet.

Complete row 10 with the appropriate expressions by replicating (/R) the cells directly above D10 and F10. Use 74.60 as the "Unit Cost" figure for the month of July, in cell E10. Total columns D and F, using the **SUM** function.

You could erase the inaccurate data in Column H by using the Blank command. Place the cell cursor in cell H3 and press **/B**. Or you could eliminate the entire column with the Delete command by putting the cell cursor anywhere in the column and typing **/DC**.

To improve the spreadsheet format, assign the Dollar format to columns E and F. Do this by placing the cell cursor in each column and typing **/FC$**.

When you have a completed spreadsheet, you might want to print it. The command is **/OPa1:f14**. The printed sheet should look like this:



Months	Unit Sales	Dollar Sales	Unit Cost	Profit
Jan	79	12075	72.39	6356.34
Feb	126	19259	60.62	11620.98
Mar	103	15744	57.14	9858.13
Apr	158	24150	65.90	13738.10
May	188	28736	75.88	14470.36
Jun	215	32863	79.35	15802.50
Jul	227	34697	74.60	17762.75
TOTAL	869	167524		89609.16
AVERAGE				1.1974E4

If you want to save your spreadsheet, be sure to use the same file name as you did the last time you saved it (SALES.SST). Otherwise, you will create a separate file.

CREATING MODELS

If you were actually an employee at Harmony House Inc., you might have the occasion to create a spreadsheet similar to the one in this lesson, perhaps for the last six months of the year. You could save yourself a lot of time and trouble if you were to use a *template* to do this.

A template is a model of a spreadsheet that is reused with different raw data to create more than one spreadsheet. It is like an outline that you fill in with the current figures. Templates are created for routine tasks, such as filing expense account reports.

To use a template, you load it into Portable Calc, fill it with data, and then save the filled sheet under a different name. For example, your expense account template might be called EXPENSE.SST and a filled-in spreadsheet created with the template could be named 8-12-84.SST.

There is a variety of books on the market that provide instructions for creating commonly-used templates with various spreadsheet programs. These instructions could be adapted for use with Portable Calc, or you might wish to try designing your own templates.

Your use of Portable Calc will be most effective if you take the time to plan your template before you start entering data. Ask yourself what you want to accomplish with the spreadsheet, what information you have available, what relationships exist between different kinds of information, what assumptions you are going to make (if you are forecasting), and how the information can be displayed to best advantage. When you have answered these questions, then you can create a template that will be useful over and over again.

If you have already worked out a spreadsheet (more or less by trial and error, as in this lesson) and it is filled with data, you can save the filled-in sheet and then eliminate the raw data to make a template.

You can leave yourself some clues about where text or numbers are to be filled in by entering a zero in any cell which will later contain a number and double quotes (") in cells meant for text. The double quotes are a signal to Portable Calc that the entry that follows is text; the quotes do not show up on the spreadsheet. Zeros can also be used in expressions to represent a variable, such as the retail price of a flute, that will be plugged in when the template is used.

When you go to fill in a template, use the Edit command to find out what is in each cell. Then change zeros to numbers and follow quotes with text.

For example, if you created a template out of the spreadsheet in this lesson, this is what would be entered in each cell:

```
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
 1                                  Dollar   Unit
 2 Months     Unit Sales              Sales   Cost     Profit
 3 ------------------------------------------------------------------------
 4 "                  0          +b4*0       0     d4-(b4*e4)
 5 "                  0          +b5*0       0     d5-(b5*e5)
 6 "                  0          +b6*0       0     d6-(b6*e6)
 7 "                  0          +b7*0       0     d7-(b7*e7)
 8 "                  0          +b8*0       0     d8-(b8*e8)
 9 "                  0          +b9*0       0     d9-(b9*e9)
10 "                  0          +b10*0      0     d10-(b10*e10)
11
12 TOTAL      +sum(b4:b10)   +sum(d4:d10)          +sum(f4:f10)
13
14 AVERAGE                                         +avg(f4:f10)
```

Of course, this is not what you would see on the screen when you loaded your template. The text would be displayed, but the rest of the sheet would be blank. This is what you would see in each cell when you used the Edit command.

FINISHING UP

Congratulations on completing the Portable Calc Training Guide! Go on from here by reading the Reference Manual for more detailed information about the program. You will discover other functions and commands that you can use to build more sophisticated spreadsheets. Experiment with designing templates and explore the time-saving results of using Portable Calc for your varied information management needs.

INDEX

Software that means business™

EPSON PX-8

Portable Calc™ Reference Manual

For Release 1.0

Welcome

Portable Calc is an electronic spreadsheet program for the Epson PX-8. It includes the most frequently used features of spreadsheet programs for larger computers. Rather than sacrificing the power of a larger program, Portable Calc's designers have economized its prompts and messages to make efficient use of the smaller display area.

A spreadsheet is a tool used in the management and analysis of data. With Portable Calc you can determine what has happened in any area of your business or personal life involving information that can be quantified. Based on such an analysis, you can also predict what will happen in the future.

Thus, Portable Calc is a calculating tool, a business planning tool, an inventory control tool, an accounting tool, a financial problem-solving tool, an estimating tool, and whatever else you make it. The program provides you with a blank worksheet arranged in columns and rows into which you enter words and numbers, changing the data as you need to, and recalculating quickly and easily.

Portable Calc is a highly interactive, display-oriented program that responds rapidly to keyboard commands. It performs simple calculations as well as complex forecasts and projections. Press a few keys, and the entire contents of the spreadsheet can change!

You can use Portable Calc to construct a "template" —the outline of a spreadsheet—that can be filled in over and over again with different data. Thus, routine tasks are performed in less time, with greater accuracy.

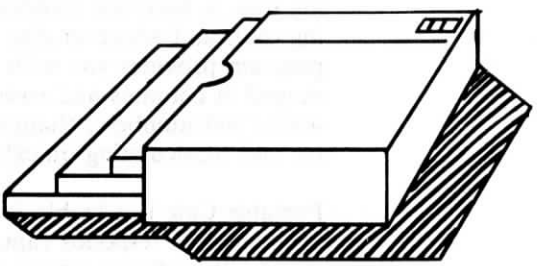
Use Portable Calc for balancing a checkbook, tracking accounts receivables, calculating interactive financial statements, performing statistical analysis, figuring taxes, or investment modelling. Whatever applications you find for this program, it will save you time and trouble compared to the old-fashined pencil-paper-and-calculator method.

You will find the program's commands simple to understand and use because they contain built-in memory joggers—like **I** for **I**nsert. And if you forget, there is always a prompt to guide you.

Everything you need to know about the program appears in the pages ahead. So relax, and enjoy the experience of becoming acquainted with this remarkable program.

WHAT YOU HAVE

Your Portable Calc software package consists of the file CALC.COM and a manual.



Before reading the Portable Calc manual or trying to use the program, you should familiarize yourself with your PX-8 by reading the PX-8 User's Manual provided with it.

Your Portable Calc manual is made up of two parts: a training guide and a reference manual. Read the *Training Guide* first; it provides a step-by-step path through the basics of the program. It will soon have Portable Calc up and running for you. The *Training Guide* does not cover every aspect of Portable Calc —that is the purpose of the *Reference Manual*—but it helps you to use the program right away, and that is the best way to begin your learning experience.

The *Reference Manual* is a comprehensive description of Portable Calc that should be read for a detailed understanding of how the program works once you have completed the exercises in the Training Guide. When you become a Portable Calc pro, use this manual for reference.

Portable Calc™ Reference Manual

For Release 1.0

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TRADEMARKS

DISCLAIMER

TABLE OF CONTENTS

How to Use this Book

You are the most important character in this book. The Reference Manual describes every feature and command of the Portable Calc program with you in mind. After the opening chapter introduces the program, you will find explanations of the tasks that Portable Calc can do for you.

REFERENCE AIDS When you want access to information, use the following reference aids:

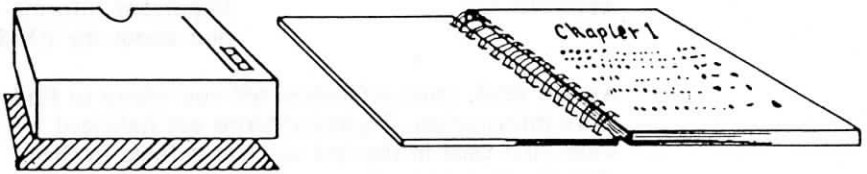


Table of Contents at the beginning of the manual	List of every subject covered in the five chapters and three appendices
Table of Contents at the beginning of each chapter	Closer look at the subjects covered in the chapter

Summary Table at the end of most chapters	Quick reference chart of material covered in the chapter
Index	Quick pointer to a subject or command

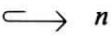
When you want summaries, use the appendices:

Appendix A	Error Messages
Appendix B	Glossary
Appendix C	Important Information about the PX-8

As you read, cross-references tell you where to find more information. Technical terms are italicized when first used in the text and are defined in the glossary. Signposts give you easy access. Watch for these symbols:

filename
filename.EXT

When you see one of these substitute file names in a procedure, use it as a reminder to insert an appropriate file name from your own directory.



"Refer to this page (*n*) of the Portable Calc Reference Manual for more information."

"CAUTION"

"REMEMBER"

"An example on-screen"

"RETURN Key"

A single-key command

A two-key command

An option that only works with a previously entered command

You may find it easier to learn some commands by the mnemonic devices which appear in boldface when applicable. You can remember, for example, to use **/E** to **E**dit a cell.

NOTE: ^ or CTRL represents the control key on your keyboard.

CHAPTER 1. INTRODUCING PORTABLE CALC

CONTENTS

1. Introducing Portable Calc

If you have some experience creating spreadsheets with paper and pencil, you will recognize many of the features of Portable Calc. You will not need to learn a lot of new terms and procedures. Instead, you will learn how to create spreadsheets with more efficiency and ease through the use of Portable Calc's commands.

This chapter introduces you to the concepts behind spreadsheets in general and Portable Calc in particular. If you are an old hand at using spreadsheets, then some of this will be review for you and some of it will be a new approach to a familiar subject.

WHAT IS A SPREADSHEET PROGRAM?

A *spreadsheet* is a tool which can help you solve financial problems both in business and your personal life. Spreadsheets allow you to examine the possibilities of a proposed action and compare your alternatives intelligently before making a decision. They are also used for routine accounting calculations. Spreadsheet applications include:

- estimating job costs
- forecasting trends
- balancing checkbooks
- controlling inventory
- depreciating assets
- preparing statements
- analyzing the effects of decisions

A spreadsheet *program* speeds up the process of creating a spreadsheet because your PX-8 can calculate faster than you can with a pencil, paper, and a calculator. A spreadsheet program is often referred to as an "electronic spreadsheet."

STARTING WORK IN PORTABLE CALC

For specific information about using Portable Calc in your Epson PX-8, please see Appendix C.

HOW TO ENTER PORTABLE CALC

The Portable Calc program is contained in a file called CALC.COM. At the operating system prompt:

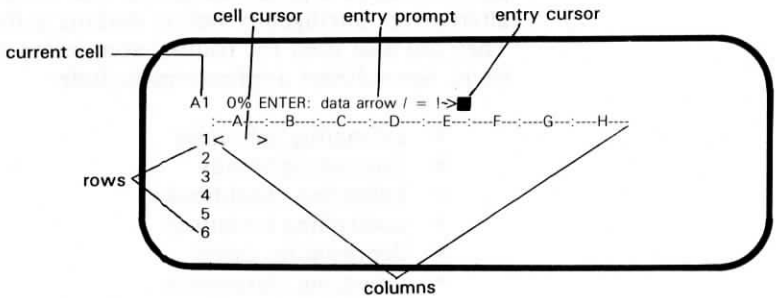
TYPE **CALC** RETURN

SEE copyright message

The copyright message contains a product identification code that precisely identifies the program and the version you are using. Refer to this I.D. number when making any inquiries about the program.

The next display will appear automatically, but you can hurry it along by pressing any key after the copyright message appears.

This is what you will see on your screen after the copyright message disappears:



The Parts of a Spreadsheet

An electronic spreadsheet is made up of *rows* and *columns* containing figures and words, the same as an old-fashioned pencil-and-paper spreadsheet. Rows are horizontal, and columns are vertical. A Portable Calc spreadsheet may be as large as 64-columns wide and 256-rows long. The rows are numbered from 1 to 256, and the columns are lettered from A to Z, followed by AA to AZ, then BA to BL.

WHAT IS A CELL

You enter information into *cells* on the spreadsheet by typing on the keyboard. A cell is the intersection of a column and a row, and thus is identified by the appropriate column letter(s) followed by the row number. For example, cell AB230 is the 28th column in row 230. AB230 is a *cell name*. The column letter(s) can be upper- or lowercase. Please note that the distinction between upper- and lowercase can, however, be significant in certain circumstances. ⊂→ *4-16*

You can think of a cell name as something like a street address. For instance, you might tell someone that your house is on the corner of Twelfth Street and Vine. You use cell names in a similar way—to tell the program where to find a piece of information.

A Portable Calc spreadsheet may contain as many as 16,384 cells (64 columns × 256 rows). You can vary the width of the cells to accommodate your data. ⊂→ *4-12*

NOTE: To make most efficient use of memory, keep your data in the upper left corner of the spreadsheet.

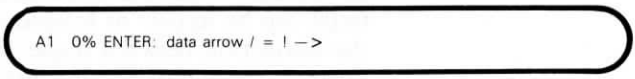
DATA TYPES

A cell can contain three kinds of data: text, a number, or an algebraic expression. These are called *data types. Text* is generally used for column headings, the title of the document, or descriptive entries within a row or column (such as "Part #624" or "May 3, 1982"). *Numbers* may contain up to twelve digits. *Expressions* can include numbers, operators (symbols which mean add, subtract, multiply, or divide), cell references, and functions (for example, the sum of a list of numbers). Portable Calc determines the value of the expression when you enter it, and recalculates when necessary.

Tools for Using the Electronic Spreadsheet

INFORMATION ON THE TOP LINE

The top line on the screen contains information and prompts. When you enter Portable Calc it looks like this:



This line serves several purposes:

- On the far left, it tells you which cell your cursor is in (the *current cell*).
- It displays the percentage of available space taken up by your data.
- It prompts you to enter data or commands, and displays error messages when appropriate.
- It displays the data or commands you type.

THE WINDOW

The portion of the screen below the top line is called the *window*. You can't see all 16,320 cells in a spreadsheet at one time, but you can see any part you want by moving the window. The term "window" simply refers to the portion of the spreadsheet that you can see; it is limited by the size of your PX-8's screen.

The window on the PX-8 is 80-characters wide and 7-rows long. Some of the space available is taken up by row numbers and column letters (called "borders") and spaces between cells. The number of cells you can see at one time will depend on the width of the columns and whether or not you have the borders of the spreadsheet displayed. If your cells are 8-characters wide and the borders are displayed, you will be able to view 48 cells at one time. The rest of the spreadsheet will be held in the PX-8's memory, ready to appear in the window when you need it.

You can move (or *scroll*) the window up, down, and to the right or left to display different parts of the spreadsheet. (See the next section in this chapter.)

One way to visualize what happens when you move the window is to think of your PX-8's screen as a window in a car and the spreadsheet as the countryside through which you are driving. As you travel you see different portions of the scenery through your car window.

ENTRY CURSOR

A *cursor* is a pointer that tells you where information will be entered when you type. Portable Calc has two cursors. The *entry cursor* is on the top line of the screen; it shows you where the next character will appear as you enter or edit data or enter commands. It is represented by a block or an underline, depending on the kind of computer you have and how it is set up.

CELL CURSOR

The *cell cursor* is represented by brackets around the cell that will receive data or that will be affected by a command. When a blank spreadsheet first appears on the screen, the cell cursor will be in cell A1.

Moving the Cell Cursor and Window

HOW TO MOVE THE CELL CURSOR

There are four ways to move the cell cursor:

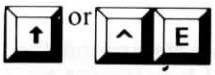
1. with the arrow keys
2. with cursor control commands
3. with the HOME key
4. with the Goto command

NOTE: You can move the cell cursor only when Portable Calc is in entry mode, not in edit mode. You cannot move it while there is an error message on the screen either. ⊂⟶ *4-7*

When the cell cursor moves to a new cell, the new cell name is displayed in the upper left corner of the screen.

Press the **right arrow** key or **^D** (hold down the CTRL key and press D) to move the cell cursor one column to the right. If you want to move several columns to the right, hold down the key(s) for a few seconds. Be careful how long you press, though, because the cursor may keep going even after you release the key(s). The top left corner of the screen will display the name of the cell that is your destination before you even get there. All the cell cursor movement commands can be repeated in a similar fashion.

Press the **left arrow** key or **^S** to move the cell cursor one column to the left.



Press the **up arrow** key or **^E** to move the cursor one row up.

Press the **down arrow** key or **^X** to move the cursor one row down.

Press the HOME key to move the cell cursor to cell A1, no matter where it may be in the spreadsheet.

CURSOR CONTROL DIAMOND

The cursor control commands (^S, ^D, ^E, and ^X) are the same as those used by the Portable WordStar word processing program. They form a diamond pattern on the keyboard in which the postion of each key indicates its action. For example, E is at the top of the diamond and the **^E** command moves the cell cursor up.

The Goto command, which is discussed in Chapter 4, moves the cell cursor quickly between any two cells.

MOVING THE WINDOW

When you move the cell cursor out of the window, the window will automatically scroll to keep up with the cursor. If you don't like to wait for the window to scroll, you can choose another mode in which it does not scroll automatically. ⊂⟶ *4-18*

SUMMARY TABLE: CELL CURSOR CONTROL		
COMMAND	**ARROW KEY**	**FUNCTION**
^D	→	Moves cell cursor right one column
^S	←	Moves cell cursor left one column
^E	↑	Moves cell cursor up one row
^X	↓	Moves cell cursor down one row
	HOME	Moves the cursor to cell A1
=*n*		Moves the cursor to the cell specified by *n*, where *n* is a cell reference.

CHAPTER 2. ENTERING DATA

CONTENTS

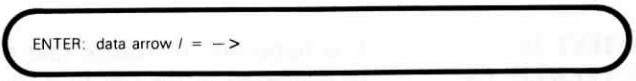
2. Entering Data

Entering data in Portable Calc is very straightforward. Generally, you simply type the data, making corrections with electronic ease, then press a key, and Portable Calc places the entry in the cell you choose. There are also shortcuts for drawing lines, making changes, and looking up data you have already entered.

THE ENTRY PROMPT

HOW TO BEGIN

You can enter data any time you see the *entry prompt* on the top line of the screen:



This prompt tells you that you can enter *data* (text, number, or expression), move the cell cursor with the *arrow* keys, or enter a command character (/, =, or !). Entry of commands is explained in Chapter 4. The entry prompt will change to display helpful information as you enter data or commands.

As you enter data, it will first appear at the entry cursor. If you enter more characters than will fit on the screen, your entry will scroll to the left when you reach the right edge of the screen. Characters will disappear on the left, then reappear if you backspace to make corrections. (See the section on making corrections, later in this chapter.) Don't worry—characters that scroll off the screen are still retained in memory and will appear on your spreadsheet.

When you press RETURN the data you have entered will be placed in the current cell. This cell is marked by the cell cursor and identified in the upper left corner of the screen. Any data already in the cell will be replaced by your entry.

ALTERNATE WAY TO COMPLETE AN ENTRY

If you complete your entry with an arrow key rather than RETURN, the data will be placed in the current cell and the cell cursor will move to the next cell in the direction of the arrow. When entering a row of data, press the **right arrow** key or **^D** to conclude each entry; when entering a column of data, press the **down arrow** key or **^X** to conclude each entry. This is a shortcut method which accomplishes two tasks at once.

You will probably find yourself using this method frequently, since data is usually entered in successive cells in a row or column. Use it for high-speed data entry, but be careful not to type too far ahead of the program's ability to update the screen, or you might lose keystrokes.

