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VIP CALC TUTORIAL

Appendices

GETTING VIP CALC UP AND RUNNING

Welcome to VIP Library and to the world of spreadsheets. You now own a very powerful calculating and financial planning tool with many useful features. With VIP Calc you can do just about anything with figures, so let's get started.

First you should be aware of the design goals of VIP Calc. VIP Calc was designed to:

* Work with any CoCo with 32 or 64K.
* Work with any printer.
* Be compatible with all VIP Library programs.

VIP Calc has the following limitations in use:

* Hi-res displays, sort, and edit are not available in 32K.
* May not be used with joysticks plugged in.

Now to get started. First, load VIP Calc from your tape or disk. VIP Calc comes in two versions, one for those with only 32K, and one for those with 64K.

To load the program from tape, turn on your system, first your TV and then your computer. Next take out your program tape, ready your cassette recorder and place the program tape in it, with the side up which contains the version which will work with your machine. Make sure that it is rewound to the beginning of the tape. Also be sure that the cable is properly connected to the computer and the tape recorder. Now, type CLOADM on your computer and press 'ENTER'. Next press the Play button on your tape recorder.

If you are using the disk version, first make sure that your disk drive is on. Next, place the program disk in the drive. If you have a 64K system type LOADM"CALC" on your computer and press 'ENTER'; if you have a 32K system, type LOADM"C32" and press 'ENTER' The drive will become active and the program will begin to load.

When loading from either tape or disk, a billboard will appear, and then the screen of Calc, with a blinking cursor after the word Command. Now take your tape out of the recorder or the disk out of the drive and place it away for safe keeping.

You are almost ready to begin to learn how to use VIP Calc with this tutorial. First, if you are using the disk version, be sure to backup your VIP Calc onto another disk using the Backup command from BASIC. This will assure that you will have the original should something happen to the one you use all the time. Those using tape should know that the it contains two copies of the program.

Ultra-Fast Data Entry

With either version, you will usually wish to begin entering data right away. VIP Calc is initially set to recalculate the entire worksheet after each entry. This allows automatic determination of results from mathematical entries. However, this is time consuming, and becomes bothersome when all you want to do is enter data quickly into your worksheet. We recommend that you instead elect manual recalculation, which allows data entry with recalculation only when you want it. This is much, much faster. To select manual recalculation, press 'CLEAR' 'G' for the Global command, then 'R' for the recalculation option, and then 'M' for manual. To force a recalculation while in the manual recalculation mode, press '!'.

ABOUT THIS MANUAL

Because of the early dominance by Visicalc(tm) in the spreadsheet market, the command structure and terminology of Visicalc has become a de facto standard in the industry. VIP Calc was therefore designed with this industry standard in mind, yet tailored to the particular constraints of your computer and the compatibility requirements of VIP Library. Given the Visicalc-established industry standards, many good books have been written explaining how to use spreadsheets and providing sample templates for a variety of home and business uses. Since spreadsheets are all essentially based on the same notions, the principles and templates set out in these works may easily be applied to almost all spreadsheet programs.

This great variety of books has made manual writing for spreadsheets much simpler. Since the user can easily find these books in the library or in bookstores, and since these books are carefully written with the novice in mind, there is little need for us to reproduce that wealth of information here. Moreover, the user can refer to these works when problems arise, cutting down on long distance calls and anxiety. Several books may be of particular interest. For your information a short bibliography is provided in Appendix A. This wealth of books will help you a lot if you have question.

In writing this manual, we have assumed that the user will have access to such works and will seek them out when a question arises. This manual will be devoted to a tutorial to introduce the user to our particular command structure and the basics of spreadsheet construction, and a discussion of how each of the commands functions. For actual spreadsheet template creation methodology and examples we hope the user will refer to the outstanding reference works available.

Of course, a discussion of where VIP Calc differs from the industry standards is contained in Appendix B for ease in adapting the examples in the reference works to this program.

The user should be aware that spreadsheets tend to be as individualized as letters or writing styles. Just as we cannot teach you how to write, we also cannot teach you how to construct you particular spreadsheet. We can only hope to teach you how to use each of the commands in this program so that you can easily maneuver about the spreadsheet and use all of its power. Exactly how you will use this power remains your task. The reference works with samples and templates should be your source of information. No telephone conversation will allow us to see your monitor screen to comprehend your spreadsheet design. Therefore, we must ask that when you call us you confine your questions to the exact workings of the program, and not ask how best to create this or that spreadsheet.