WHAT IS ENTERED VS. WHAT IS DISPLAYED

It is important to realize that the data you enter may be displayed in the cell in a form that is different from the way you entered it. For example, a text entry may have to be truncated (shortened) to fit the width of the column, a number may be rounded or written in scientific notation, and an expression will display as a number arrived at by calculation.

Just remember that the data is stored in memory exactly as it was entered, no matter how it is displayed. When a cell containing a number or expression is referenced in an expression in another cell, its full value is used in the calculation.

MAKING CORRECTIONS AND CHANGES

You will probably need to make corrections occasionally as you enter data, and you may want to change or correct data that has already been entered. There are different methods for performing these two tasks.

Correcting Errors When Entering Data

As you enter data at the entry prompt, you can correct any errors by using one of the following: the delete key (DEL), the backspace key (BS), or **^H**. All three do the same job—they backspace the cursor and delete the character there. This is the same way you make corrections when responding to prompts in Portable WordStar.

Any time you want to interrupt what you're doing when you're entering data or a command, press **^U**. Your entry will be cancelled and the entry prompt will be restored.

Correcting Data After It's Entered

When you want to make changes in data that has already been entered into the spreadsheet, either reenter the data (thus cancelling the previous entry) or use the Edit command (/E), which is described in Chapter 4. The Edit command allows you to change only the incorrect portion of the entry (like using a word processor).

Sometimes when you enter data incorrectly the computer will beep and you will see an error message on the top line of the screen. Simply press ESCape to erase the error message and return to the entry prompt. If you are uncertain why the message appeared, see the listing of error messages in Appendix A.

DATA TYPES

The three types of data you can enter into your spreadsheet—*text*, *numbers*, and *expressions*—are treated differently by Portable Calc. Therefore, it is important that the program recognize which data type you are entering. In most cases, this is obvious.

When you begin typing your entry, Portable Calc automatically changes the prompt to identify the data type. It is wise to pay attention to the prompts to make sure that data is being entered and interpreted correctly.

Entering Text

HOW TO ENTER TEXT

If you begin your entry with a letter, a space, a double quotation mark, or a right single quotation mark, Portable Calc will assume that you are entering text or an expression and will change the entry prompt to read:

```
ENTER: text or expression —>
```

Expressions can also begin with a letter or a punctuation mark, so Portable Calc isn't certain whether the entry is text or an expression until you've completed it. Then the program evaluates and categorizes the entry.

Some text entries can confuse Portable Calc. If the entry looks like it begins with a cell name (for example, H90 Model Terminals), Portable Calc will expect an expression since they often begin with cell names. The program will evaluate the "expression" to see if it is a valid one, and finding it lacking, will signal its confusion with an error message:

```
?? INVALID NUMBER OR EXPRESSION
```

To avoid such a case of mistaken identity, type a double quotation mark (") before entering the text, indicating that what follows is a text entry.

TYPE "

SEE *ENTER: text ->*

TYPE **H90 Model Terminals** RETURN

As soon as you type the double quotation mark, the entry prompt changes to acknowledge that you are making a text entry. The double quotation mark does not appear on the screen, either at the prompt or in the cell. To enter text that begins with a double quotation mark (such as "Lost" Orders), type the double quotation mark twice.

You will also want to use a double quotation mark if your text begins with a number (for example, 3rd Year Payments) to keep Portable Calc from classifying the entry as numeric.

Graphic characters cannot be included in text entries.

NOTE: You can use both upper- and lowercase letters in text entries.

HOW LONG CAN A TEXT ENTRY BE?

Text entries can be up to 254-characters long. Horizontal scrolling makes it possible to enter more text than will fit on the screen. When the cursor reaches the right edge of the screen, typing additional characters causes the text to scroll to the left, and part of the entry disappears from view (but not from the computer's memory). If you try to enter more than 254 characters, the computer beeps and ignores the extra characters.

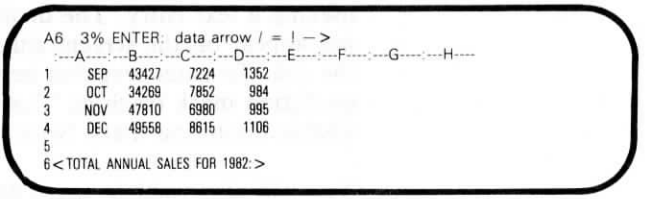
Overflowing Text

WHAT IF THE TEXT WON'T FIT IN THE CELL?

Text that won't fit in a cell (because the entry is wider than the column) overflows into neighboring cells until an occupied cell is encountered. Then the entry is truncated and the portion that is not displayed is retained in memory. Should the next cell become empty at some point, then more of the extended entry will be displayed.

Also, when you enter data in a cell that contains overflow text, the new entry displaces the overflow text. Any of that text that overflows into following cells is also removed from display, but the entire entry is stored in memory and will display again if space becomes available.

Here is an example of an extended text entry:



The column width is set to the standard 8 characters, so the text entry in cell A6, which is 28-characters wide, must extend into cells B6 through D6.

Notice that as long as the cell cursor is in A6, it expands to include the overflow text. However, when the cursor is moved to the right, to a cell containing overflow text, it shrinks to the column width. The cursor only expands with the text when it is in the cell where the overflow text entry originates.

If a text entry overflows off the screen, the cursor will remain in the screen window. The text will scroll along with the window when the cell cursor is moved off the screen.

In the preceding example, columns B, C, and D contain monthly sales figures for various products. As the spreadsheet now stands, each row could be totalled, the totals could be entered in column E, and a total annual sales figure could be placed in cell E6. That is the plan for constructing this spreadsheet.

But, suppose you would like to consider placing in row 6 an annual total for the sale of each product. You want to try out this idea without erasing the text you already have in row 6. You can enter expressions in cells B6, C6, and D6 that will yield the totals of the three columns. Those figures will take the place of the overflow text. If you decide that you prefer your original plan for the spreadsheet, you can blank cells B6, C6, and D6 (using the /B command) and the text will return.

If you try to make an extended text entry in the last column (BL), the entry will be truncated because there is no next cell to which it can overflow. The same thing would happen to a text entry made in a cell to the left of column BL if it was long enough to overflow past column BL. The truncated text will not be lost; it will be stored in memory and will appear on the screen when the column is widened.

Column width can be changed by use of the Format command (/F). ⊂⟶ *4-12*

Repeating Text

You may want to repeat a character, such as an underline or asterisk, to divide sections of a spreadsheet or to underline a heading. An apostrophe (or right single quotation mark) at the beginning of your entry signals Portable Calc that you want the next character repeated. At the entry prompt, follow this procedure:

TYPE '

SEE ***ENTER: repeat text ->***

TYPE *

SEE **********(in cell)

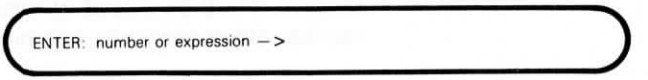
The character you enter after the apostrophe will be repeated until an occupied cell is encountered. If you enter more than one character, only the first will be repeated; any others will be ignored. All the features of overflow text apply to repeated text as well. ⊂⟶ *2-7*

When a portion of a spreadsheet containing repeated text is printed (or output to a file), the repeated text will show only if the portion includes the cell where the repeated text originates. ⊂⟶ *4-21*

Entering Numbers

HOW TO ENTER A NUMBER

If you begin your entry with a digit, plus sign, minus sign, or period, Portable Calc will assume you are entering a number or an expression and will change the entry prompt to read:



A number can contain up to twelve *significant digits* and can be preceded by a plus or minus sign. A decimal point may be placed at any point. These are valid numbers:

–7.3648320275 .036 9958741 –.75

This is an invalid number, because it contains more than twelve significant digits:

1234567890.1234567

If you accidentally press the space bar before you begin a numeric entry, Portable Calc will classify the entry as text. Also, do not use commas in numeric entries. The PX-8 will sound a beep and display an error message, and the entry will be classified as text.

NOTE: There are no special rules for entering integers, as there are in some spreadsheet programs.

EXPONENTIAL NUMBERS

Portable Calc does not limit you to numbers with magnitudes of twelve places. Larger (or smaller) numbers can be expressed in *scientific* (or *exponential*) *notation* as a number multiplied by a power of 10. In this way a number of more than twelve digits or one that is too lengthy to fit in a cell can be represented in a shortened form.

Take, for example, the number 82 trillion (82,000,000,000,000). In scientific notation it would be

8.2E13

The E signals to Portable Calc that the next number (called the "exponent") is the power to which 10 is raised—in this case 13. Thus, E13 is equivalent to 10^{13}. The number 8.2E13 means 8.2 multiplied by 10 to the 13th power, or 82 trillion.

In scientific notation, the number is represented as one digit followed by a decimal point and a string of digits multiplied by a power of 10. To represent a number less than 1, use a negative exponent. For example, .00082 would be expressed as 8.2E−4.

Largest and Smallest Possible Numbers

Here are the largest numbers Portable Calc will accept:

9.99999999999E123
and
−9.99999999999E123

Here are the smallest numbers Portable Calc will accept:

9.99999999999E−126
and
−9.99999999999E−126

The limits on the size of the exponent are +123 to −126. Exponents may vary from 1 to 4 characters (including the minus sign). These are examples of invalid numbers:

12345.E122 6.31E145

The first one is invalid because it is too large. Expressed properly in scientific notation the number is 1.2345E126. However, the largest possible positive exponent is 123, so this number would result in an error message. The second number also has too large an exponent.

WHAT IF THE NUMBER IS TOO BIG OR TOO WIDE?

You can type in a number at the entry prompt that exceeds Portable Calc's limits, but you will get an error message or sign. If you try to enter a number with more than twelve significant digits, or one that is larger or smaller than the program allows, then the number will be classified as text and will be entered into the cell, the PX-8 will beep, and the following error message will display on the top line:

```
?? INVALID NUMBER OR EXPRESSION (Press ESC to start over)
```

If your number is a valid one, but has too many digits to fit in the cell, it will be converted to scientific notation so that it will fit, if possible. This could mean that some of the significant digits would not be displayed, but they would still be stored in memory. If the column width is too narrow to allow the number to be represented even in scientific notation, then you will see the following error sign in the cell:

```
>>>>>>>>>>
```

If you have chosen Decimal or Integer format with the Format command and you try to enter a number that is too wide for the cell, Portable Calc will not attempt to display it in scientific notation. Instead, you will get the preceding error sign.

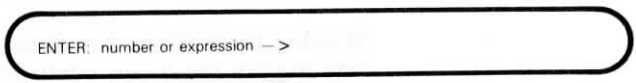
Column width can be changed by using the Width option of the Format (/F) command. This command also has other options that affect the display of numbers. You can specify that numbers will display in exponential form, in integer form, in dollars and cents, with a certain number of decimal places, left-justified, or right-justified. ⊂→ *4-9*

Entering Expressions

An *expression*, or formula, can be entered into your Portable Calc spreadsheet. Expressions generally require calculation, which can be as simple as **3 + 2** or as complicated as anything taught in a high school algebra class. You will find that the use of expressions will make your spreadsheets more efficient tools that can provide answers to complex problems.

HOW TO ENTER AN EXPRESSION

Expressions can begin with a digit, a letter, or a symbol, and can be up to 254 characters in length. When you complete an entry, Portable Calc evaluates it and classifies it as a numeric entry, text, or an expression. If you are entering an expression beginning with a digit, plus or minus sign, period, at sign (@), or left parenthesis, the entry prompt will change to read as follows:



Since an expression almost always results in the entry of a number in a cell, the rules concerning the display of numbers (discussed earlier in this chapter) also apply to expressions.

NOTE: If an expression results in a number with more than 12 significant digits, it will be trimmed to 12 significant digits before it is displayed in the cell. Zeros will be used as place holders if necessary. However, in calculating, Portable Calc's internal level of accuracy exceeds the limit of 12 significant digits.

CELL REFERENCES

One or more cell names can be included in an expression, to be replaced by the value of the cell(s) when Portable Calc performs the calculation. For example, when calculating the value of the expression **B7+8** the program would discover what was in cell B7—say, the number 21—and plug that into the expression to arrive at a value of 29, which would then be entered into the current cell. A cell name used in an expression is called a *cell reference*.

A reference to an empty cell or a cell containing text yields a value of zero.

A SHORTCUT FOR FINDING A CELL REFERENCE

You may often find yourself in the middle of entering an expression, unable to remember which cell you want to reference. Is "monthly salary" located in column Q or column R? If the window does not currently display that portion of the spreadsheet, you may have a hard time remembering.

Portable Calc provides you with a method for moving the window without abandoning the entry of your expression. Simply press the ESCape key at any point after the first character of the expression has been typed. Portable Calc will enter a special mode in which you can use the cell cursor control commands (^D, ^S, ^E, ^X) or the arrow keys to find the cell you are looking for.

Pressing the ESCape key during entry of an expression toggles the cursor control commands and arrow keys so that they no longer perform the function of completing the entry and moving the cell cursor. Instead, they move the cell cursor without completing the entry. Pressing any key that is not an arrow key or cursor control command restores the original function of these keys.

As you search for the cell, the upper left corner of the screen will display the current location of the cell cursor, as it usually does when you move the cell cursor. When the cell cursor is on the cell you want to reference, press ESCape again, or simply type the next character of your expression. The cell name will be entered in the expression, and you can continue with your entry as usual. When you complete the entry with RETURN or an arrow key, the cell cursor returns to the cell where you entered the expression.

When you find the cell to be referenced, instead of pressing ESCape you can type the character you want to follow this cell reference in your expression. The cell name will be entered in the expression followed by the character you typed.

If you press RETURN when you locate the cell to be referenced, the cell name will be entered in the expression, the entry will be terminated, and the result will be entered into the cell that was the current cell when you began entering the expression.

If you type a colon (:) when you locate the cell, the cell name will be entered into your expression as the first part of a cell range. You can then use the cursor control commands or arrow keys to look for the field that completes the range. When you find it, type the character to follow the cell range or press RETURN to complete the entry. ⊂⟶ *2-17*

EXAMPLE OF THE CELL REFERENCE SHORTCUT

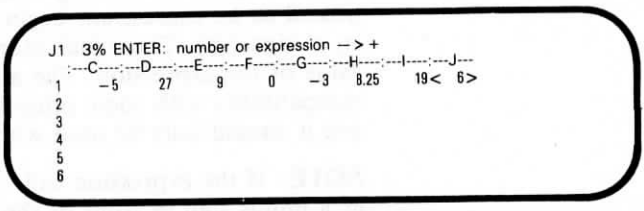
Here is an example of the use of this feature. With the cell cursor at cell A1, follow this procedure at the entry prompt:

STEP 1 TYPE +

PRESS [ESC]

PRESS [→] (10 times)

SEE



STEP 2 TYPE −

SEE

```
J1  3% ENTER: number or expression —> +J1-
   :---C----:---D----:---E----:---F----:---G----:---H----:---I----:---J---
1      -5      27       9       0      -3    8.25     19<   6>
2
3
4
5
6
```

STEP 3 TYPE **2**

PRESS RETURN

SEE

```
A1  3% ENTER: data arrow / = ! —>
   :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1 <  4>      12      -5      27       9       0      -3    8.25
2
3
4
5
6
```

When you begin an expression with a cell reference the entry prompt will read as follows:

```
ENTER: text or expression —>
```

You will also get the same entry prompt if you begin with a function, which is a valid way to start an expression, but Portable Calc will not recognize it as such and will classify the entry as text. To make sure that an expression starting with a function will be treated as an expression, begin it with a plus sign or an at sign (@). These indicators do not affect the value of the expression. The at sign is provided for compatibility with some other spreadsheet programs, and it should only be used with functions. ⊂→ *3-3*

NOTE: If the expression calls for a left parenthesis or a minus sign in front of the function, Portable Calc will recognize that you are entering an expression.

CAUTION

Do not use spaces in expressions (except within function arguments); you will get an error message if you do.

CELL RANGE

You can refer to a group of cells by using a feature called *cell range*. The cells must be adjacent and form a rectangle. The range is specified by naming two of the diagonally opposite corners of the rectangle, separating the references by a colon or period. For example, A3:F12 refers to a block 6-columns wide (from column A through column F) and 10-rows high (from row 3 through row 12). The following cell ranges also identify the same block:

F12:A3
F3:A12
A12:F3

Usually, a block is referred to by the upper left corner followed by the lower right corner, which would be A3:F12 in the preceding example.

You can specify a portion of a row or a column as well:

A12:D12 (1 row, 4 columns)

B3:B20 (18 rows, 1 column)

HOW TO BUILD AN EXPRESSION

Cell references and cell ranges are some of the "building blocks" that can be used to create expressions.

An expression is usually made up of two kinds of elements: *terms* and *operators*. A term can be a number, a cell name, a cell range, a function (representing a calculation or comparison) or even another expression within parentheses. A term must represent a numeric or logical value. ⊂⟶ *3-3*

An operator is one or two mathematical symbols that indicate what kind of calculation or comparison is to be performed with the two terms it connects. For example, in the expression **105 – 10** the numbers are terms and the minus sign is the operator.

There are two kinds of operators: *arithmetic operators* and *comparison operators.*

ARITHMETIC OPERATORS

You can add (+), subtract (−), multiply (*), and divide (/) with Portable Calc's arithmetic operators. Here are some examples of their use:

82+30 (adds 82 and 30)

82−30 (subtracts 30 from 82)

82*30 (multiplies 82 by 30)

82/30 (divides 82 by 30)

COMPARISON OPERATORS

Use comparison operators (also called logical operators) to compare two values and determine whether the expression (or portion thereof) is true or false. If the expression is true, then it is equal to 1 (or it "returns" 1), if false, then it equals 0. The comparisons you can make are: equal to (=), less than (<), greater than (>), not equal to (<>), less than or equal to (<=), and greater than or equal to (>=). So, if you enter the expression **5>3**, then 1 will appear in the current cell because the expression is true. The false expression **3>5** will return a value of 0.

In the following examples of the use of comparison operators, cell B5 contains the number 9:

B5=9 (returns 1)

B5<15 (returns 1)

B5>32 (returns 0)

B5<>9 (returns 0)

B5<=9 (returns 1)

B5>=20 (returns 0)

USE OF PARENTHESES

Expressions can get quite lengthy and complex, involving many calculations. It is important to have an established precedence for processing the operators, since different methods can give different answers for the same expression. Normally, the order is: multiplication and division first, addition and subtraction second, and comparison operators last. If all operators in an expression have equal precedence, then the expression is evaluated from left to right.

For example, the expression **1+2−3+4** contains operators of equal precedence. Thus, the order of evaluation is:

1+2, which equals 3
3−3, which equals 0
0+4, which equals 4

In the expression **1+2*3+4**, there are operators of unequal precedence. First the multiplication is carried out, then the additions, from left to right:

2*3, which equals 6
1+6, which equals 7
7+4, which equals 11

EXAMPLES OF USING PARENTHESES

Use parentheses to change the order of processing operators. Enclose in parentheses the parts of the expression you want calculated first. For example, the preceding expression could be written **(1+2)*(3+4)**, and would be calculated as follows:

1+2, which equals 3
3+4, which equals 7
3*7, which equals 21

Here is another example of an expression without parentheses:

7E2*2+4<1500

To calculate the value of this expression, first Portable Calc multiplies 700 (or 7E2) by 2, resulting in 1400; then adds 1400 to 4, resulting in 1404; and finally, compares 1404 to 1500, resulting in 1, because the expression is true.

NOTE: Scientific notation is a way of representing a number; it is not considered to be a multiplication when determining the order for evaluating an expression. For example, 2E2 is the same as 200, not 2 times 10 squared.

If you want to change the order of processing so that the addition is done first, enclose that part in parentheses:

7E2 * (2 + 4) < 1500

Now Portable Calc calculates the value of the expression by first adding 2 and 4, resulting in 6; then multiplying 700 (or 7E2) times 6, resulting in 4200; and finally, comparing 4200 to 1500, resulting in 0 because the expression is false.