The first part of this manual will lead you through a few exercises to get you familiar with moving about your worksheet and with the basics of data entry. From there all of the commands will be illustrated. Once you are familiar with the structure of the program and how it is used, the remaining features will be discussed with some examples for you to put to use.

Conventions Used in This Manual

Keyboard notation is as follows: 'CLEAR' indicates pressing the clear key. 'SHIFT"A' indicates holding the SHIFT key while pressing the A key. 'CLEAR'-'A' indicates pressing the clear key and then pressing the A key. "Clear" and 'C-l-e-a-r' indicate pressing the keys C-L-E-A-R.

O V E R V I E W

INTRODUCTION TO SPREADSHEETS

Electronic spreadsheets are one of the most popular programs for personal computers. Nary a person exists who does not have the need to make calculations, be they for taxes, a home budget, check book ledger, financial plans, mathematics problems, or hundreds of other uses. Prior to easy access to computers we all had to depend on pencil and eraser to draw up our budgets. If we wanted to change some assumption, such as our monthly heating costs or medical expenses, we would have to erase all the figures dependent on those figures and recalculate. Drawing up budgets or financial plans was a burden, being both time comsuming and messy.

Electronic spreadsheets were designed to eliminate the hassle associated with financial planning. Spreadsheets allow the creation of your worksheet right on the screen, with labels for all your entries. But most important, you can enter formulas to allow you to manipulate data from anywhere on your worksheet. All you need do is specify that such and such a number should be added, subtracted, or whatever, to some other number. Now, if you change numbers which are basic assumptions in your financial plan, such as the number of car payments, or the number of employees, the program will automatically recalculate your worksheet to include your new assumption. This is POWER! You can change any number, and instantly see the results of the change. All those "What if?" questions you have always wanted to ask can now be quickly and accurately answered.

Once you have created a satisfactory worksheet, you can print it, save it, and recall it at any time for re-use when you get new figures. Your worksheet becomes your template.

AN OVERVIEW OF VIP CALC

Try to keep in mind when you are using this program that the object is to create a worksheet. You should picture a worksheet with a potential of 512 columns across and 1024 rows down. Its exact size and shape for you will depend on your needs and the amount of work area available with your computer.

Although a 25 by 40 worksheet may be common, the screen display of the worksheet is limited, depending on the display mode, from a 3 column by 12 row display up to a 9 column by 20 row display. It is obvious that you will not be able to see all of your worksheet on the screen at once; you only see your worksheet through a "window". In fact, even with the densest display, you will only be able to see about one-fourth of a normal worksheet.

This limitation is unavoidable with current technology. Therefore, much of the program must be devoted to allowing you to easily access any part of your worksheet, and easily compare different parts of your worksheet at the same time on the screen. Easy access is made possible with "scrolling" commands so you can move across columns and up and down rows. There also is a GOTO command which allows you to specify any coordinate for inspection. Comparison of parts of your worksheet is controlled by the availability of sixteen independently scrollable Windows. With these Windows you can split your screen into up to sixteen windows on separate parts of your worksheet just as the usual display is merely a window on your whole worksheet. Each of these windows is like a separate little screen in which you can move through the columns and rows.

You will be entering three different types of information on the worksheet, labels, values and

formulas. Labels usually surround your worksheet on the top and left sides. They can be used to tell you what, in general, will fill each column and row. They are also used to comment your worksheet. Values are the raw numerical data which will be worked on. Formulas are instructions on how to treat data from other positions, such as add the number from cell X to the number from cell Y and put it in this cell.

Entry of these three types of information is the focus of many of the commands in the program. Another focus of the commands is to control how to view the numbers displayed, for example you may only wish to have two digits displayed after the decimal point.

Of course, you will also wish to print your worksheet for inspection and perhaps for your paper records or maybe even for inclusion in a report. You will also wish to store your worksheets for future use. Several options are provided for printing and saving your worksheet.

This is the basic structure of VIP Calc. Of course there is much, much more, but to get started this information should be sufficient.

V I P C A L C T U T O R I A L

Lesson One: GETTING STARTED

After the program has executed, you will be on the Command line so that you can access your tape or disk files. Since you have not yet saved any worksheets, just press 'BREAK', the universal abort command, and the system will place you in the worksheet. Before beginning to learn how to get about the spreadsheet, the first tasks you must consider are choosing your screen display size and the display color. These topics are discussed in the following sections.

- The Screen Display Modes

Those of you using the 64K version are in the 51 by 21 display mode, i.e., there are 51 characters per line, with 21 lines per screen. The 51 by 21 screen display is only one of many display options available with VIP Calc. In the 64K version you may choose between a 32 by 16 low resolution screen and eight high resolution screens: 51, 64 and 85 by 21 or 24, and a choice of a narrow or wide character set in the 64 display. The default is the 51 by 21 display in the 64K version and the 32 by 16 display in the 32K version.