There is a limit to the complexity of expressions that Portable Calc can handle. If you try to do too much in one expression, you will get an error message. You will also get an error message in the cell (ERR) when you enter an expression that attempts the impossible (such as dividing by zero) or that results in a number too large or too small for Portable Calc to handle. This is different from the error message you get on the top line of the screen when your expression has an incorrect format. ⊂⟶ *2-12*

Remember that the expression itself is stored in memory, while its value is displayed in the cell. For example, the expression **C5 + 7 * 3** may result in a display of 27, but if the contents of cell C5 are changed, then the value of the expression will change also.

EXPRESSION OR NUMBER?

Since expressions themselves do not appear in cells, only their numeric values, how can you tell if an entry in a cell is the result of a number entry or an expression entry? You can't tell by looking at it. The only way to find out is by using the edit command (/E), which will display the expression or number on the top line of the screen. ⊂⟶ *4-7.*

SUMMARY TABLE: DATA ENTRY COMMANDS	
KEYS	**FUNCTION**
DEL, BS, ^H	Backspace and delete previous character
'	Repeat text

SUMMARY TABLE: INITIAL INDICATORS OF DATA TYPE		
TEXT	**NUMBERS**	**EXPRESSIONS**
a – z	0 – 9	0 – 9
A – Z	+	+
"	–	–
'	.	. (
space		@ followed by a function cell name

SUMMARY TABLE: OPERATORS			
ARITHMETIC		**COMPARISON**	
Key	**Function**	**Key**	**Function**
+	add	=	equal to
–	subtract	<	less than
*	multiply	>	greater than
/	divide	< >	not equal to
		< =	less than or equal to
		> =	greater than or equal to

CHAPTER 3. USING FUNCTIONS

CONTENTS

3. Using Functions

A function is a shortcut method for automatically performing complex calculations. By using function names in your expressions, you can instruct Portable Calc to add a list of numbers, determine their average value, or count them, as well as perform various other arithmetic and logical operations.

The six types of functions—arithmetic, constant, list, logical, range, and cell functions—will be described in this chapter.

HOW TO USE FUNCTIONS

Functions require values with which to perform their operations (except in a few cases). These values are called *arguments*. All functions that take arguments will accept numbers, expressions, other functions, or cell names—in any combination—as arguments. Most will also accept cell ranges. When a cell range is used, it constitutes as many arguments as there are cells in the range (except that empty cells and cells containing text are ignored). When an empty cell or one containing text is named by itself as an argument, then it is equal to zero.

If you were instructing Portable Calc to find the average of D8, 27, 94, and 185, then those 4 items would constitute the arguments. You would type **+avg(D8, 27, 94, 185)**. Arguments are always separated by commas or spaces, are enclosed in parentheses, and follow directly after the function name. Do not type a space between the function name and the argument.

When Portable Calc has completed the operation called for by a function, we say that the function "returns" a value. This simply means that the result of the calculation is inserted in the expression in place of the function name and its argument, or is entered in the cell if the function constitutes the entire expression. The value returned by a function is accurate to 12 places.

If your expression begins with a function name, you must type a plus sign (+), an at sign (@), a left parenthesis ((), or a minus sign (−) first to alert Portable Calc that an expression, not text, follows. Only use the left parenthesis or the minus sign if they are an integral part of your expression. A left parenthesis must eventually be followed by a right parenthesis. If you use a minus sign, the result of your function will be multiplied by −1.

Function names can be entered either in lower- or uppercase, and it's all right for an expression to include both lower- and uppercase function names. When you use the Edit command (/E) to make changes in an expression, any function names will appear in uppercase, even if they were originally typed in lowercase. ⊂⟶ *4-7*

NOTE: This chapter often describes the common uses of Portable Calc's functions. However, there are few limits on the kinds of arguments that can be included in each function. Experimentation may lead you to discover some useful and inventive applications.

ARITHMETIC FUNCTIONS

Arithmetic functions perform operations only on a single argument. If you try to use an arithmetic function with more than one argument, it will accept only the first argument and ignore any others. If you use a cell range as an argument, the function will accept only the first cell in the range. There are two arithmetic functions: absolute value (ABS) and integer (INT).

Absolute Value

ABS

The function **ABS** provides the absolute value of the argument. The absolute value of a number is its value with no minus sign. The argument can be positive or negative, but the number returned will be positive, or the absolute value. Here are some examples of the use of **ABS**:

ABS(A7) returns 104.3 when cell A7 contains the value 104.3 or −104.3

ABS(35 * R62 − 75) returns 5 when cell R62 contains the value 2

NOTE: The sign of an exponent does not affect the sign of the number of which it is a part. (1E−2 is equal to .01, not −100.) Thus, the sign of the exponent is not changed by the ABS function.

ABS(M11) returns 10E−3 when cell M11 contains the value −10E−3

Integer

INT

This function, named **INT**, returns the integer value of the argument. The integer value is the whole number portion of a decimal number. The function does not round the number, instead, it truncates everything to the right of the decimal point. Here are some examples of the use of **INT**:

INT(L20/3) returns 33 when cell L20 contains the value 100

INT(B20) returns −2 when cell B20 contains the value −2.3521 (The sign is not changed.)

INT(G55) returns 0 when cell G55 contains the value .7536

INT(C12) returns 8.42E8 when cell C12 contains the value 8.42E8 (This is a whole number written in scientific notation; it is equal to 824,000,000.)

INT(H3) returns 0 when cell H3 contains the value 3.95E−5 (This is equal to .0000395.)

CONSTANT FUNCTIONS

There are several functions which do not require an argument because they always return the same value. Two of these *constant functions* are mathematical, **E** and **PI**, and two are logical, **TRUE** and **FALSE.**

Natural Logarithm Base

E

The constant function **E** always returns the value of the natual logarithm base e, or 2.71828182845. This fixed number is used for interest-related mathematical formulas.

NOTE: Do not confuse the constant function E with the use of E in scientific notation to indicate an exponent of 10.

Pi

PI

Using the function **PI** is the same as typing the value of pi with 12 significant digits, or 3.14159265358. Pi is the ratio of the circumference of a circle to its diameter.

True

TRUE

TRUE is a constant function that returns the value 1.

False

FALSE

FALSE is a constant function that returns the value 0.

LIST FUNCTIONS

The *list functions* perform calculations on a list of arguments, rather than on just one argument.

Averaging Numbers

AVG

To find the average (arithmetic mean) of a list of arguments, use the list function **AVG**. The values will be added together and divided by the number of values.

If you use a cell range as an argument and it contains blank cells or cells containing text, they will not be counted in determining the total number of items to be averaged. However, such cells will be counted if they are used as individual arguments, as will any cells containing a zero.

Here is an example of the use of **AVG** with a list of numbers and expressions. With the cell cursor at F1, follow this procedure at the entry prompt:

TYPE **+AVG(16,27,7*5,80,120-16)** RETURN

SEE < *52.4*>

Here is an example of the use of **AVG** with a cell range. At the entry prompt:

TYPE **+AVG(A1:E1)** RETURN

SEE

```
F1  3% ENTER: data arrow / = ! —>
 :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1             27       9        0      —3<8.25>
2
3
4
5
6
```

The average of the numbers in cells B1 through E1 is placed in cell F1. Since cell A1 is empty it is not included in the average.

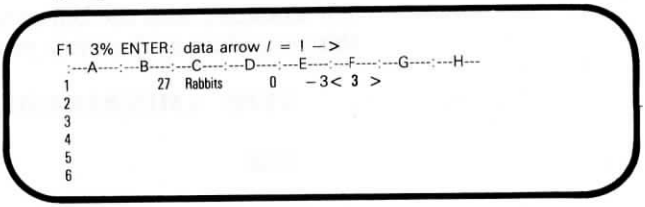
Counting Numeric Items

COUNT

Use the list function **COUNT** to count the numeric items in a range of cells or list of cells. For example, with the cell cursor at F1, follow this procedure at the entry prompt:

TYPE **+COUNT(B1:E1)** RETURN

SEE



Since cell C1 contains text, it is not counted. The result of the expression appears in cell F1.

Finding the Largest Value

MAX

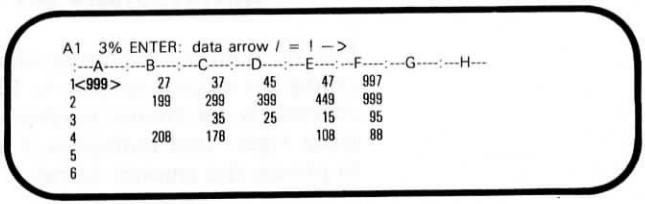
With the list function **MAX** you can determine the largest (*max*imum) value in a list of arguments.

Here is an example of the use of **MAX** which includes another function as one of the arguments. Follow this procedure at the entry prompt, with the cell cursor in cell A1:

TYPE **+MAX(B1:F4,600,AVG(405,590,1020))**

RETURN

SEE



Portable Calc scans the range of cells specified in the expression and locates the largest value (999), compares it to the values of the other arguments, and enters the largest (999) in the current cell (A1).

NOTE: The maximum value in a list of negative numbers is the number closest to zero, not the largest in absolute value. For example, in the list **−52, −203, −12**, the maximum value is **−12**.

Finding the Smallest Value

MIN

The list function **MIN** works the same way as **MAX**, except that it finds the *min*imum rather than the maximum value.

For example, with the cell cursor in cell A1, follow this procedure at the entry prompt:

TYPE **+MIN(B3,B4,D1,E1:E4,F3)** RETURN

SEE

```
A1  3% ENTER: data arrow / = ! —>
 :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1 <15>      27      37      45      47     997
2          199     299     399     449     999
3           55      35      25      15      95
4          208     178     168     108      88
5
6
```

Portable Calc inspects the cells listed in your expression and picks the smallest number it finds, which in this case is 15, in cell E3. Thus, the expression returns 15 in cell A1.

In another example, **MIN** could be used to compute FICA tax with the following expression:

+MIN(A1,35700)*.067

Cell A1 contains the gross salary figure. Since the ceiling on income subject to FICA tax is $35,700, the expression determines taxable income by choosing the lesser figure and multiplies it by the tax rate (6.7%) to obtain the amount of tax.

NOTE: The minimum value in a list of negative numbers is the number farthest from zero, not the smallest in absolute value. For example, in the list **−24, −95, −4**, the minimum value is −95.

Adding a List of Numbers

SUM

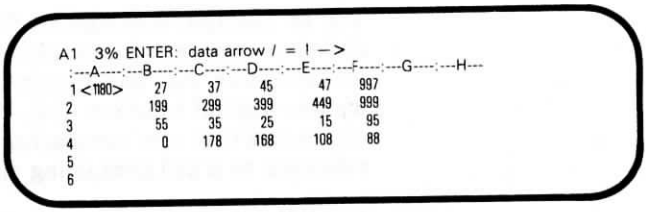
Use the list function **SUM** to add a list of arguments. In parentheses following the function name, type the numbers, expressions, or the list of cells or cell range containing the numbers to be added.

For example, follow this procedure at the entry prompt, with the cell cursor at cell A1:

TYPE **+SUM(B1:F1,B4,12,D3/5+10)**

RETURN

SEE



The sum of the numbers in the first row plus the number in cell B4, plus 12, plus 15 (the value of the expression) is 1180.

LOGICAL FUNCTIONS

A logical function tests an argument or arguments for a true or false value. Zero evaluates as false, and any non-zero value evaluates as true. To display the value "true" in a cell, Portable Calc uses 1, to display "false" it uses 0.

The AND Function

AND

AND accepts a list of one or more arguments. If any of the arguments evaluates to 0 (or false), **AND** returns 0, otherwise it returns 1.

For example, the expression **+AND(A42:55)** would return a value of 0 if any of the cells from A42 to A55 had a value of 0. The expression **+AND(F9,F9>20)** would return a value of 0 if F9 was equal to 7.

The IF Function

IF

Use the **IF** function to build comparison tests into your spreadsheets. A comparison test instructs Portable Calc to return one of two values, depending on whether or not an expression evaluates to be true or false.

The **IF** function evaluates its first argument as zero (false) or non-zero (true). Often the first argument is an expression that has a logical result, such as another logical function (OR, AND, or NOT), or an expression that uses comparison operators, or a reference to a cell containing such an expression.

If the result of the evaluation is non-zero (or true), then the value of the second argument is returned. If the evaluation results in zero (or false), the value of the third argument is returned.

The **IF** function can only be used to return one of two numeric values. Unlike the **IF** statement in many programming languages, it cannot be used to print text, or alter the sequence of a series of calculations.

For example, you want to test whether cell A1 is greater than or equal to, or less than cell B1. Depending on the outcome, you want the contents of one of two cells multiplied by 9 and placed in the current cell.

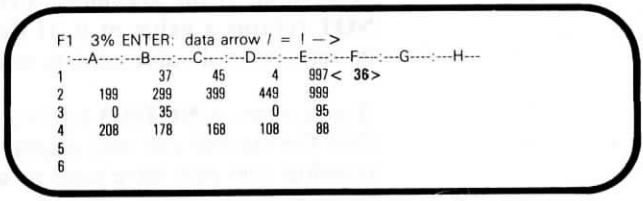
Here is the **IF** part of the total expression. A1<B1 is the comparison you are testing; if it is false, the value of cell E4 will be used.

```
IF (A1<B1, D1, E4)
    |      |   |
  test     |   use if false
           |
       use if true
```

With F1 as the current cell, follow this procedure at the entry prompt:

TYPE **9*IF (A1<B1, D1, E4)** RETURN

SEE



First, Portable Calc assesses whether the value of cell A1 (0) is less than that of cell B1 (37). This is true, so cell D1 (4) is multiplied by 9, and the results (36) are put into the current cell, F1.

In another example, cell A1 contains the age of an individual. Cell B1 contains the expression **+IF(A1>65,TRUE,FALSE)**. Cell C1, which assigns social security benefits to those who are above retirement age, contains the expression **1000*B1**. Thus, if the individual's age is greater than 65, cell B1 will contain the value 1, which will be multiplied by 1,000 and placed in cell C1, representing the amount paid to that individual.

The **IF** function can take another **IF** function as an argument. This is called nesting, and it can go more than one level deep. Here is an example:

IF(AND(C9>=2,C9<3),1.25,IF(AND(C9>=3, C9<4),1.5,IF(AND(C9>=4,C9<5),2, SUM(B3:B10))))

If the third argument of the **IF** function is 0, then it can be left out. An **IF** function with two arguments will return the value of the second argument if the first evaluates as true, and it will return 0 if the first argument evaluates as false.

For example, the function **IF(A1=45,B1*B2)** will return the value of cell B1 times cell B2 if cell A1 equals 45, otherwise, a value of zero will be returned.

The NOT Function

NOT

NOT takes only one argument, usually a comparison expression. If the argument is true, or non-zero, then **NOT** returns a value of 0. If the argument is false, or zero, then a value of 1 is returned.

If you enter **+NOT(D3+10=17)** and D3 equals 7, then the current cell will display a zero, since the expression that you have used as an argument is true.

Here is another example of the use of **NOT**:

IF(NOT(E5=F5),G3−G2,G3)

If the contents of cell E5 are equal to the contents of cell F5, then **NOT** will return 0 and the **IF** expression will return the value of G3. If E5 is not equal to F5, then **NOT** will return 1 and the entire expression will return the value of cell G3 minus the value of G2.

The OR Function

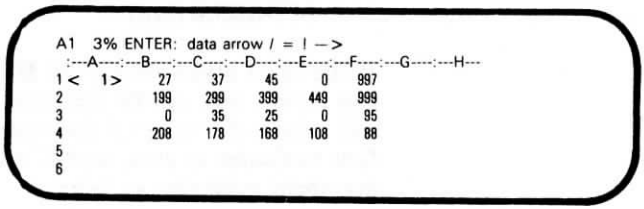
OR

OR returns a value of 1 if any of its arguments evaluate to true or non-zero.

For example, with the cell cursor at cell A1 follow this procedure at the entry prompt:

TYPE **+OR(B1:F4)** RETURN

SEE



Since the cell range includes values other than 0, Portable Calc returns a value of 1 in the preceding example.

Here is another example of the use of **OR**:

IF(NOT(OR(A1>10,B1<12)),.05*C1,0)

If cell A1 is greater than 10 or if B1 is less than 12, then the **OR** function is equal to 1 and the first argument of the **IF** function evaluates to zero (because of the **NOT** function). The third argument, 0, will be returned. If neither argument in the **OR** function is true, then it is equal to 0, the **NOT** function is equal to 1, and the second argument, .05 times the value of cell C1, is returned.

RANGE FUNCTIONS

Range functions are very useful in certain kinds of spreadsheet applications. Often they are used to extract information from tables—such as tax tables or freight charge schedules.

Choosing a Number in a Series

CHOOSE

With the function **CHOOSE** you can pick out a particular number from a cell range, usually within a row or column. The row or column need not contain sequential values, but it must correspond to a row or column that does.

With **CHOOSE** you instruct Portable Calc to select the *n*th number in that series by specifying *n* as the first argument. The first argument could also be a reference to a cell containing a number.

For example, to select the serial number for order #4 in the following table, follow this procedure at the entry prompt (the cell cursor is in A1):

TYPE **+CHOOSE(4,B4:F4)** RETURN

SEE

```
A1  3% ENTER: data arrow / = ! —>
  :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1 <11170>
2 order #        1      2      3      4      5
3 part         bolt    pin   gasket  screw   bolt
4 ser. #      23445  41789  311684  11170  23240
5
6
```

Portable Calc chose the fourth number in the cell range (11170) and placed it in the current cell.

If you use a value as the first argument that is larger than the number of succeeding arguments, you will receive the message **N/A** in the current cell. (Remember that each cell in a cell range is considered an argument.)

Looking Up a Value

LOOKUP

The **LOOKUP** function is like a research assistant. You can use it to find the number you need from a range of values in your spreadsheet, as long as the values are arranged in ascending order (as in a table). If the values in the cell range you specify are in random order, the function will yield a result, but it won't be a useful one.

LOOKUP takes anything but a cell range for its first argument and it takes a cell range for its second (usually a range within a single row or column).

If the range is a partial row, **LOOKUP** starts at the left of the row and compares the values in each cell to the first argument. When a value equal to or larger than the first argument is found, **LOOKUP** returns the value in the cell directly below it (in the next row). In a partial column, **LOOKUP** compares from top to bottom and returns the value to the right of the target number (in the next column).

Here is an example of the use of **LOOKUP**. With the cell cursor in cell A4, follow this procedure at the entry prompt:

TYPE **+LOOKUP(41,B1:F1)** RETURN

SEE

```
A4  3% ENTER: data arrow / = ! ->
  :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1 POUNDS      27      37      47      57      67
2   RATE    1.99    2.65    3.04    3.39    3.62
3
4 <3.04>
5
6
```

Portable Calc searched for a number within the range of cells B1 through F1 that is equal to or higher than 41. The program chose 47, the number in cell D1, as this target number. Then the number in the cell immediately below cell D1—3.04—was returned in the current cell (A4). This is how you would use Portable Calc to do something like look up the shipping cost for a 41-pound package.

CELL FUNCTIONS

A cell function checks the condition of the cell named in the argument and bases the value returned on what is discovered. Cell functions can find out if there is an expression evaluation error in the cell or if it is available to be used. If more than one cell name or a cell range is used as the argument, only the first cell is checked; the others are ignored.

Checking for Errors

ERR

When you enter an expression that attempts the impossible or exceeds Portable Calc's capabilities, you get the error indicator **ERR** in the cell. You can also place the **ERR** indicator in a cell by using the **ERR** function. Simply place the cell cursor in the cell where you want the message to appear, then follow this procedure:

TYPE **+ERR** RETURN

Any expression that refers to a cell containing the **ERR** message will also result in the display of **ERR**.

ERR can also be used as an argument in a function.

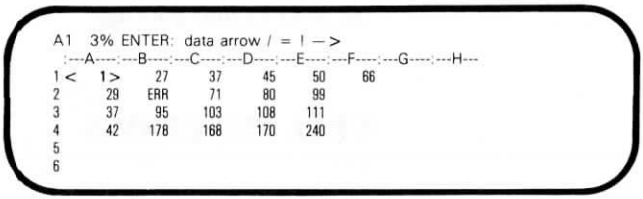
ISERR

Use **ISERR** to determine whether the cell named in your argument contains the message **ERR**. The argument can consist of only one cell name. If the message is found, **ISERR** returns a value of 1, otherwise, it returns 0.

For example, with the cell cursor at cell A1 follow this procedure at the entry prompt:

TYPE **+ISERR(B2)** RETURN

SEE



Since Portable Calc discovered an error indicator in cell B2, the function **ISERR** returned a value of 1 in cell A1.

If there had been no error indicator in the specified cell, the expression would have returned a value of 0 in cell A1.

Checking for Availability

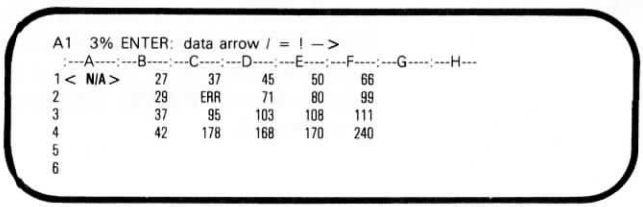
NA

If you don't know what you want to enter in a particular cell, but you know you don't want to leave it blank, you can use the **NA** function to indicate that the contents of the cell are not available. **NA** is similar to the function **ERR**. To use it, you place the cell cursor in the cell where you want the message N/A to appear, and type **+NA**.

For example, with the cell cursor in cell A1 follow this procedure at the entry prompt:

TYPE **+NA** RETURN

SEE



When a cell is empty or contains text, an expression that refers to the cell either ignores it or uses zero as its value (depending on the expression). However, when a cell contains N/A, an expression that refers to it will also result in the display of N/A.

NA can be used as the second or third argument in an **IF** function, so that N/A will be returned depending on whether or not the first argument evaluates as true or false.

ISNA

You can also check whether a particular cell is empty or contains the message N/A by using the function **ISNA**. **ISNA** returns 1 (true) if the cell named in the argument is empty or contains N/A, and 0 (false) if it does not.

For example, your spreadsheet includes a column of incomplete data. In another column, you construct an expression that will substitute an approximate value for the missing numbers. Column A contains the incomplete data. Cell B1 contains the expression **+IF(ISNA(A1),30,A1)** and this expression is replicated down the column. Here are the results:

```
B1   1% ENTER: data arrow / = ! —>
  :---A----:---B----:---C----:---D----:---E----:---F----:---G----:---H---
1         <    30>
2       29     29
3       37     37
4       42     42
5              30
6       35     35
```

The expression returned the value 30 for every empty cell, and for the cells that contained a number it returned that number. (You would get the same results if you had entered N/A in the empty cells.) Now the data in column B can be used in calculations in place of the incomplete data in column A.

SUMMARY TABLE: FUNCTIONS

ABS(*argument*)	Returns absolute value of argument
AND(*list of arguments*)	Returns 0 if any argument evaluates to 0, otherwise returns 1
AVG(*list of arguments*)	Returns average value of arguments
CHOOSE(*argument,range*)	Returns value of *x*th cell in range (*x*=value of first argument)
COUNT(*list of arguments*)	Returns number of arguments
E	Returns value of natural logarithm base **(2.718...)**
ERR	Returns **ERR** (error) in current cell
FALSE	Returns a value of 0
IF(*argument, argument, argument*)	If value of first argument is non-zero, returns value of second argument, otherwise, returns value of third argument
INT(*argument*)	Returns integer part of argument
ISERR(*cell, list of cells, or range*)	Returns **ERR** if any cell contains **ERR**
ISNA(*cell, list of cells, or range*)	Returns N/A if any cell is empty or contains N/A
LOOKUP(*argument, range*)	Searches range for value equal to or higher than first argument. Returns value of cell immediately to right of matching cell if a column range, or cell immediately below matching cell if a row range
MAX(*list of arguments*)	Returns maximum value from arguments
MIN(*list of arguments*)	Returns minimum value from arguments
NA	Returns N/A (not available) in current cell
NOT(*argument*)	If argument evaluates to 0 returns 1, and vice versa
OR(*list of arguments*)	Returns 1 if any argument is non-zero, otherwise returns false
PI	Returns value of pi (3.14159...)
SUM(*list of arguments*)	Returns sum of arguments
TRUE	Returns a value of 1

NOTE: A single **argument** can be a number, an expression, a function, or a cell name. A **list of arguments** can be any of the preceding or a cell range, in any combination. **Range** refers to a cell range.

CHAPTER 4. USING COMMANDS

CONTENTS

4. Using Commands

Portable Calc's varied assortment of commands is where its real power lies. You will see, when you learn to use them, that you can specify the format for your spreadsheet, insert or delete rows and columns, recalculate the entire spreadsheet at once, copy cells in a unique manner, and print your spreadsheet using simple commands. Portable Calc commands are easy to remember because each one uses the first letter of a word that describes what the command does, such as **E** for **E**dit or **I** for **I**nsert.

WHAT IS A COMMAND?

In Chapter 2, the discussion of the entry prompt pointed out the command characters (/, =, and !) that are part of that prompt. In this chapter, you will learn how to use these characters, along with letters, to make Portable Calc perform important tasks.

HOW TO ENTER A COMMAND

You must have the entry prompt on the screen to initiate a command. If you begin your entry with the command character / (slash), the prompt will change to a list of *extended commands*. If you type = (equal sign) or ! (exclamation mark) instead, you will execute one of the two *basic commands*.

Most Portable Calc commands and their options require the entry of a single character. The program immediately displays the next list of options or performs the operation as soon as the character is entered. When you become proficient with the commands, you will not need to read the prompts and can enter extended commands and options quickly, one character after another. A few commands require a string of characters (such as a filename) and are executed by pressing RETURN at the end of the string.

NOTE: Commands and options can be entered either in upper- or lowercase.

THE BASIC COMMANDS

There are two basic commands in Portable Calc: Goto and Calculate. They perform simple operations that you may need to use often.

The Express Method for Scrolling

When you want to move the cell cursor from one part of the spreadsheet to another, there is a faster way than using the arrow keys. It's called the Goto command.

To use this command, follow this procedure at the entry prompt:

TYPE =

SEE

TYPE *cell name* RETURN

The cell cursor jumps directly to the cell you have specified, and the window moves along with it. The new current cell will appear in the upper left corner of the window.

Performing Calculations

If your spreadsheet includes expressions with cell references, any changes you make in the referenced cells will affect those expressions. Use the Calculate command (!) to tell Portable Calc that you want to see the results of your entries. Every expression is then evaluated and the spreadsheet updated accordingly.

You can choose the order of evaluation (row-by-row or column-by-column) with the extended Global command (/G), or specify that all calculations be performed automatically, thus obviating the need to use the Calculate command. ⊂→ *4-17*

It may take a little time for Portable Calc to evaluate all the expressions in your spreadsheet. If you have used the Calculate command, the exclamation point will remain on the top line until the calculations are completed.

EXTENDED COMMANDS

There are eleven extended commands, initiated by typing a *slash* (/) at the entry prompt:

TYPE /

SEE

```
COMMAND: BDEFGILOQRS —>
```

Each of the letters listed is a command; when you type one of them, the prompt changes to give you options (subcommands), request information, or allow you to ener another command.

In extended command mode, the same letter may be used to represent different options for different commands. Just keep checking the prompt line to find out what your options are.

NOTE: Commands and options may be entered in either lower- or uppercase.

Erasing the Current Cell

To erase (or **B**lank) the contents of the current cell use the **/B** command. The entire contents of the current cell will be erased immediately, along with any formatting at the Field level. **/B** has no effect on Column or Global level formatting. ⊂→ *4-10*

For example, to erase cell G29 move the cursor to that cell and type **/B**. When the command is completed, the extended command prompt will be replaced by the entry prompt.

You can blank your entire spreadsheet or a portion of it by blanking one cell then using the Replicate command (/R) to repeat the blank cell. However, replicating a blank cell does not cancel the spreadsheet's format. Field level formatting will be erased in the cell where you used the Blank command, but all other formatting will remain as it was.
⊂⟶ *4-24*

Deleting a Row or Column

Deleting is different from blanking. If you blank all the cells in an entire row you are erasing their contents but leaving their positions intact. When you use the **D**elete command (/D) you delete not only the contents, but the row or column itself. All the succeeding rows or columns move up or move over to fill in the gap left by the deletion.

When a column is deleted, all the columns to the right (with higher-letter names) are affected; those to the left remain unchanged. Similarly, when a row is deleted, only those rows below (with higher numbers) are moved.

Throughout the spreadsheet, expressions containing cell references are modified so that they still refer to the same cell *contents*. For example if you delete row 3, any references to cells in rows 4 through 256 are decreased by 1. A reference to cell G32 will become G31. This process is called *expression adjustment*. The Global command's Adjustment option has no effect on expression adjustment with the Delete command. ⊂⟶ *5-3*

The Delete command deletes the Column-level formatting of a column as well as its contents. It does not affect formatting at the Field and Global levels.

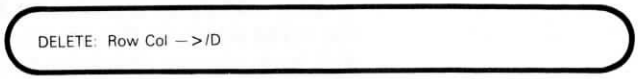
Deleting a row does not affect format at all.

If you attempt to delete a row or column containing cells that are used in expressions elsewhere in the spreadsheet, the command is aborted and an error message appears on the top line of the screen.

To delete row 9, move the cell cursor to any cell in row 9:

STEP 1 TYPE **/D**

SEE



STEP 2 TYPE **R**

The row will be deleted and the entry prompt will reappear on the top line.

To delete a column, simply move the cell cursor to the column you wish to delete and type **/DC**.

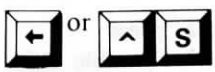
Editing Data

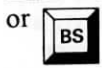
When you want to edit the contents of a cell, use the extended command **/E**. Place the cell cursor on the cell you want to Edit, and type **/E**. The entry prompt will be replaced by the contents of the cell, with the entry cursor on the first character.

CURSOR MOVEMENT IN EDIT MODE

While you are using the edit command, the arrow keys and cursor control commands give different results than they normally do. Rather than moving the cell cursor, they now move the entry cursor:

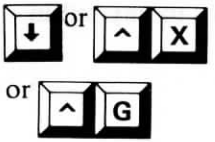
The **right arrow** key or **^D** moves the entry cursor one character to the right.





The **left arrow** key, **^S**, or the BACKSPACE key moves the entry cursor one character to the left.

The **up arrow** key or **^E** inserts a space at the location of the entry cursor. The character at the cursor and all those to the right of it move to the right.



The **down arrow** key, ^**X**, or ^**G** deletes the character at the cursor location. Characters to the right of the cursor move to the left.

Each of the arrow keys repeat their action when held down.

If your computer includes an INSert key, it will give the same result as the up arrow key. The DELete key will back up one character to the left and delete that character.

Edit mode is similar to typeover mode in Portable WordStar; when you type a character it replaces the one at the cursor, and the cursor moves one character to the right.

If you press a key that cannot be displayed in Portable Calc (such as a graphic character), the PX-8 responds with a beep. You will also hear a beep, and see an error message as well, if you attempt to edit an empty cell.

NOTE: The use of the ESCape key to find and enter cell references in expressions is not allowed in edit mode. ⟶ *2-14*

When you edit a cell containing text, you will note that it is preceded by a double quotation mark, whether or not you included the double quotation mark when you originally entered the text. Similarly, expressions will always be preceded by the plus sign in edit mode.

So, if you are editing what you thought to be an expression or a number, but it begins with a double quotation mark, you have probably entered the data incorrectly and Portable Calc has mistaken it for text. Correct the entry and delete the double quotation mark before pressing RETURN.

COMPLETING THE EDIT

When you are finished editing the data, press RETURN to enter it back into the cell. Portable Calc examines the entry to determine whether it is text, a number, or an expression. This is done in the same manner as when data is first entered.

To interrupt the edit mode and leave the current cell unchanged, press ^**U**.

Here is an example of the use of **/E**. You want to change the expression **c4*AVG(g5:g10)** in cell K2 to read **c4*AVG(g5:g9)**. With the cell cursor at cell K2, follow this procedure at the entry prompt:

STEP 1 TYPE **/E**

SEE

```
+c4*AVG(g5:g10)
```

STEP 2 PRESS → 12 times

TYPE **9**

PRESS **^G** RETURN

When you press RETURN, the result of the new expression will be entered in cell K2.

Changing the Cell Format

/ F

The **F**ormat command gives you control over five aspects of spreadsheet design:

1. Number formatting
2. Number justification
3. Text justification
4. Column width
5. Number of digits to right of decimal

If you do not specify a format, Portable Calc will simply apply the default (initial) settings to your data entries.

Format settings are saved with the spreadsheet when you use the Save command; when you load the file again, you automatically get the format settings you chose.

When you exit from Portable Calc using the Quit command, your current format settings are cancelled. Each time you start work in Portable Calc the default settings are in effect.

To design the format, type **/F** at the entry prompt:

TYPE **/F**

SEE

```
FORMAT: Global Column Field —>/F
```

Global, Column, and Field are the scope options; they determine how much of the spreadsheet will be affected by your formatting choices. You can set the format for all the cells in the spreadsheet by pressing **G** for the **G**lobal option. If you want the setting to apply only to the current column, select the **C**olumn option by pressing **C** at this point. Or, to restrict your changes to the current cell, use the **F**ield option, **F**.

A restricted scope option can override a more general one. When Portable Calc prepares to display data in cell M7, for example, first the program checks whether you have specified a particular format for that cell. If you have not, then Portable Calc checks for a column format that applies to column M. If there is no specified column format, then the format selected for the entire spreadsheet will be used.

Field level (cell) settings have priority over column level settings, and column level settings have priority over global settings.

When you select one of the scope options, the prompt changes to list further options:

```
FORMAT: D E G I $ R L TR TL width.dec —>
```

The **D**efault option (D) instructs Portable Calc to revert to the next lower priority format settings. Only the Width and Decimal options are not affected.

The command **/FFD** cancels any field-level formatting for the current cell and reverts the cell's format to that of the column it is in. If there is no column-level formatting, the global-level format is used, or if there is none, the default format applies.

The command **/FCD** cancels any field- and column-level formatting for the current column and reverts the column to the global-level format. If there is none, then the default format applies.

The command **/FGD** cancels all format settings and reverts the entire spreadsheet to the default format.

The default settings are **G**, **R**, and **TL**.

NUMBER FORMATTING

The next four options—**E**, **G**, **I**, and **$**—control the way numbers are displayed; they have no effect on the value of numbers in memory.

Using the **E**xponential option (E) causes Portable Calc to display numbers in exponential (scientific) notation. You will want to select this option if your spreadsheet contains many very large or very small numbers that would not fit in the cells if displayed in decimal notation. ⊂⟶ *2-10*

When the **G**eneral option is in effect, numbers are displayed in decimal notation, if possible. If a number will not fit into a cell, Portable Calc will try to convert it to scientific notation. This is a default setting.

Use the **I**nteger option (I) to instruct Portable Calc to round numbers to integer values, which means they are displayed with no decimal places. This is done by adding .5 to the absolute value of a number and displaying the integer portion with the correct sign.

The Dollar option ($) is used to round numbers to the nearest penny and display them in dollars-and-cents form. This is done by adding .005 to the absolute value of a number and displaying the integer portion plus the first two decimal places with the correct sign. For example, 388.92043 would be rounded to 388.92.

NUMBER JUSTIFICATION

The number justification options are **L** and **R**.

Use the Numeric **L**eft Adjustment option to display numbers flush left (left-justified) in the cell.

Use the Numeric **R**ight Adjustment option to display numbers flush right (right-justified) in the cell. This is a default setting.

TEXT JUSTIFICATION

The text justification options are **TL** and **TR**.

The **T**ext **L**eft Adjustment option is used to display text flush left (left-justified) in the cell. This is a default setting.

The **T**ext **R**ight Adjustment option is used to display text flush right (right-justified) in the cell.

HOW TO SET COLUMN WIDTH

Use the **Width** option to specify column width by simply typing in a number from 0 to 76. The default column width is 8-characters.

If you set the column width to 2 and try to enter a 2-digit number, you will get an error indicator. This is because an extra space is needed in case there is a minus sign. So the widest number you can enter is always one digit smaller than the column width.

You can set the width for the current column by choosing the Column scope option, or for all columns by choosing the Global scope option, but you can't set the width for an individual cell (Field scope option).

When a text entry is too large to fit in the column, it is shortened on the right if left-justification is in effect, or on the left if right-justification is in effect. When a numeric entry is too large, Portable Calc trims it only if no significant digits would be lost. Otherwise, the number is converted to scientific notation, if possible.

Significant digits are all the non-zero digits and the zeros that are included between them. For example in the number .0123 the zero is not a significant digit but the others are. In the number 5,025,790 all digits but the last (0) are significant. Non-significant numbers can be represented by an exponent. For example, 220,100 can be expressed as 2.201E5. The last two zeros are included in E5.

HIDING DATA

Setting the column width to 0 hides the data in the column. This could be useful for maintaining the confidentiality of portions of a spreadsheet.

THE DECIMAL OPTION

You can specify the number of decimal places to be used in numeric entries with the Decimal option. Simply type a period followed by a number from 1 to 15. For example, if you set the Decimal option to 3, and enter the number 25 in a cell affected by that setting, it will display as 25.000. The result of a calculation will also be displayed with 3 decimal places. If you enter a number with 4 decimal places (or arrive at one through a calculation), the fourth decimal place will be truncated for display, but will be retained in memory.

The default for this option is a variable setting, which allows you to enter as many or as few decimal places as you want for each entry (subject to the limit of the column width, of course). Like the Width option, the Decimal option cannot be used with the Field scope option.

Setting the Decimal option to 0 does not suppress all decimal places; instead, it gives you the default setting. To display numbers without any decimal places, use the Integer option (I).

The Decimal option cannot be set without setting the width at the same time. For example, 18.4 sets the width to 18 with 4 decimal places. All numbers displayed in **D**, **G**, or **E** formats will contain 4 digits to the right of the decimal point, even if some or all of them are 0's.

EXAMPLES OF USING FORMAT OPTIONS

Here are some examples of the use of format options. Note that when you select more than one option you must separate them by commas or spaces.

You want to change the column width on column N to 15 and set the text flush left. With the cell cursor in column N, follow this procedure at the entry prompt:

STEP 1 TYPE /

SEE

```
COMMAND: BDEFGILOQRS —>
```

STEP 2 TYPE **F**

SEE

```
FORMAT: Global Column Field —>/F
```

STEP 3 TYPE **C**

SEE

```
FORMAT: D E G I $ R L TR TL width.dec —>
```

STEP 4 TYPE **TL,15** RETURN

Now, suppose you want all the numbers in your spreadsheet displayed in integer format, in columns 10-characters wide. The following example will show you how, without the prompts. At the entry prompt, follow this procedure:

TYPE **/F**

TYPE **G**

TYPE **I,10** RETURN

If you choose conflicting options, such as **I** and **E**, or **$** along with a decimal setting of 3, the last-named option will take effect and the conflicting one will be ignored.

Changing Features Globally

Five Portable Calc features affect the overall operation of the program. You can change the way they work with the Global command, **/G**:

TYPE **/G**

SEE

```
Adjust=ALL  Border=YES  Calc=NO  Order=ROW  Scroll=YES  ->/G
```

The Global command options are: Adjustment, Border, Calculation, Order, and Scrolling. The prompt line shows the current settings, which in the preceding example are also the default settings.