Your choice of display will depend on the nature of your monitor, your visual acuity, and your preferences. We do not guarantee that all displays will work equally well on all TV's. No TV is ideal for hi-res displays because of the limitations inherent in TV's. Moreover, some TV's are better than others, allowing a crisp display of the characters in all displays; some will only allow a readable display in the 32 by 16 display. For your convenience we have included in Appendix F, "What If

Your TV is Fuzzy?", a discussion of the limitations of the color TV.

The 32 by 16 display is the colorful display, making full use of the color potential of your computer. It does not, however, feature true lowercase characters. Its lowercase characters are displayed just as they are in BASIC: light uppercase characters on a dark background. Numbers, symbols and punctuation will also be displayed in this way. The border is black. Only uppercase characters, control characters and markers will be light. The LCA-47 Lowercase Adapter, sold by Micro Technical Products, Inc., Mesa, Arizona, will give you true lowercase with the 32 by 16 display.

The hi-res displays all have true lowercase characters with descenders. You may choose between 51, 64, or 85 by 21 or 24 displays at any time. You may choose between two background colors in the hi-res mode: green and white. The display may also be inverted.

The 32 by 16 display may be selected by those with computers with more memory. This mode does not require computing power to create the screen, and thus all commands and functions are considerably faster in the 32 by 16 display. Some may choose this display for that reason alone. Moreover, in the 64K version the hi-res mode consumes around 8K bytes of the memory, so this should be a consideration when deciding which mode to use. When you have reached the limits of work space using the hi-res displays you may "dump" the hi-res displays to give you the additional memory consumed by the hi-res displays. Of course you will be limited to the 32 display and will lose the hi-res displays.

In the 64K version the system starts with the 51 by 21 hi-res mode. You may at any time move between the displays. To do so press 'CLEAR' twice to enter

the Command mode and then either 32, 51, 64, 85, 21 or 24 to obtain the display desired. For the 64 display the default is the wide character set. To obtain the narrow character set you must press "64N" from the Command Mode. You may freely go between these hi-res modes at any time.

- Changing the Display Color

When in the 32 display you may change the display color from green to orange; in the hi-res mode you may change the background color from green to white or black. To do so first press 'CLEAR' twice to enter the Command mode. Then press 'C'-'ENTER' to toggle between green and white (or orange). In the hi-res displays you may also press 'I'-'ENTER' to invert the display, changing the background to black and the letters to green instead of black. Pressing 'C'-'ENTER' would change the letters to white on a black background. In the 32 display, the display color option, along with the tint control on your color television set, give you a wide selection of video display colors to suit your mood.

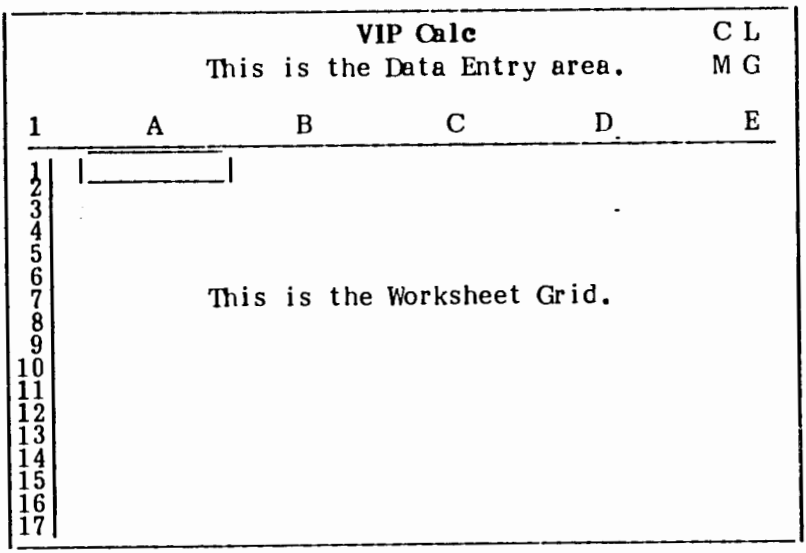
Now you are ready for an explanation of the layout on the screen.

— The Screen Layout

The screen layout of VIP Calc is divided into two distinct parts, the data entry portion and the worksheet. The top three lines are the data entry portion; the section with the numbers and letters is the worksheet grid. Let's talk about the worksheet portion first.

You will see bars running horizontally and vertically. The horizontal bar has letters on it. The vertical bar has numbers. These bars represent

the top and left side of your worksheet. The horizontal bar also labels the columns, column A and so on to column Z, then AA to AZ, and so on to the end, initially BK, or 63 columns. The vertical bar gives the row numbers, initially from 1 to 255. These numbers and letters form coordinates for individual cells in the worksheet grid.



The worksheet can be defined by you to be any size up to 512 columns by 1024 rows. When you have defined over 1000 rows, the rows over 1000 will be

indicated by "M", the standard symbol for 1000, plus the number. The maximum size of your worksheet is determined by your needs and by the amount of memory you have available. You worksheet size is controlled by the Matrix command discussed below in the discussion of Memory Management, and in the Command summary.

A worksheet can obviously be quite huge, going off the screen many times over to the right and on the bottom. In fact, the screen is like a gliding window, displaying just a small portion of your worksheet. You can move your "window" anywhere on the worksheet but you cannot see anything larger than what fits in your screen. Of course, your "window" size varies with your display. The window is quite small in the 32 display, allowing only 3 columns by 12 rows to be visible at one time; yet in the 85 display you can see five times more cells, up to 9 columns by 20 rows. Still, until you print your worksheet you will only be able to see the view through your window. You will later learn of the ability to split the screen to put many separate parts of your worksheet on the screen at one time to help see more of your worksheet.

You've seen that the worksheet is a grid of cells. OK, so what is a cell? Well, a cell is distinct area for data display. Originally each cell is nine characters wide, so up to nine characters will be displayed in each cell. Methods to enlarge or shrink the cells are discussed below. It must be emphasized that what is displayed does not limit what is stored for that cell; each cell may represent nine (even up to 81) characters of a string up to 255 characters long.

As you can see, the cells are located at coordinates of the grid, for example, A1, C3 or Z200. Let's look at cell A1 above. Already there is something there, a block. Obviously that is not

data, it is the cursor. The cursor is an indicator of where you are and the location from which actions will take place. The cursor is preset to be a block. By pressing 'SHIFT'-'CLEAR' you may toggle to a blinking cursor or to no cursor at all, whatever suits your needs.

You can move the cursor with the arrow keys. When at a boundary, movement of the cursor causes movement (scrolling) of the screen. Try it. Press the 'RIGHT ARROW' and hold it for a while. The cursor has moved to the right of the screen, and then you can see column A disappear on the left and a new column I appears on the right, and so on as the columns go off on the left and come on the right.

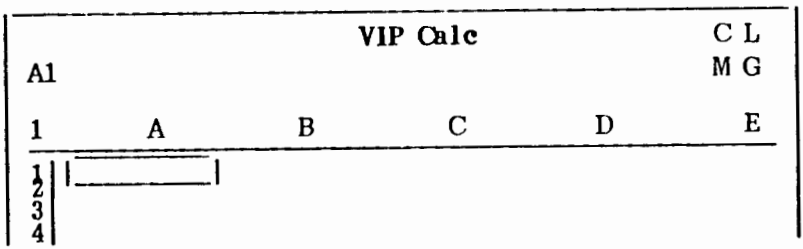
In fact, a whole family of arrow key commands allows you to move virtually anywhere on the worksheet with ease. And since the hi-res displays are somewhat slower to react to single cell movements, you will quickly learn to depend on the arrow commands which provide for greater and quicker movement. The following commands move the cursor:

'LEFT ARROW'	Cursor to the Left
'RIGHT ARROW'	Cursor to the Right
'UP ARROW'	Cursor Up
'DOWN ARROW'	Cursor Down
'SHIFT' 'LEFT ARROW'	Screen Left
'SHIFT' 'RIGHT ARROW'	Screen Right
'SHIFT' 'UP ARROW'	Screen Top
'SHIFT' 'DOWN ARROW'	Screen Bottom
'CLEAR' 'LEFT ARROW'	Page Left
'CLEAR' 'RIGHT ARROW'	Page Right
'CLEAR' 'UP ARROW'	Page Up
'CLEAR' 'DOWN ARROW'	Page Down
'CLEAR'-'SHIFT' 'LEFT ARROW'	Left of Worksheet
'CLEAR'-'SHIFT' 'RIGHT ARROW'	Right of Worksheet
'CLEAR'-'SHIFT' 'UP ARROW'	First Cell of Worksheet
'CLEAR'-'SHIFT' 'DOWN ARROW'	Last Cell of Worksheet

Try each of these cursor commands to see how it works. You will notice that the paging commands move you in increments of the screen size minus one column or row. This lets you keep track of where you are.