Each option is a *toggle* command—it has two possible settings. To change a setting, you simply type the first letter of the name of the option (**A**, **B**, **C**, **O**, or **S**). This puts the other setting into effect. You can only change one at a time; you will be returned to the entry prompt after typing the letter. If you just want to see what the current settings are and don't wish to change any of them, press **^U** to cancel the command.

Global option settings are not saved in the spreadsheet file (when you use the Save command). They are cancelled when you exit from Portable Calc.

The five Global options are described in the following paragraphs:

The **A**djustment option determines how Portable Calc will adjust the cell references in expressions when the expressions are replicated with the Replicate command (/R). ⊂→ *4-24*

Portable Calc's ability to automatically change cell names in expressions to preserve the proper mathematical relationships is called *expression adjustment*. ⊂→ *5-3*

If the option is set to ALL, then all cell references are adjusted. For example, if the expression **A1+a2** (located in cell A3) were replicated into cell B3, the expression would be adjusted to read **B1+B2**.

If the Adjustment option is set to LOW, then only references to cells in which the column name is lowercase are adjusted. In the previous example, the expression **A1+a2** would be adjusted to read **A1+b2**, instead of **B1+B2**. This allows you to specify when entering the expression which references should be adjusted and which should not.

The **B**order option controls display of the identification borders that appear at the left and top of the window. If the setting is YES, the upper line and leftmost column indicate which cells are currently being displayed in the window. If the setting is NO, the borders are removed, but the location of the cell cursor is still displayed in the upper left corner of the screen. Turning off the borders makes slightly more space available for displaying cells.

NOTE: Whenever you set this option, either to YES or to NO, the cell cursor returns to the home position (cell A1).

Here is an example of the use of the Border option. At the entry prompt, follow this procedure:

TYPE **/GB**

SEE

```
A1  3% ENTER: data arrow / = ! —>
<34319>   327    29     0    —3   8.25   193  23423
      5    —9    11     2   2.4      7    12  10293
    —13     0   9.6   3.8    10      1    —5  30234
     23    12    34  25.4    56  45.6     .5    564
      1     4     0     3     9    —2     6    458
    167  4556  6788   677   885    408   345   1234
     23   —17    49    34    23     51    83   2345
```

When you enter a new expression or edit an existing one, Portable Calc immediately calculates the value of the expression and displays the result in the current cell. However, it does not automatically recalculate other expressions that refer to that cell unless you have the Calculation option set to YES. This setting is useful once you have constructed a spreadsheet and are entering numbers to see how they change the results.

With a setting of NO, reevaluation occurs only when you type an exclamation point (the Calculate command) or when you replicate a cell. This is the default setting. It is convenient when you are first building a spreadsheet or making major changes to an existing one, since it saves you the time that it would take to constantly recalculate the entire spreadsheet. ⊂→ *4-4*

The **O**rder option determines whether calculations are performed row-by-row or column-by-column. With the ROW setting, expressions are evaluated from left to right, beginning at row 1. With the COL setting, they are evaluated from top to bottom, beginning at column A.

The setting of the Order option has an effect on expression evaluation. For instance, if the setting is ROW, expressions that refer to cells in following rows could be evaluated incorrectly if they are using the current values of cells that have not yet been recalculated.

To see an example of this phenomenon, first make sure the Global Calculate option is set to YES (type /GC if it is not) and the Order option is set to ROW (/GO). Then follow these steps at the entry prompt, with the cell cursor in cell A1:

STEP 1 TYPE **A2** 

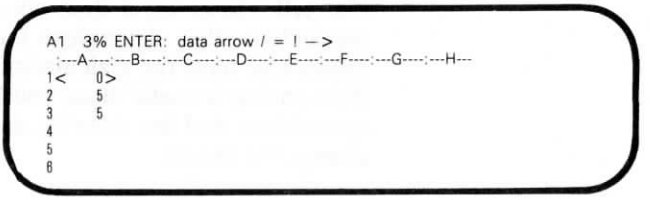
The value in A1 is 0, since cell A2 is empty.

STEP 2 TYPE **A3** 

The value in A2 is 0, since cell A3 is empty.

STEP 3 TYPE **5** RETURN

SEE



All three cells—A1, A2, and A3—should contain the value 5. But when you entered the number 5 in cell A3, Portable Calc started with row 1, looking for expressions that referred to A3, and found none until it reached cell A2. Therefore, A2 was given the value 5, and A1 was left alone.

Try the same exercise with the Order option set to COL. You will see that the same thing happens, because cell A1 still refers to a cell that is evaluated later than it is.

To avoid incorrect expression evaluation, make sure that cell references do not refer to cells that are evaluated later if those cells contain references to cells that are also evaluated later. For row-by-row evaluation, such referenced cells should not be in higher-numbered rows or further in the same row. For column-by-column evaluation, the referenced cells should not be in higher-lettered columns or further in the same column.

With the Scrolling option, you can determine whether the window will shift immediately when the current cell moves off the screen. A YES setting causes Portable Calc to scroll the window right, left, up, or down to follow the cell cursor, so that the window always includes the current cell. This is the default setting.

If the setting is NO, the cell cursor will disappear when you move it off the screen and the top line will show the name of the current cell. Press RETURN at the entry prompt to move the window to the new area of the spreadsheet.

With scrolling turned off, you can "lock" a portion of the spreadsheet on the screen so that you can refer to it while you enter data in another area. For example, your price list might have product names in column A and retail prices in column K, too far apart to display in the window together. But you could keep column A on the screen while you update figures in column K off the screen.

The NO setting also allows you to do high speed entry of a column or row of data without having to wait for screen updating after each entry.

NOTE: If the Scrolling option is set to NO, once the cursor is moved off the screen it does not display, even when moved back into the current window, until the RETURN key is pressed. If you are entering data and the cursor is not displayed, your data entries will not display either until RETURN is pressed an extra time (in addition to completing the entry).

Inserting a Row or Column

Use the **I**nsert command to add a row or column in a section of the spreadsheet that is already filled:

TYPE **/I**

SEE

```
INSERT: Row Col —>/I
```

Respond by typing **R** or **C**, as in the Delete command (/D).

If you type **R** for row, a new blank row is inserted in place of the current row, and the current row plus all higher-numbered rows are moved down and renamed one number higher.

If you type **C** for column, Portable Calc inserts a new blank column, and the current column plus all higher-lettered columns are moved to the right and renamed one letter higher.

In both cases, expressions are adjusted if necessary. The Global command's Adjustment option does not affect expression adjustment with the Insert command. In order to make room when you insert a column or row, any data in the last column (BL) or last row (256) is deleted. If the last column or row contains cells that are referenced by other expressions, however, then the Insert command is cancelled.

An inserted row or column will take on the Global formatting, if there is any. Otherwise, it will have the default format. The only exception to this rule is that all Column formatting will be retained in an inserted row.

To insert a new column between columns R and S, move the cell cursor to column S. Follow this procedure at the entry prompt:

TYPE **/I**

TYPE **C**

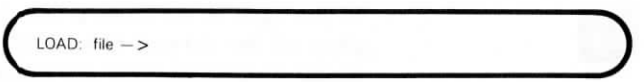
Column S and all subsequent columns will shift to the right to accommodate your new column.

Loading a File

When you want to return to a spreadsheet that has already been saved, you must **L**oad it into the computer's memory:

TYPE **/L**

SEE



Respond by typing the file name of the spreadsheet you wish to see (preceded by the drive letter and a colon if the file is not on the logged drive), then press RETURN. Portable Calc will display the spreadsheet on the screen and the format settings in effect when you saved the file will become operative again.

NOTE: If you try to load an output file (created with the **/O** command) or a file containing something other than a spreadsheet, you will get an error message.

When you load a file on top of a spreadsheet that you are currently working on, the data and format of the spreadsheet you are loading will be superimposed on the current spreadsheet. Any cells containing data or special formatting will be loaded over the same cells in the current sheet, replacing their contents and format.

To combine two files so that they occupy different areas of the same spreadsheet, first make sure that they will not overlap when joined. (You can use the Insert command, /I, to make more room if necessary.) Then use **/L** to load the second file.

Printing the Spreadsheet

Use the **O**utput command to print the current spreadsheet (or a part of it) or to put it in a special file that can be edited by Portable WordStar. You cannot print a file or create a special output file for it while it is in storage—it must be the currently loaded file.

At the entry prompt, follow this procedure:

TYPE **/O**

SEE

```
OUTPUT: printer or File —>
```

If you respond by typing P for Printer, the following prompt will appear:

```
OUTPUT BLOCK: range —>
```

Enter the cell range that you want printed: the upper left cell, followed by a colon and the lower right cell. The cell range can be larger than the used portion of the spreadsheet. Sixty rows, 80-characters long, can be printed on a page (if you are using a standard printer).

You can print a single page by including in the range to be printed only columns that are displayed completely on the screen and no more than 60 rows. A spreadsheet with the default column width of 8 can be printed on one page with the range A1:H60.

NOTE: The spreadsheet borders are not printed.

If the block to be printed is too wide or too long to fit on the paper, Portable Calc will print it in segments on successive pages that you can "cut and paste" to make a complete spreadsheet.

For example, if your spreadsheet is both wider than 80 characters and longer than 60 rows, Portable Calc will print the first 80 characters of rows 1 through 60, then the first 80 characters of rows 61 through 120, and so on until the last row of data is printed. Then the program will print characters 81 through 160 of rows 1 through 60, and so on, down to the last row.

If one part of your spreadsheet is separated from another by lots of empty cells, when you print the whole spreadsheet, Portable Calc "prints" the empty cells, which can result in blank pages being ejected from the printer.

NOTE: In order for repeated text to be included in the printed spreadsheet, a cell containing the repeat text command (') must be within the specified cell range. Use the Replicate command to copy the cell containing the command if necessary. ⊂→ *2-9*

Once you have responded to the prompt requesting a cell range, printing will begin. Make sure your printer is on. If you press RETURN instead of specifying a range, the entry prompt returns and nothing is printed.

If you respond to the Output command prompts as though you wanted to print, and a printer is not properly hooked up to your PX-8 or is not turned on, the program will wait for you to get the printer ready and then it will print. If Portable Calc can't proceed with printing, you will have to reset the PX-8 and you will lose any work you have not saved.

HOW TO STOP PRINTING

Printing can be stopped by typing ^**U**.

EDITING A SPREADSHEET WITH WORDSTAR

If you want to edit a spreadsheet with Portable WordStar or include it in a document that you have created with Portable WordStar, you must use the Output command to make a special copy of your spreadsheet file. In this output file, your spreadsheet will be in a format that Portable WordStar can use. Type F for File, and the following prompt will appear:

```
OUTPUT: file —>
```

Enter a file name that is different from the one that you have already given or plan to give to the original spreadsheet file. If you do not specify a drive name by typing it in front of the file name (such as *A:file-name*), then your file will be placed on the logged drive.

If the file name you select is already in use, Portable Calc will overwrite the file. In other words, the previous file will be erased and will be replaced by the current one.

After the file name, you are asked to provide the cell range to be placed in the output file, the same as when printing.

To include the output file in a document created with Portable WordStar, simply read (^KR) the file into the document.

Exiting from Portable Calc

When you want to leave Portable Calc and return to the operating system, use the Quit command.

Whenever you use the Quit command, any entries you just made in the current spreadsheet will be lost if you have not saved them with the Save command.

So, if you have already saved your work (or do not wish to do so), and are ready to exit from Portable Calc, follow this procedure at the entry prompt:

TYPE **/Q**

SEE

```
QUIT: Y to confirm —>
```

If you respond by typing **Y** for Yes, you will be returned to the operating system. Pressing any other key will cancel the command and the entry prompt will reappear.

Copying Cells

You will probably often want to copy the contents of one cell or range of cells to another cell or range of cells. You can use the **R**eplicate command to copy text and numeric entries exactly, while expressions are copied with appropriate adjustments made to the cell references. Only the contents of cells are copied, not the format.

For example, you want to copy a column heading from cell C1 to cell A6. Follow this procedure at the entry prompt:

STEP 1 TYPE **/R**

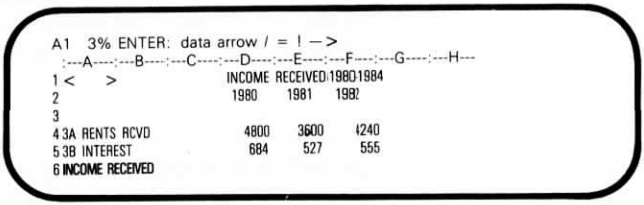
SEE

```
REPLICATE: from,to —>
```

Enter the name of the cell from which you are copying, followed by a comma and the name of the cell to which you are copying:

STEP 2 TYPE **C1,A6** RETURN

SEE



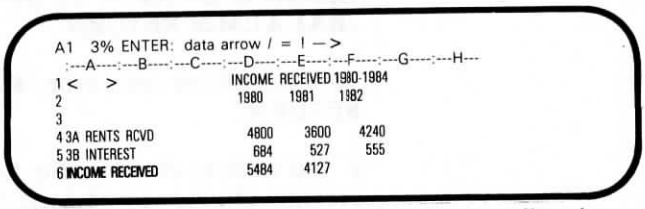
The contents of cell C1 (INCOME RECEIVED) were copied to cell A6. Note that it makes no difference where the cell cursor is when you give the **/R** command.

Next you enter the expression **D4+D5** in cell D6 to total the column. You want to copy this expression to cell E6, adjusted so that it will add cells E4 and E5. At the entry prompt, follow this procedure:

TYPE **/R**

TYPE **D6,E6** RETURN

SEE



Portable Calc adjusted the expression to reflect its new position and placed the result in cell E6.

When using the Replicate command, it is important to understand how Portable Calc handles expression adjustment. See Chapter 5 for a description of this subject.

You may not always want all the cell references in an expression to be adjusted when you replicate it—for example, a referenced cell may contain a constant of some kind. You can control expression adjustment with the Global Adjustment option. ⊂→ *4-15*

If you have the Global Adjustment option set to LOW, only lowercase entries in expressions will be adjusted. For example, a1 will be adjusted, but A1 will be left as it is.

You can copy from a cell to a range of cells. In the preceding example, you might wish to copy the expression in cell D6 to a range of cells in row 6, in order to total the columns for successive years. To do so, you would enter **D6,E6:H6** RETURN at the *from,to* prompt.

ERASING YOUR ENTIRE SPREADSHEET

You can use the Replicate command to erase all the cells in your spreadsheet by blanking (/B) one cell and copying it to a cell range that covers the used portion of the spreadsheet. However, this method does not clear any format settings (except in the one cell blanked with /B).

For example, if the data extends from column A to column M and from row 1 to row 20, first blank cell A1 by typing **/B** with the cell cursor in A1, then replicate to the rest of the spreadsheet by typing **/RA1,A1:M20** RETURN.

To blank all the cells, type **/RA1,A1:BL256** RETURN.

If you want to eliminate the formatting as well as the contents of your spreadsheet, exit from Portable Calc with the Quit command (/Q), then reenter the program. You will then have a clean spreadsheet with the default format.

COPYING A CELL RANGE

It is also possible to copy a range of cells. To copy a partial row, respond to the *from,to* prompt with the range, followed by the leftmost field in the row to which you are copying. For example: C2:M2,F5. This would have the effect of copying the data in 11 cells in row 2 (beginning with cell C2) to 11 cells in row 5 (beginning with cell F5). If you're copying from a partial column, the *to* cell is the top cell in the partial column to which you are copying.

You can make multiple copies of a partial row down the length of a partial column, or multiple copies of a partial column along the length of a partial row.

For example, you want to copy rows 2 through 8 of column B into rows 10 through 16 of columns G through L:

TYPE **/R**

TYPE **B2:B8,G10:L10** RETURN

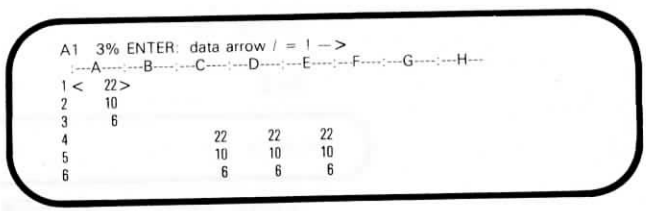
The result of this command is to make six copies of seven cells in column B (B2 through B8). The copies are placed in columns G through L, beginning at row 10.

Here is another example of replication:

TYPE **/R**

TYPE **A1:A3,C4:E4** RETURN

SEE



Finally, you can copy a block of cells. Respond to the *from,to* prompt with the range you want copied (top left cell, colon, lower right cell), followed by the location to which the top left cell of the block will be copied. For example, to copy rows 1 through 3 of columns A through C to an area whose top left corner is cell E5, type **/RA1:C3,E5**.

MOVING A ROW OR COLUMN

To move a row or column, simply replicate it to the new position (making room with the Insert command, /I, first if necessary), then use the Delete command (/D) to remove it from the original position.

Saving Your Spreadsheet

When you have completed work on a spreadsheet, you must save the file if you wish to be able to use it again. The Save command stores the file in a form that can be loaded by Portable Calc to make changes or additions, to print, or to copy to an output file. It will not be in a form that can be edited by Portable WordStar; that requires the use of the Output command. ⊂⟶ *4-21*

Saving preserves the format settings as well as the contents of the spreadsheet. Even the current cell position is saved—if the cell cursor is in cell P75 when you save the spreadsheet, P75 will be the current cell when you load the file again. ⊂⟶ *4-9*

To save your spreadsheet, follow this procedure at the entry prompt:

TYPE **/S**

SEE

```
SAVE: file – >
```

TYPE *filename* RETURN

Choose a file name that describes your spreadsheet, so that you will be able to identify it later. If you do not specify a particular drive by typing the drive letter and colon in front of the file name (such as *H:filename*), your file will be placed on the logged drive.

When you press RETURN you will see the entry prompt, and your spreadsheet will still be displayed on the screen. Use the Quit command (/Q) if you want to return to the operating system, or the Load command (/L) if you want to work on another spreadsheet that you have saved.

If you respond to the Save prompt with the name of an existing file, Portable Calc will overwrite that file without warning, no matter what kind of file it is. For example, if you respond with SALES.LTR, an existing text file, the contents of SALES.LTR will be replaced by the spreadsheet you are saving.

If you are saving a new version of a spreadsheet that has been saved before, make sure you use the same file name, unless you want to keep separate files for the different versions.

It is important to check certain conditions before you enter Portable Calc and take other precautions to prevent the loss of your work. You should make sure that the drive to which you will save your spreadsheet is operative and that it has enough space to store the file. Also, check to see that there is no file with the same name you are planning to use. It is a good idea to do a trial save when you begin work, and to use the Save command frequently as you go.

SUMMARY TABLE: COMMANDS

COMMAND	OPTION	ACTION
/B		Blank contents of current cell
/D	Row Col	Delete current row or column
/E		Edit contents of current cell
/F	Global Column Field	Set Format for current cell or column, or entire spreadsheet
	* Default	Reverts format to next lower priority level
	Exponential	Displays numbers in scientific notation
	* General	Displays numbers in decimal format; converts to scientific format to fit cell width if necessary
	Integer	Displays numbers rounded to integers
	$ Dollar	Displays numbers with two decimal places
	L Numeric Left Adjustment	Displays numbers flush left
	* R Numeric Right Adjustment	Displays numbers flush right
	*TL Text Left Adjustment	Displays text flush left
	TR Text Right Adjustment	Displays text flush right
	width.dec	Sets column width and number of decimal places to display. The default width is 8; the default for decimals is 0, which produces variable decimal entry.
/G		Set Global features (for entire spreadsheet)
Adjust →	* ALL/LOW	Expression adjustment of lowercase cell references
Border →	* YES/NO	Display of row and column borders
Calc →	YES/* NO	Enable automatic recalculation
Order →	* ROW/COLUMN	Recalculation order
Scroll →	* YES/NO	Turns off screen update when cell cursor moves off screen.
/I	Row Col	Insert row or column at current cell cursor position
/L		Load a saved spreadsheet
/O	Printer File	Output to printer or file
/Q		Quit Portable Calc
/R		Replicate cells
/S		Save spreadsheet

* Default setting

CHAPTER 5. EXPRESSION ADJUSTMENT

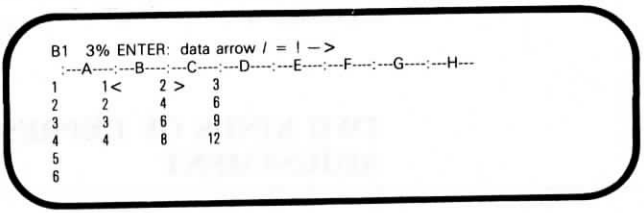
CONTENTS

5. Expression Adjustment

You have already seen how expression adjustment works, in reading about the Delete, Insert, and Replicate commands. Your appreciation of the power and flexibility of Portable Calc's expression adjustment feature will increase as you learn to use the program. In this chapter the principles of expression adjustment are explained to help you expand your understanding of this important feature.

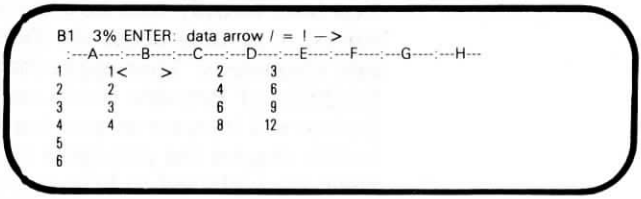
WHAT IS EXPRESSION ADJUSTMENT?

Here is an example that will illustrate the basic concept of expression adjustment. First, look at this simple spreadsheet:



This spreadsheet was constructed as follows: Cell B1 contains the expression **A1*2**, cell B2 contains the expression **A2*2**, etc. Each cell in column B is related to the cell to its left in column A by an expression that doubles the number in column A. Furthermore, the cells in column C contain the sum of the cells in column A and B of the same row. In other words, the expression in cell C1 is **A1+B1**.

If you insert a column where column B now stands by using the Insert command (**/IC**), then your spreadsheet will look like this:



When you insert or delete a column or a row, Portable Calc automatically adjusts any expressions affected by the change. In this example the expression in cell D1 (which used to be cell C1) would be adjusted from **A1+B1** to **A1+C1** to reflect the new location. All the cells in column D would be similarly adjusted, so that the correct relationships are maintained.

Expression adjustment is the process by which Portable Calc revises cell references to assure meaningful expressions.

TWO KINDS OF EXPRESSION ADJUSTMENT

Two Portable Calc commands, Delete and Insert, cause cells to be *moved*. The Replicate command *copies* data into cells. Expression adjustment operates differently for these two categories of commands.

Adjustment for the Insert and Delete Commands

The example at the beginning of this chapter demonstrates how expression adjustment is handled in the Insert command. Whenever the data in a cell is moved to another cell, references to the original cell in expressions throughout the spreadsheet are revised to refer to the new cell. So, as you saw in the example, when the contents of column B are moved to column C (by inserting a new column at B), all references to column B are changed to read column C.

Of course, in the example, as a result of inserting the column, every column except A was shifted to the right. Thus, column C's contents were moved to column D, column D to column E, and so on. So all references to cells in the affected columns had to be updated to reflect the new positions.

When a column is deleted (/DC), all columns to the right of the deleted column are shifted to the left. Expression adjustment works the same in this case as it does for the Insert command, and of course the same method applies to the deletion or insertion of rows.

Adjustment for the Replicate Command

When a cell that is copied with the Replicate command contains an expression with cell references, that expression usually needs to be revised when it reaches its new location. Portable Calc adjusts the expression so that all of its cell references are in the same relationship to the new cell as the old references were to the old cell.

For example, suppose cell D2 contains the following expression:

A2+B2*C2

You want to copy this expression in the eight cells below cell D2, using the Replicate command. You type the following:

/RD2,D3:D10

If you now look in cell D7 (using the Edit command so that you can see the expression rather than its value), you will see the following expression:

A7+B7*C7

The cell names in D7 bear the same relationship to that cell as the cell names in D2 bear to that cell. They refer to the three cells immediately to the left.

Now take a look at a more complicated example. Cell A22 contains the following expression:

2*A4+MAX(E1:G10)

You type **/RA22,D20** to replicate A22 into D20. Now cell D20 contains the following expression:

2*D2+MAX(H255:J8)

How did Portable Calc arrive at this new expression? Cell D20 is 3 columns to the right of cell A22 and 2 rows above it. So all cell names in the A22 expression were modified to refer to cells 3 columns to the right and 2 rows above. To adjust the reference to cell E1, Portable Calc went to the bottom of column H (3 columns to the right) and counted up 2 cells. For purposes of expression adjustment, columns and rows are treated as circular units. To find a cell above row 1, Portable Calc goes to the bottom of the column and counts up.

The only expressions affected by a Replicate command are the newly created ones. Any others that refer to the cells containing the new expressions will need to be recalculated to yield new results, but the expressions themselves will not change.

With the Global command's Adjustment option **(/GA)** you can instruct Portable Calc to adjust only cell references that are written in lowercase letters when the Replicate command is used. Type any cell names you want unchanged in uppercase letters. For instance, the previous example could have been entered as follows:

2*a4+MAX(E1:G10)

Then, with the Adjustment option set to LOW, the expression copied into cell D20 would have been:

2*d2+MAX(E1:G10)

The Adjustment option has no effect on expression adjustment with the Insert and Delete commands.

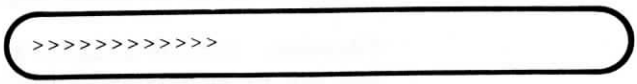
APPENDICES

CONTENTS

Appendix A
ERROR MESSAGES

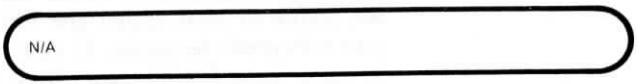
If you make a mistake while entering a command or data, an error message or sign will appear on the screen.

When the error is made in entering data, one of the following error signs may appear in the current cell:



Situation. The column is not wide enough to display the numerical value.

Situation. The expression is incorrectly formed or its numeric result exceeds Portable Calc's limits.



Situation. The expression refers to a cell containing the function **NA**.

The following is an alphabetical listing of error and informational messages that may appear on the top line of your screen as you enter commands or data in Portable Calc. The computer will also alert you to the error with a beep.

The error messages require that you press ESCape before continuing. Doing so ensures that Portable Calc does not proceed to the next command, even if you have typed ahead. When you press ESCape, the command or cell entry is cancelled, and the entry prompt appears so that you can reenter the command or data correctly. Pressing ESCape does not affect your spreadsheet.

?? COORDINATE

Situation. You are using the Goto command (=), Replicate command (/R), or Output command (/O) and you did not supply a correct coordinate.

?? DELETING REFERENCED CELL

Situation. You are using the Delete command (/D) and you are attempting to delete a cell that is referenced by an expression in a cell not being deleted.

?? FILE NAME

Situation. You are using the Load (/L), Output (/O), or Save (/S) command and Portable Calc cannot load, output, or save the file you named. If you are trying to load, either the file does not exist or you mistyped the name. If you are trying to output or save, your file directory may be too full.

?? FILE TYPE

Situation. You are using the Load command (/L), and the file you named does not contain valid spreadsheet data.

?? "from" COORDINATE

Situation. You are using the Replicate command (/R) and you did not specify a valid cell or cell range before the comma.

?? INVALID NUMBER OR EXPRESSION

Situation. You are entering data, and the first character you typed causes Portable Calc to expect a numeric or expression entry. However, when you complete the entry it is neither a number nor an expression, and Portable Calc treats it as text. If you really intended the entry to be a number or an expression, use the Edit command (/E) to correct it.

?? OPTION

Situation. The command required a single-letter response to choose an option, and you supplied an invalid letter.

OUT OF FILE SPACE

Situation. You are using the Output (/O) or Save (/S) command, and there is not enough drive storage capacity or directory capacity for the data you are trying to output or save.

OUT OF MEMORY

Situation. There is not enough memory to complete the operation you have initiated. If you are entering data, the last line typed is lost. If you are using the Insert (/I), Replicate (/R), or Load (/L) command, part of the operation may be completed. Note that the Replicate command starts working with the high-numbered cells.

?? RANGE

Situation. The command required a cell range, and you did not supply a correct one.

?? "to" COORDINATE

Situation. You are using the Replicate command (/R) and you did not specify a valid cell or cell range after the comma.

Appendix B
GLOSSARY OF TERMS AND CONCEPTS

ARGUMENT — The values with which a function performs its calculation. Arguments are contained in parentheses immediately after the function name, separated by commas or spaces if there is more than one. For example, in the function **AVG(7,A53,B1:B33)** the arguments are 7, A53, and B1:B33.

BACKUP FILE — A duplicate of another file, which you create for safekeeping.

BIT — A short form of "binary digit." A bit is the smallest unit of data and has a value of 0 or 1.

BYTE — A sequence (or group) of binary bits used to represent one character of information. A byte consists of 8 bits. The PX-8 is an 8-bit computer; it processes one byte at a time.

CELL — The basic unit of space where data is placed on the spreadsheet. A cell can contain a number, text, or an expression. Cells are defined by the intersection of a row and a column.

CELL CURSOR — A pair of brackets on the screen, marking your place in the spreadsheet. The cell cursor always encloses only one cell at a time.

CELL NAME — The "address" of the cell, which consists of the column letter followed by the row number. For example, the cell located where column D and row 6 intersect is cell D6.

CELL RANGE A group of adjacent cells that form a rectangular portion of the spreadsheet or a portion of a row or column. A range is defined by the upper left and lower right cells of a block and by the first and last cells of a partial row or column. The range name consists of the two cell names connected by a colon or a period. For example, D5:G9 is the cell range covering rows 5 through 9 of columns D through G.

CELL REFERENCE When a cell name is used in an expression, it is called a cell reference. The numeric value of the cell is used in calculating the value of the expression.

CHARACTER A single digit, letter, punctuation mark, space, or other symbol which the computer can read or write.

COLUMN A column is a vertical arrangement of cells, designated by a letter.

COMMAND An instruction transmitted to your computer when you press specified keys.

CONTROL COMMAND Commands issued to the computer when you press a key (or keys) while holding down the control key.

CONTROL KEY A key, often represented by the caret symbol (^), used with other keys to command the computer to perform specific functions.

COORDINATE The intersecting column letter and row number that identifies a cell.

CP/M The operating system used by your computer.

CURRENT CELL The cell where the cell cursor is currently located. Data entered at the entry prompt goes into the current cell. The current cell's location is shown in the upper left corner of the screen.

CURRENT ROW/ CURRENT COLUMN — The row or column where the cell cursor is currently located.

CURSOR CONTROL COMMANDS — **^D**, **^S**, **^E**, and **^X**: commands that move the cell cursor. They have the same effect as the arrow keys.

DATA — In Portable Calc, information stored in a cell. Portable Calc recognizes three types of data: text, numbers, and expressions.

DATA ENTRY — In Portable Calc, to place data in the current cell.

DEFAULT — A preset value or condition in a program, which you can change or allow to stand. In Portable Calc, the default setting of a command option is the one assumed by the program unless you specify otherwise.

DRIVE — A component of your computer where information is placed by the manufacturer or stored by you.

The *logged drive* is the default drive, or the drive that is assumed unless some other is specified.

ENTRY — A sequence of numbers, letters, or symbols terminated by RETURN (or sometimes an arrow key) and stored in the current cell.

ENTRY CURSOR — An underline or rectangle on the top line of the screen that indicates where the next character will appear as you enter data or commands.

ENTRY PROMPT — The message that appears on the top line when you enter the program and that reappears after every command or data entry is completed. The entry prompt indicates your immediate options:
Enter: data arrow = ! ; /.

ERROR MESSAGE A statement that appears on your screen when your computer is unable to continue processing. The message tells you what the problem is and how to solve it.

EXPRESSION A formula which generally contains terms and operators, expressing a calculation which results in a value. Expressions can contain functions, constants, numbers, cell references, and other expressions. A single function or cell reference can be a simple expression.

FIELD "Field" has the same meaning as "cell" as an option in certain commands.

FILE A storage unit for information that has been entered into your computer in the form of text, data, or programs. A file is identified by a unique name. In Portable Calc, a file contains a spreadsheet.

FILE NAME A sequence of up to 11 characters that identifies a file.

FORMAT Information about a cell that determines how data will be displayed in it. There is a Format command that controls the format through various options.

FUNCTION A sequence of operations that Portable Calc performs automatically when you enter the function name as part of an expression. Example:
+SUM(C4:C10)

GLOBAL A command that affects the entire spreadsheet. Portable Calc has both a Global command and a Global option within the Format command.

HARDWARE The mechanical and electronic components of a computer system.

INTEGER A whole number. It is also a Format command option that rounds off decimal numbers and displays them as the nearest whole number.

JUSTIFICATION The alignment of text or numbers within cell boundaries. Data can be either left- or right-justified.

K (SPACE ON DRIVE) The abbreviation for kilobyte. 1K is equal to 1,024 bytes (or 1,024 characters) of memory. The more bytes of memory a computer has, the more information it can store.

LOAD To read an entire file from storage into memory.

MEMORY See **RAM** and **ROM**.

OPERATING SYSTEM A collection of programs that "runs" the computer. Using your operating system, you can tell your computer the name of the program you want to run—in this case, Portable Calc. The system finds the program and begins its operation. Your operating system also determines when and how information is sent to your printer and other components. Your operating system is CP/M.

OPERATOR One of the basic elements of an expression, along with terms. An operator tells Portable Calc what calculation to perform on the parts of the expression which have numeric values to arrive at a value for the entire expression.

OPTION One of the choices available in certain Portable Calc commands. Options are usually displayed in abbreviated form on the line where you enter the command.

PROGRAM A coded set of instructions which tells a computer what to do and how to do it. By changing the code, you can alter the functioning of a program.

To program a computer means to write the coded instructions for its operation.

PROMPT A question or statement that appears on your screen, indicating that the computer is ready to process your instructions.

RAM **R**andom **A**ccess **M**emory. An area of computer memory where information can be read or written. RAM is measured in K bytes; e.g., a computer with 64K RAM has 65,536 bytes of random access memory.

READ Copy information from a disk or other drive into RAM.

RESULT The calculated value of an expression.

ROM **R**ead **O**nly **M**emory. You cannot write in the ROM portion of your computer, you can only run programs stored there. Information is stored once in ROM (by the manufacturer) and cannot be changed.

ROM CAPSULE A capsule which you can insert into and remove from the computer. It contains read-only memory and is used to store applications programs.

ROW A horizontal arrangement of cells, designated by numbers.

SAVE To store information in an area of the computer (floppy disk, RAM disk, or microcassette tape) from which it can be retrieved.

SCROLL Move the screen view (or "window") up, down, right, or left by moving the cell cursor off the screen.

SIGNIFICANT DIGIT Significant digits are all the non-zero digits and the zeros that are included between them.

SOFTWARE Programs written to be used on a computer.

SPREADSHEET A sheet of paper with ruled lines marking rows and columns, used to set up a matrix of numbers and calculations. Portable Calc is an electronic spreadsheet.

STRING A sequence of letters, numbers, or other characters.

TERM A numeric item connected by operators to make up an expression. A term can be a number or any cell reference, function, or shorter expression that has numeric value.

TOGGLE A command key that, when pressed once, turns a feature on (or off) and when pressed again, gives the opposite result.

UTILITY PROGRAM A program designed to do a routine task. Utility programs help you move or examine files and check that the components of your computer system (computer, printer, disk drives, etc.) are set up properly. Utility programs are supplied to you with your operating system.

VALUE In Portable Calc, the quality of a cell, expression, or function that can be expressed as a number. The value of an expression is the number that results when all the calculations are performed.

WINDOW The portion of the spreadsheet that is visible on the screen.

WRITE Copy information from RAM onto a drive.

Appendix C
IMPORTANT INFORMATION ABOUT THE PX-8

Inserting the ROM Capsule

Portable Calc is contained in a ROM capsule that you must plug into a slot provided in your PX-8. The PX-8 has two slots beneath the cover on the bottom side. If you are using only one capsule containing Portable Calc, it can go in either slot. If you are using two capsules, it doesn't matter which one goes where.

Refer to your PX-8 User's Manual for more detailed instructions.

The Program File

The Portable Calc program is contained in the file CALC.COM on the ROM capsule. You don't need to make a back-up copy of this file, because it is a permanent part of your computer and cannot be damaged or lost. In fact the Portable Calc file is protected to prevent unauthorized use. A copy of this program will not run properly.

Memory Requirements

There are several things you should know about the way memory is used in the PX-8. Within certain limits, you may choose the sizes of two areas of RAM (random access memory): the RAM disk and USER BIOS. The RAM disk can be used for storing files created with Portable WordStar, Portable Calc, or BASIC. USER BIOS stores Portable Scheduler messages. *If your system has the optional RAM Disk Unit, you need not be concerned with any of the following information, because the size of your RAM disk will be fixed.*

- You can select the size of the RAM disk and USER BIOS at System Initialization, or by running the utility program, CONFIG.COM.
- The size of your RAM disk and USER BIOS is listed on the System Display (press CTRL + HELP).
- Possible RAM disk sizes range from 0-24K.
- Possible USER BIOS sizes range from 0-16 pages. Four pages are equal to 1K, so the range in bytes is 0-4K.
- The combined size of the RAM disk and USER BIOS cannot exceed 24K at any time. For example, if the RAM disk is set to 22K, you will not be able to set USER BIOS any larger than 8 pages (2K).
- Portable WordStar runs properly no matter what RAM disk or USER BIOS size is selected.
- Portable Calc runs properly as long as an 18K combined RAM disk and USER BIOS area is not exceeded. If this limit is exceeded, the program may run, but there will not be much room to accept data.

- **Whenever the size of the RAM disk is decreased, all data on the RAM disk is lost!**

- **Any time you lower the size USER BIOS, your Portable Scheduler messages will be erased. The next alarm will still go off, but subsequent alarms must be reset.**

- **Initializing the system by using the reset hole on the side of the PX-8, and pressing the SHIFT key and the NUM GRPH key, erases all Scheduler messages.**
- The number of Scheduler messages you can store depends on the size of the RAM disk and the length of the messages.

- The following chart suggests RAM disk sizes for using some PX-8 programs. If you will be using both Portable Calc and Portable WordStar, use the RAM disk size suggested for Portable Calc.

	PORTABLE SCHEDULER		
with	*Heavy use*	*Moderate use*	*Not in use*
PORTABLE CALC	14 or 15K	16 or 17K	18K
PORTABLE WORDSTAR	20 or 21K	22 or 23K	24K

Function Keys

The five function keys on the top row of the PX-8 keyboard—labeled PF1 through PF5—can be set to perform a command or series of commands, to enter data, or to execute a combination of commands and data entry. There are actually ten settings possible at any one time since the keys can be shifted to give different results.

Function keys can speed up your work if there are a series of commands or stock data entries that you use frequently.

To set your custom function keys, use the CONFIG.COM program while in the operating system. Select number 2 (CP/M function key) from the Main Menu of the program. Then select any of the function keys numbered PF6 through PF10 (which correspond to PF1 through PF5 when shifted) that you wish to set, by typing a number 6-10.

Type in the desired command(s) or data, entering the keystrokes exactly as you would in Portable Calc; pressing CTRL, arrow keys, and RETURN whenever needed. When you press RETURN it appears as ^M on the screen. At the end of each string, press the HELP key.

There is a limit of 15 keystrokes that can be set to one function key. Any key but HELP can be used.

See the PX-8 User's Manual for more details on using CONFIG.COM.

NOTE: The STOP key can be used in place of ^U to interrupt data entry and commands.

Entering Portable Calc from the Menu Screen

On the PX-8 you can enter Portable Calc either in the usual way at the CP/M prompt or from the Menu Screen. The Menu Screen contains a listing of all the programs available to you on the drives you specify at the System Display.

At the System Display you can also choose to have the Menu Screen displayed whenever you return to the operating system.

To enter Portable Calc from the Menu Screen, simply use the arrow keys to locate the file name CALC.COM (it will begin flashing when you get to it) and press RETURN.

Printing the Contents of the Screen

In addition to using the Output command to print your spreadsheet, you can also use the SCRN DUMP key to print whatever is currently in the window.

First, make sure the printer is turned on. Then, with the screen displaying the portion of the spreadsheet you want to print, press CTRL and **PF5** (SCRN DUMP).

If you don't want the spreadsheet borders to appear in the print out, turn them off with /GB before printing.

Printer Compatibility

To determine whether or not a specific printer will be compatible with Portable Calc, it will help to know some details about the way Portable Calc works.

Portable Calc sends the following characters to the printer:

* all printable ASCII characters
* carriage return, line feed
* form feed

Portable Calc sends its output to CP/M's LST: device.

Portable Calc will work with any printer that is compatible with Portable WordStar.

In order to produce a comprehensible spreadsheet, the printer you use must be capable of printing at least 80 columns.

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NOTE: Boldfaced page number references tell you where to find the principal treatment of a command or function.

EPSON PX-8

Portable Scheduler™ Reference Manual

For Release 1.0

EPSON PX-8

Portable Scheduler™ Reference Manual

For Version 1.0

Welcome

Welcome to Portable Scheduler, the appointment calendar that keeps track of your busy days and helps you stay on top of them. Portable Scheduler reminds you when to go to a business meeting, pay a bill, see a friend, make a phone call, or take a coffee break. You just set a pleasant-sounding alarm to go off at the appointed times. You'll never forget an important engagement again!

You can note appointments up to 25 days ahead and set as many alarms as you like. With one keystroke you can even print out your schedule for the morning or the weeks ahead.

You'll find Portable Scheduler extremely easy to use—complete instructions and examples are given in the following pages.

What You Have

Portable Scheduler is contained in a ROM capsule. The program file is called SCHEDULE.COM. You don't need to make a back up copy of this file, because it is a permanent part of your ROM capsule and cannot be damaged or erased.

The *Portable Scheduler Reference Manual* is a comprehensive description of the program. Read it through to learn everything you need to know about running Portable Scheduler. At the back of the manual you'll find a quick guide and a menu map. These reference aids will refresh your memory as you use the program.

If this is your first time with computers, check the glossary in Appendix C for any unfamiliar words.

Portable Scheduler™ Reference Manual

For Release 1.0

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TRADEMARKS

DISCLAIMER

TABLE OF CONTENTS

How to Use this Book

This manual is organized to provide speedy access to information.

REFERENCE AIDS

The following reference aids should help you find answers to your questions about the program:

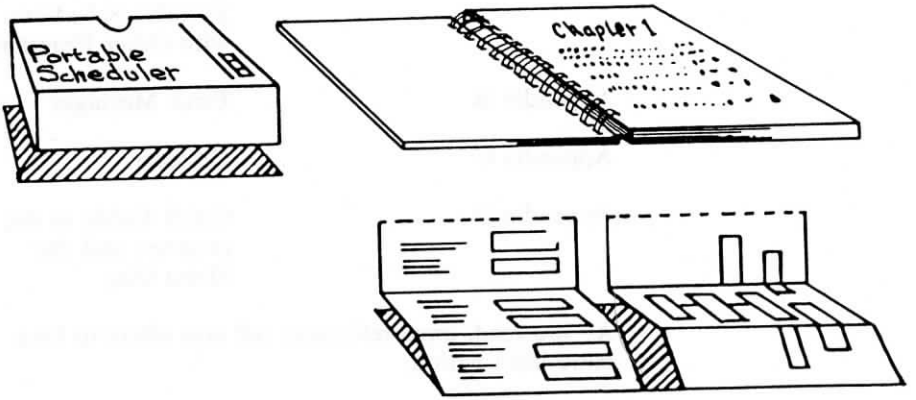


Table of Contents at the beginning of the manual	List of every subject covered in the three chapters and four appendices
Table of Contents at the beginning of each chapter	Closer look at the subjects covered in the chapter

Summary Table at the end of each chapter	Chart of commands covered in the chapter
Index	Quick pointer to a subject or command

When you want summaries, use the appendices:

Appendix A	Memory Requirements for Using Portable Scheduler with Other Programs
Appendix B	Error Messages
Appendix C	Glossary
Appendix D	Quick Guide to the program and the Menu Map

As you read, cross-references tell you where to find more information.

Watch for these symbols in the text and left margin:

"CAUTION"

"REMEMBER"

"An example onscreen"

CHAPTER 1. GETTING READY

CONTENTS

1. Getting Ready

Before you begin using Portable Scheduler, a little preparation is required.

PLUGGING IN THE CAPSULE

If you are using only the capsule that contains Portable Scheduler, plug it into the ROM 1 slot. If you are using a program on another capsule as well, it doesn't matter which capsule goes in which slot. Refer to your PX-8 User's Manual for instructions.

SETTING THE DATE AND TIME

Check the date and time on the PX-8's internal calendar and clock by holding down the CTRL key while you press the HELP key. You will see the System Display with the date and time on the top line.

You can also set the date and time when you initialize the system. If you set a nonexistent date, such as August 32, the following error message will appear when you try to run Portable Scheduler:

```
BAD DATE
PRESS ESC KEY
```

It is important that the date and time are correct, so that Portable Scheduler can do its work accurately. If you need to change them, use the program called CONFIG.COM to do so. The PX-8 User's Manual explains how to use this program. Note that the PX-8 uses a twenty-four-hour clock. For example, 2:30 PM is entered as 14:30, and midnight is 24:00.

SETTING MEMORY SIZE

Use CONFIG.COM to set the size of the RAM disk and USER BIOS (two of the areas of memory in the computer). While you're learning to use Portable Scheduler, Portable Calc, and Portable WordStar, set the RAM disk to 14K. Appendix A of this manual tells how to set the size of the RAM disk according to the programs you're using and the number of messages you keep in Portable Scheduler. When you become more familiar with the programs you will want to adjust the RAM disk to make the most efficient use of memory.

Set USER BIOS to zero and leave it at that setting as long as you are using Portable Scheduler.

If your system has the optional RAM Disk Unit, you don't need to set the RAM disk size. If you are planning to use a RAM Disk Unit or a system bus connector, attach it before beginning to use Portable Scheduler, since you will lose all Portable Scheduler messages any time you attach or remove either of these devices. If you must attach or remove a RAM Disk Unit, modem, or any other device that connects to the system bus after you have stored messages in Portable Scheduler, you may save your messages by using ^PF5 to print them. (See page 3-5.)

NOTE: Please be sure to read Appendix A when you have completed the three chapters. It contains important information that can prevent you from losing data.

CHECKING THE VOLUME

HOW TO SET THE VOLUME

The volume must be set high enough for the alarm to be audible. The volume control is a dial on the right side of the PX-8; turning it clockwise sets the volume higher. Check the volume by holding down the CTRL key and turning the computer off with the switch on the right side. Release the CTRL key and turn the computer back on. You should hear a beep; if you don't, turn up the volume.

ENTERING PORTABLE SCHEDULER

FROM MENU

At the Menu Screen, use the arrow keys to locate SCHEDULE.COM (it will begin flashing when you get to it) and press RETURN.

FROM CP/M

You can also enter Portable Scheduler from the system prompt.

SEE A> (or any drive A-G)

TYPE **B: SCHEDULE** RETURN

SEE copyright message

The copyright message will remain on the screen briefly (you can hurry it along by pressing any key), and then you will see the Portable Scheduler half-day calendar.

CHAPTER 2. NOTING APPOINTMENTS

CONTENTS

2. Noting Appointments

You can keep track of over 100 appointments (or other matters you want to remember) by entering messages in Portable Scheduler's calendar.

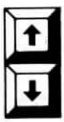
THE HALF-DAY CALENDAR

After the copyright message you will see a calendar display that looks something like this:

```
      Thursday Morning   MicroPro        October 6,1983
7:00                          10:00
7:30                          10:30
8:00                          11:00
8:30                          11:30
9:00                          12:00
9:30                          12:30
F1=EARLIER F2=LATER F3=MONTHLY F4=CLEAR ENTRY  F5=ALARM ON/OFF ESC=EXIT
```

The half-day calendar contains appointment slots for the current day, either morning or afternoon. As long as the date and time you gave the computer is accurate, you will get a calendar for the present half of the day. For example, you would see the previous display if you had entered 10/6/83 at the date prompt and 8:46 at the time prompt.

Moving the Cursor



As you can see, the half-day calendar is divided into half-hour intervals with space for noting appointments or entering memory joggers. Move the cursor (the flashing rectangle) to the line on which you want to make an entry, using the up and down arrow keys on the right side of your keyboard. The cursor moves one half-hour segment at a time.

The basic WordStar cursor movement commands can be used in Portable Scheduler also. You may prefer them to the arrow keys. To move the cursor up a line, press ^E (CTRL plus E). Move it down a line by pressing ^X.

Pressing the up arrow (or ∧E) when the cursor is at the first time slot causes it to move to the last time slot. Likewise, pressing the down arrow (or ∧X) while at the last time slot will move you to the first one.

Entering Messages

HOW TO NOTE AN APPOINTMENT

When you've located the correct time slot, simply type in a message to remind yourself what to do at that time. You can use up to thirty characters (letters, numbers, punctuation, spaces, and symbols) to write the message.

Here is an example:

```
11:30
12:00  Lunch with Wanda, Milly's Cafe
12:30
```

You can set an alarm at the same time as you enter a message. See page 2-9 for details.

NOTE: It is a good idea to enter something in each half-hour slot for which you will be occupied by an appointment. This will prevent scheduling another appointment during that time period and it will make the Monthly Calendar (which you'll learn about in Chapter 3) much more useful.

You can simply use ditto marks, like this:

```
10:00  Meeting with V.P. of Marketing
10:30  "    "   "  "  "
```

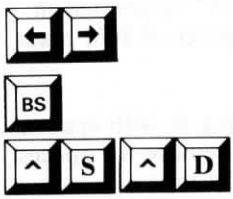
HOW MANY MESSAGES CAN BE ENTERED?

You can enter roughly 100-500 messages (depending on their length), as long as the RAM disk size is set at 20 or below or you are using the optional RAM Disk Unit. There is room for about 150 messages of 25 characters each. But as the RAM disk size increases, the available space for saving messages decreases. (See Appendix A.)

If the number and length of your messages exceeds the limits of memory, you won't be able to save them. As soon as you enter a message that won't fit in memory, you will hear a beep, and the bottom line of the screen will display this message:

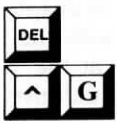
```
*** ERROR: NO ROOM TO SAVE SCHEDULE. PRESS ESC AND DELETE MESSAGE. ***
```

Press ESCape and delete the message you just entered. You won't be able to move to any other time or date until you do. Then, check the current day's calendar and remove any messages you no longer need. Return to the time slot where you tried to enter the last message and enter it again.



Correcting Errors

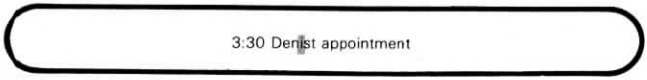
If you make a mistake typing a message, move the cursor to the error with the left or right arrow keys, the backspace key, or the WordStar commands ^**S** (left one character) or ^**D** (right one character).



You can either delete the error, using the DEL key or ^**G** to delete one character at a time, or type the correction over it. The DELete key deletes the character to the left of the cursor, while ^**G** deletes the character the cursor is on.

Use ^**T** to delete from the cursor to the end of the message.

There is no insert mode, so if you missed a character you may have to retype part of your message. For example, you may make an error such as this:

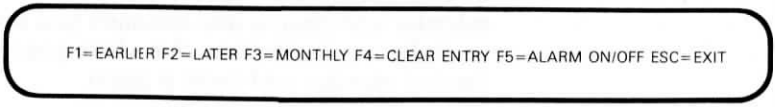


You cannot insert the missing "t"; you will need to retype from the cursor on.

Deleting Messages

ENTRY MENU

Delete an entire message by pressing a function key, labeled **PF4**, located on the top row of your keyboard. Note that the bottom screen line is a menu which describes the function key commands. This is the "entry menu;" it lists commands used to make entries in the calendar.



Because of space limitations, the "P" is omitted in naming the keys. Thus, the description of **PF4** reads "F4=CLEAR ENTRY."

Do not delete a message by covering it with spaces, unless you make another entry to replace the spaces. A time slot with nothing but spaces in it will look empty on the half-day calendar, but it will appear to be in use on the monthly calendar (covered in chapter 3). You can delete the spaces in such a line with the **PF4** function key. Using the right arrow key at the end of the text in a line leaves spaces that could give the same result.

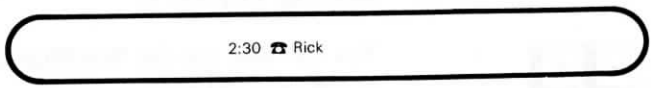
Using Symbols in a Message

Portable Scheduler lets you use symbols in your messages as a kind of shorthand. By including them, you can say more in less space. You produce symbols by holding down NUM GRPH while pressing another key. Here is a chart of some useful symbols and their corresponding keys:

NUM GRPH +	
V	☎
B	大
N	女
M	🚗
,	✈
.	↓
:	↑
;	×

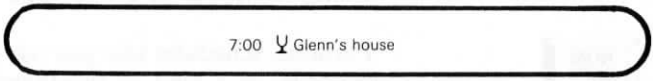
Here are some examples of ways you might use these symbols in your messages.

To remind yourself to make a phone call:



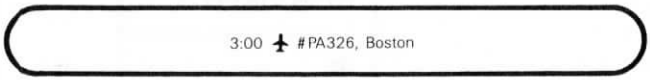
To remind yourself to call the TV repairman:

To note a dinner engagement:



To prompt yourself to attend to your car:

To note your flight time:



Moving to Another Half-Day Calendar

PF2
ENTRY MENU

To look at the next half-day calendar, simply press the **PF2** function key.

PRESS **PF2**

SEE calendar display for the following half-day

For example, pressing **PF2** will take you from Friday morning, October 7 to the afternoon of the same day. Press it again, and you will be looking at Saturday morning, October 8.

You can also use the WordStar command ∧**C** to get to the next half-day.

PF1
ENTRY MENU

To move backward a half-day, press **PF1** or use the WordStar command ∧**R**.

Portable Scheduler will not allow you to look at calendars for past days, nor can you go farther than 24 days ahead. You will hear a beep if you attempt either of these commands.

See Chapter 3 to find out about the express method for moving several days at a time.

SETTING AN ALARM

PF5
ENTRY MENU

You can set an alarm at any half-hour interval to remind yourself of an appointment or a task, or to wake yourself up! Place the cursor at the time you choose. If there is already a message, the cursor can be anywhere within it when you set the alarm.

PRESS **PF5**

SEE ♪

The cursor will return to the beginning of the message if it wasn't already there.

For example:

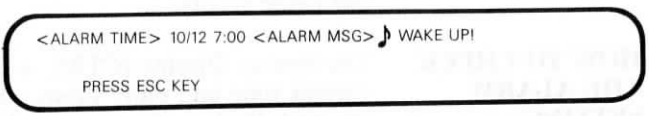
Before setting alarm

After setting alarm

HOW TO CLEAR AN ALARM

To remove an alarm that you have set, press **PF5** again. This key is a toggle switch—when you press it once, it turns the alarm on; press it again, and it turns the alarm off. The ♪ symbol disappears when you turn the alarm off.

When alarm time arrives you will hear a distinctive sequence of tones, and if there was a message it will appear on the screen along with the date and time.



When you press ESCape, the message will disappear, and whatever was on the screen before the alarm sounded will reappear. If you don't press ESCape to clear the message, it will remain on the screen for 50 seconds, then vanish.

The alarm will always go off at the appointed time, even if the PX-8 is turned off or you are operating another program. Whatever is on the screen will be cleared temporarily to display your message or to remind you of the time. If the computer is turned off or unplugged, as long as the batteries are charged it will turn itself on at alarm time.

Since the alarm goes off only once per appointment, try to keep your computer within hearing range so that you don't miss any alarms. If you suspect that you've missed one, just check the current half-day calendar.

When an alarm has gone off, the corresponding symbol disappears from the half-day calendar, unless you're using Portable Scheduler at the time. When you exit from Portable Scheduler, the symbol will be erased.

USING THE SYSTEM ALARM

The alarm can also be set at the System Display, which you get to by pressing CTRL and HELP. However, if you set a "system alarm," and then set an alarm—for any time—with Portable Scheduler, the system alarm will be cancelled. Also, if an alarm is already set by Portable Scheduler, you can't set a system alarm.

Portable Scheduler will not allow you to set an alarm in a past time-slot, except for one that is later than the time when you entered the program. For example, you might enter Portable Scheduler at 2:55, work in it for ten minutes, then set an alarm for 3:00 that same afternoon. The program will accept the alarm, but it will never go off!

HOW TO CHECK THE ALARM SETTING

The System Display (CTRL + HELP) tells you the current time and date, shows when the next alarm is set, and displays the message. If the alarm was set by Portable Scheduler, the ♪ will be present. If it is a system alarm, there will be no ♪.

EXITING FROM PORTABLE SCHEDULER

ESC

When you have finished entering messages and setting alarms, you must save them. None of the entries or deletions you make are saved until you exit the program.

PRESS **ESCape**

On the bottom line of the screen you will see a new menu of commands, the "exit menu:"

F1=SAVE AND EXIT F2=ABANDON AND EXIT F3=DO NOT EXIT

PF1
EXIT MENU
^ K D

In the exit menu, the function keys have different effects than when you're making calendar entries. To save your entries:

PRESS **PF1**

SEE menu screen or system prompt

The entries will be saved in the USER BIOS area.

You can also use the WordStar "save—done" command, **^KD**, to save your entries without using the exit menu.

Saving causes you to exit Portable Scheduler and returns you to the operating system, either at the menu screen or the system prompt, depending on whether or not you are in menu mode.

CAUTION

An alarm will not go off until it is saved.

PF2
EXIT MENU
^ K Q

If you should decide that you don't wish to save the entries you've made, then press **PF2** at the exit menu. You will return to the operating system, and your calendar will remain the same as the last time you saved it. The WordStar "abandon file" command, ^**KQ**, will do the same thing at the entry menu.

PF3
EXIT MENU

You can also change your mind once you've entered the exit menu. If you decide you want to continue making entries instead of saving or abandoning, press **PF3**. The exit menu will be replaced by the entry menu.

CAUTION

Any time you reset your system, any Portable Scheduler messages you have stored will be erased.

SUMMARY TABLE: HALF-DAY CALENDAR COMMANDS		
COMMAND OR KEY	**CORRESPONDING WORDSTAR COMMAND**	**FUNCTION**
		Cursor movement:
down arrow	**^X**	Moves cursor to next half-hour slot
up arrow	**^E**	Moves cursor to previous half-hour slot
right arrow	**^D**	Moves cursor right one character
left arrow or **BS (backspace)**	**^S**	Moves cursor left one character
PF2	**^C**	Moves cursor to next half-day calendar
PF1	**^R**	Moves cursor to previous half-day calendar
PF3		Moves cursor to monthly calendar
		Editing:
DEL		Deletes character to left of cursor
^G		Deletes character at cursor
^T		Deletes to end of message
PF4		Deletes entire message
		Alarm:
PF5		Sets/clears alarm

SUMMARY TABLE: HALF-DAY CALENDAR COMMANDS (continued)		
COMMAND OR KEY	**CORRESPONDING WORDSTAR COMMAND**	**FUNCTION**
		Exiting:
ESCape + PF1	**^KD**	Saves messages and changes just entered and exits from Portable Scheduler
ESCape + PF2	**^KQ**	Exits from Portable Scheduler without saving messages and changes just entered
ESCape + PF3		Returns to entry menu

CHAPTER 3. CHECKING YOUR CALENDAR

CONTENTS

3. Checking Your Calendar

Portable Scheduler makes it easy for you to plan the days ahead by quickly locating the date and time you need to check. You can note appointments, change or delete messages, or just confirm your memory.

THE MONTHLY CALENDAR

With one keystroke you can see what your schedule looks like for the next 24 days.

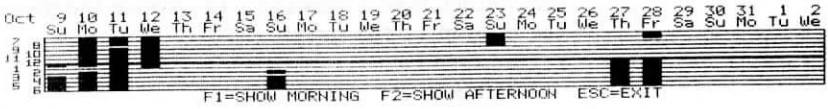
Glancing at the Month Ahead

PF3
ENTRY MENU

When you want to discover what's happening on a certain date, you can use **PF2** to look ahead a few days. But to check a date a little farther in the future, take a look at the monthly calendar.

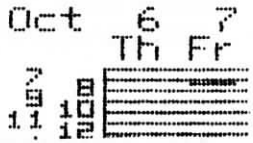
PRESS **PF3**

This is what you will see, beginning with the current date and ending 24 days ahead:

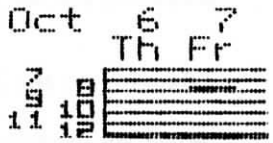


The time of day is given in hourly segments on the left side of the screen, and each appointment is represented by a bar in the corresponding time slot. You can see at a glance how busy your calendar is.

Each hourly segment has space for two bars, each representing a half-hour time slot. For example, an 8:00 appointment looks like this on the monthly calendar:



This is how an 8:30 appointment looks:



Choosing a Date by the Express Method

PF2
MONTHLY MENU

Now you want to find out more about your appointments for the afternoon of October 17th. Do you have time to fit in a tennis game after work, or will that 3:30 appointment take until dinner time?

Using the right cursor arrow, move the cursor (now a line, rather than a block) to 17. Notice the menu at the bottom of the screen.

PRESS **PF2**

See the half-day calendar for Monday afternoon, October 17th appear on the screen. Now you can make any additions or changes you wish, or return to the monthly calendar and choose another half-day to inspect.

Press **PF3** again and the monthly calendar will appear. Move the cursor right or left, using the arrow keys. If the cursor is on the first day and you press the left arrow, the cursor will wrap around to the last day. And if you're on the last day, pressing the right arrow will land you on the first day.

PF1
MONTHLY MENU

To see the half-day calendar for a particular morning, position the cursor on the date and press **PF1**.

Saving While in the Monthly Calendar

To save (or abandon) from the monthly calendar, press ESCape followed by **PF1** or **PF2**, just as you did in the half-day calendar. **^KD** and **^KQ** can also be used at the monthly calendar to save or abandon.

PRINTING YOUR SCHEDULE

If you would like to print a copy of your monthly schedule or any of the half-day calendars, you can do so easily. First, make sure the printer is turned on. Find the calendar you want to print—the cursor can be anywhere on the screen. Then press CTRL and **PF5** (SCRN DUMP).

If you are using the Epson RX-80, your printed results will look just like the screen. If you use the FX-80 or another Epson printer, however, the graphic symbols will not print.

SUMMARY TABLE: MONTHLY CALENDAR COMMANDS		
COMMAND OR KEY	**CORRESPONDING WORDSTAR COMMAND**	**FUNCTION**
		Cursor movement:
→		Moves cursor to next day
←		Moves cursor to previous day
PF1		Moves cursor to morning half-day calendar
PF2		Moves cursor to afternoon half-day calendar
		Exiting:
ESCape + PF1	**^KD**	Saves messages and changes just entered and exits from Portable Scheduler
ESCape + PF2	**^KQ**	Exits from Portable Scheduler without saving messages and changes just entered
ESCape + PF3		Returns to entry menu

APPENDICES

CONTENTS

APPENDIX A MEMORY REQUIREMENTS FOR USING PORTABLE SCHEDULER WITH OTHER PROGRAMS

There are several things you should know about the way memory is used in the PX-8. Within certain limits, you may choose the sizes of two areas of RAM (random access memory): the RAM disk and USER BIOS. *If your system has the optional RAM Disk Unit, you need not be concerned with any of the following information.*

- You can select the size of the RAM disk and USER BIOS at System Initialization, or by running the utility program, CONFIG.COM.
- The size of your RAM disk and USER BIOS is listed on the System Display (press CTRL + HELP).
- Possible RAM disk sizes range from 0-24K.
- Possible USER BIOS sizes range from 0-16 pages. Four pages are equal to 1K, so the range in bytes is 0-4K.
- The combined size of the RAM disk and USER BIOS cannot exceed 24K at any time. For example, if the RAM disk is set to 22K, you will not be able to set USER BIOS any larger than 8 pages (2K).
- Portable WordStar runs properly as long as the 24K limit (RAM disk plus USER BIOS) is not exceeded.
- Portable Calc runs properly as long as an 18K combined RAM disk and USER BIOS area is not exceeded. If this limit is exceeded, the program will run, but there will not be much room to accept data.

- BASIC runs properly as long as a 23K combined RAM disk plus USER BIOS is not exceeded. If the limit is exceeded, the program signals an error and will not run.

- Portable Scheduler stores your messages in USER BIOS. The program determines how much space it needs for storage as you use it, and adjusts the size of USER BIOS accordingly. That is why you can set USER BIOS to zero and forget about it. But, because of the 24K combined RAM disk and USER BIOS limit, if you set the RAM disk to 24K, Portable Scheduler will have no room to store messages and will signal an error when run.

- **Whenever the size of the RAM disk is decreased, all data on the RAM disk is lost!**

- **Any time you lower the size of USER BIOS, your Portable Scheduler messages will be erased. The next alarm will still go off, but subsequent alarms must be reset.**

- **All Scheduler messages will be erased whenever you initialize the system by using the reset hole on the side of the PX-8 and pressing the SHIFT and NUM GRPH keys.**

- **If you run a program that uses the USER BIOS area, your Portable Scheduler messages will be destroyed.**

- The number of Portable Scheduler messages you can store depends on the size of the RAM disk and the length of the messages. The following chart gives the approximate number of messages you can store with various RAM disk sizes:

Size of RAM disk	23K	22K	21K	20K
Number of 20-character messages	40	80	120	160
Number of 30-character messages (maximum length allowed)	25	50	75	100

- The following chart suggests RAM disk sizes for using some PX-8 programs.

	PORTABLE SCHEDULER		
	Heavy use	Moderate use	Not in use
with			
PORTABLE CALC	14 or 15K	16 or 17K	18K
PORTABLE WORDSTAR	20 or 21K	22 or 23K	24K
BASIC	19 or 20K	21 or 22K	23K

APPENDIX B ERROR MESSAGES

The following list shows error messages that may appear on your screen as you work in Portable Scheduler. Along with the messages, listed alphabetically here, are explanations and recommendations for appropriate action.

```
BAD DATE
PRESS ESC KEY
```

Situation. You have entered a non-existent date during System Initialization.

Action. Enter the correct date, using the program CONFIG. COM.

```
NO ROOM FOR DATA
PRESS ESC KEY
```

Situation. You have set the RAM disk size to 24, therefore leaving no space in USER BIOS for Portable Scheduler to store your messages. Scheduler will not run until you decrease the size of RAM.

Action. Set RAM to a smaller size, using CONFIG.COM.

```
***ERROR:NO ROOM TO SAVE SCHEDULE. PRESS ESC AND DELETE MESSAGE.***
```

Situation. You have entered a message that puts the unsaved portion of your schedule over the limit of memory available.

Action. Delete the last message entered. You will not be able to move the cursor to another time slot until you do so. If there are any obsolete messages, delete them, then reenter the message that caused the error.

APPENDIX C GLOSSARY OF TERMS AND CONCEPTS

BACKUP FILE — A duplicate of another file, which you create for safekeeping.

BIT — A short form of "binary digit." A bit is the smallest unit of data and has a value of 0 or 1.

BYTE — A sequence (or group) of binary bits used to represent one character of information. A byte consists of 8 bits. The PX-8 is an 8-bit computer; it processes one byte at a time.

CHARACTER — A single digit, letter, punctuation mark, space, or other symbol which the computer can read or write.

COMMAND — An instruction transmitted to your computer when you press specified keys. See **Control Commands.**

CONTROL COMMANDS — Commands issued to the computer when you press a key (or keys) while holding down the control key.

CONTROL KEY (CTRL) — A key, often represented by the caret symbol (^), used with other keys to command the computer to perform specific functions.

CP/M — The operating system used by your computer.

CURSOR — A small rectangle on the screen, marking your place in the text.

DATA — Information stored or processed by the computer.

DRIVE — A component of your computer where information is placed by the manufacturer or stored by you. Normally, drive A is the RAM disk, drives B and C are ROM, drives D-G are optional floppy disk drives, and drive H is the microcassette tape.

The *logged drive* is the drive currently in use.

ERROR MESSAGE A statement that appears on your screen when your computer is unable to continue processing. The message tells you what the problem is and how to solve it.

FILE A storage unit for information that has been entered into your computer in the form of text, data, or programs. A file is identified by a unique name.

HARDWARE The mechanical and electronic components of a computer system.

INSERT Add characters or spaces to your text.

K (SPACE ON DRIVE) The abbreviation for kilobyte (1,000 bytes). 1K is equal to 1,024 bytes (or 1,024 characters) of memory. The more bytes of memory a computer has, the more information it can store.

MENU A screen display that lists options or commands from which you can choose, just as you would select courses from a restaurant menu.

OPERATING SYSTEM A collection of programs that "runs" the computer. Using the operating system, you can tell the computer the name of the program you want to run—in this case, Portable Scheduler. The system finds Portable Scheduler and begins its operation. The operating system also determines when and how information is sent to the terminal, printer, disk drives, and other components. Your operating system is CP/M.

PROGRAM A coded set of instructions which tells a computer what to do and how to do it. By changing the code, you can alter the functioning of a program.

To program a computer means to write the coded instructions for its operation.

PROMPT A question or statement that appears on your screen, indicating that the computer is ready to process your instructions.

RAM **R**andom **A**ccess **M**emory. An area of computer memory where information can be read or written. RAM is measured in K bytes; e.g., a computer with 32K RAM has 32,768 bytes of random access memory.

ROM **R**ead **O**nly **M**emory. You cannot write in the ROM portion of your computer, only run programs stored there. Information is stored once in ROM (by the manufacturer) and cannot be changed.

ROM CAPSULE A capsule which you can insert into and remove from the computer. It contains read only memory and is used to store applications programs.

SAVE To store information in an area of the computer (floppy disk, RAM disk, USER BIOS, microcassette tape) from which it can be retrieved.

SOFTWARE Programs written to be used on a computer.

STRING A sequence of letters, numbers, or other characters.

TOGGLE SWITCH A command key that, when pressed once, turns a feature on and, pressed again, turns it off.

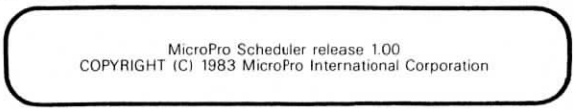
UTILITY PROGRAM A program designed to do a routine task. Utility programs help you move or examine files and check that the components of your computer system (computer, terminal, printer, disk drives, etc.) are set up properly. Utility programs are usually supplied to you with your operating system.

APPENDIX D QUICK GUIDE

The steps below will guide you through a simple path to creating and saving a schedule with Portable Scheduler.

1. Entering Portable Scheduler
   At the Menu Screen
   Select SCHEDULE.COM

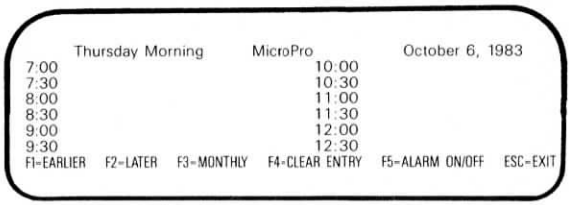
SEE



2. Selecting another Half-Day Calendar
   At the half-day calendar
   To advance, PRESS:

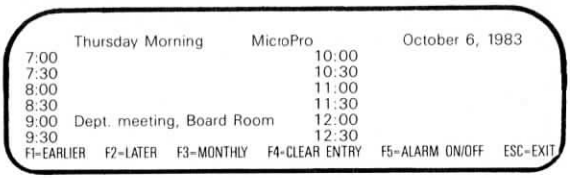
   PF2

SEE



3. Entering Messages
   At the half-day calendar
   Select time slot with arrow keys
   Type your message

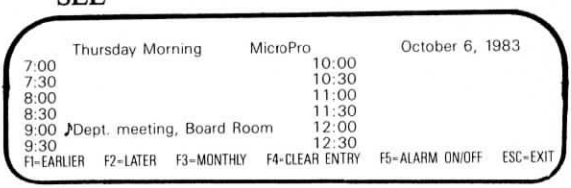
SEE



4. Setting Alarms
   At the half-day calendar
   PRESS:

   PF5

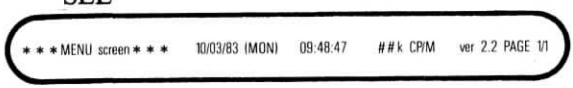
SEE



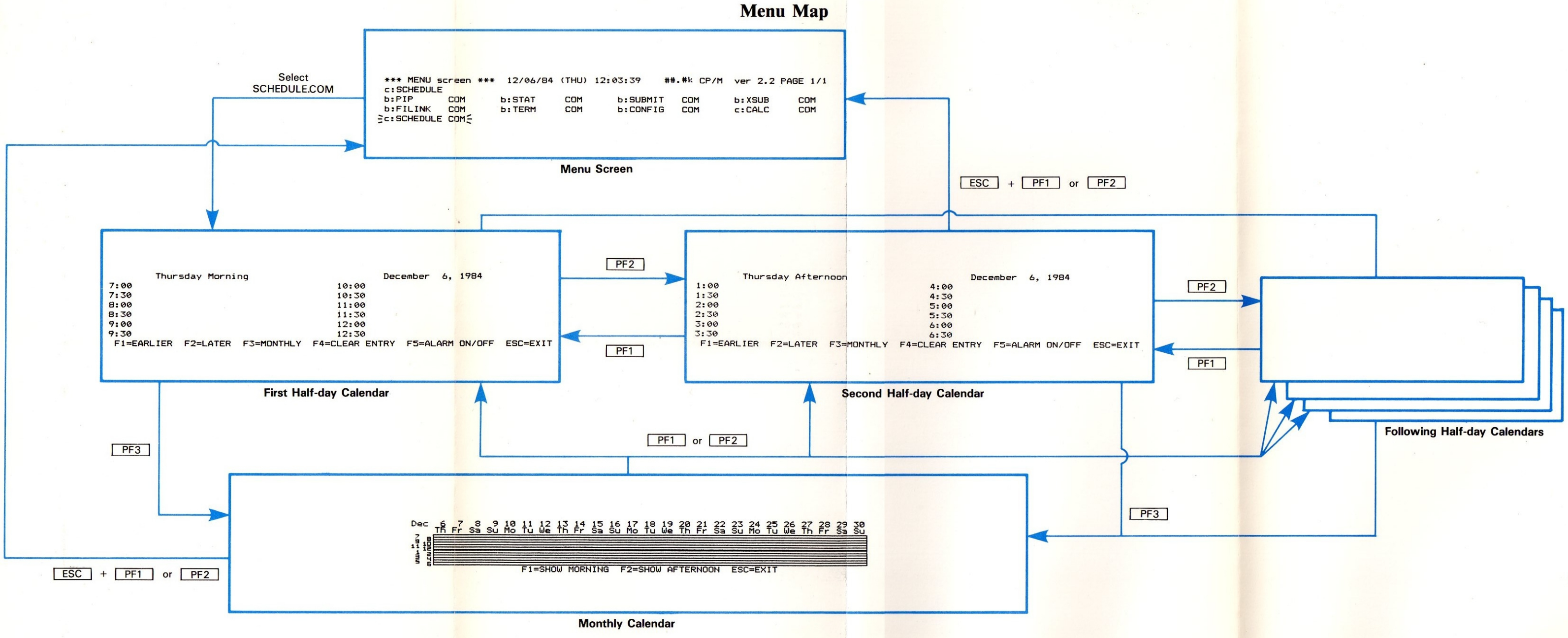
5. Saving and Exiting From Portable Scheduler
   At the half-day calendar
   PRESS:

   ESCape + PF1

SEE



Menu Map


Select
SCHEDULE.COM
*** MENU screen *** 12/06/84 (THU) 12:03:39 ##.#k CP/M ver 2.2 PAGE 1/1
c:SCHEDULE
b:PIP COM b:STAT COM b:SUBMIT COM b:XSUB COM
b:FILINK COM b:TERM COM b:CONFIG COM c:CALC COM
>c:SCHEDULE COM<
Menu Screen
ESC + PF1 or PF2
Thursday Morning December 6, 1984
7:00 10:00
7:30 10:30
8:00 11:00
8:30 11:30
9:00 12:00
9:30 12:30
F1=EARLIER F2=LATER F3=MONTHLY F4=CLEAR ENTRY F5=ALARM ON/OFF ESC=EXIT
First Half-day Calendar
PF2
PF1
Thursday Afternoon December 6, 1984
1:00 4:00
1:30 4:30
2:00 5:00
2:30 5:30
3:00 6:00
3:30 6:30
F1=EARLIER F2=LATER F3=MONTHLY F4=CLEAR ENTRY F5=ALARM ON/OFF ESC=EXIT
Second Half-day Calendar
PF2
PF1
Following Half-day Calendars
PF1 or PF2
PF3
Dec 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su
F1=SHOW MORNING F2=SHOW AFTERNOON ESC=EXIT
Monthly Calendar
PF3
ESC + PF1 or PF2

INDEX

NOTE

EPSON OVERSEAS MARKETING LOCATIONS

EPSON AMERICA, INC.
2780 Lomita Blvd.
Torrance, CA 90505 U.S.A.
Phone: (213) 539-9174
Telex: 182412

EPSON UK LTD.
Dorland House
388 High Road,
Wembley, Middlesex, HA9 6UH, U.K.
Phone: (01) 902-8892
Telex: 8814169

EPSON DEUTSCHLAND GmbH
Am Seestern 24
4000 Düsseldorf 11
F.R. Germany
Phone: (0211) 5952-0
Telex: 8584786

EPSON ELECTRONICS (SINGAPORE) PTE. LTD.
No.1 Maritime Square, #02-19
World Trade Centre
Singapore 0409
Phone: 2786071/2
Telex: 39536

EPSON ELECTRONICS TRADING LTD.
Room 411, Tsimshatsui Centre,
East Wing, 66, Mody Road
Tsimshatsui Kowloon, Hong Kong
Phone: 3-694343/4
3-7213427
3-7214331/3
Telex: 34714

EPSON ELECTRONICS TRADING LTD. TAIWAN BRANCH
1,8F K.Y. Wealthy Bldg. 206, Nanking
E. Road, Sec, 2, Taipei, Taiwan, R.O.C.
Phone: 536-4339
536-3567
Telex: 24444

EPSON FRANCE S. A.
114, Rue Marius Aufan
92300 Levallois-perret
France
Phone: (1) 758-77-00
Telex: 614169

EPSON AUSTRALIA PTY. LTD.
Unit 3, 17 Rodborough Road
Frenchs Forest, NSW 2086
Australia
Phone: (02) 452-5222
Telex: (71) 75052

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