— The Data Entry Section

Now's a good time to introduce the data entry area at the top of the worksheet. The top line is the Command line; the second line is the Status line; the third line is the Entry line.



The Command line serves to prompt you about the commands and sub commands available, the name of the command you are currently using, to prompt you when you must perform some task in a command, and to inform you of errors. The Command line also is a command entry line for Command mode commands such as saving and loading files, changing screen displays, and dumping the hi-res displays for extra memory.

The second line is the Status line. It provides the status of the cell where the cursor lies. At the far left is given the coordinate of the cell in which the cursor is located. If any formula, label or number were in the cell, the Status line would show the full entry, or as much as fits on the line, not truncated for worksheet display purposes.

The third line is the Entry line. On this line you enter your label, number or formula in full. When you have finished entry the contents of your entry are stored in memory and it is displayed in the cell up to the limits of the cell size.

On the right are four "flags": a "C" an "L", an "M" and a "G". The "L" indicates that lowercase may be used. To shift to uppercase only, press 'SHIFT"0' just as with BASIC. This will change the "L" to a "U". The "C" flag tells you the calculation order. VIP Calc starts up calculating down columns. You can change the calculation sequence so that calculation is instead done across rows. See the Global command in the Command summary later in this manual. The "M" indicates that the system will ignore whether letters are uppercase or lowercase when doing a locate (see the Locate command in the Command Summary). The "G" flag indicates that the overall worksheet format is "General". Formatting will be discussed later in this tutorial.

— Memory Management

Full featured electronic spreadsheets, as you will soon learn, are extremely memory intensive. It doesn't take long at all to fill up your memory, even if you have a 64K computer! Powerful spreadsheets for other computers, such as Visicalc and Multiplan, require at least 48, and even 64K of memory as a minimum to run their programs. VIP Calc, which meets and surpasses other spreadsheets in features, also works best when you have a lot of memory.

To help conserve memory, VIP Calc has a Matrix command to limit the size of the worksheet to the size which you actually need. Most worksheets can fit withing definite size constraints, using mostly rows or mostly columns. To best use the Matrix command you have to understand how memory is used in VIP Calc.

Memory is column oriented. If you enter any type of data anywhere in the worksheet, all cells in columns prior to that cell must be allocated three bytes of data for overhead. VIP Calc starts with a worksheet size of 255 rows by 63 columns. If you put data in cell C1, automatically every cell in columns A and B are allocated. Already you have consumed 255 (rows) times two (columns) times three (overhead per cell) bytes, for a total of 1530 bytes, and all you have done is put in one cell of data!

As you can see, if you do not need that many rows, you could reduce the memory consumption considerably. For example, if you set the system to only use ten rows, when you put data in cell C1, you would only have consumed ten rows times two columns times three bytes, for a total of 60 bytes. Quite a difference!

VIP Calc has the Matrix command to so limit your worksheet size. To use it, press 'CLEAR' twice to enter the command mode, type "MATRIX" and then the coordinate of the cell to be the lower right-hand corner of your worksheet.

Because of the lower amount of memory allowed with 32K machines, 32K version users will have to limit the matrix size to N14 when using the sample in this tutorial by entering "MATRIXN14" from the command line. You should do this right now, before going on to Lesson Two.

As an additional help for 64K users in need of more memory, VIP Calc offers a Dump command to allow you to dump the hi-res displays. This will give you an additional 8K or so of memory which you may use when you receive the "Not enough memory" message when entering data. The Dump command is discussed in the Command mode summary later in this manual.

Lesson Two: LABELS AND VALUES

Introduction

The best way to get to know how to use VIP Calc is to go through some examples. These will help you become familiar with the mechanics of the program. Once you are familiar with the commands and capabilities of the program you can begin to use its sophisticated features to tailor spreadsheets for your individual needs.

First a few words about commands in VIP Calc. This program is not the first spreadsheet on the market. In fact several other good spreadsheets exist for other computers. These spreadsheets have created industry standards for command structures in spreadsheets. VIP Calc conforms with these industry standards so that those of you familiar with other programs will have no trouble becoming accustomed to our program, and so that if you ever have a need to use these other programs the switch will be easy. Of course, VIP Calc offers many features not available with other spreadsheets, so those of you who learned on other systems will have to learn some new things. (See Appendix B for a discussion of the differences between VIP Calc and Visicalc (tm).) We have strived to make the move as comfortable as possible.

Commands are comprised of a combination of 'CLEAR', the character which tells the system that what follows is a command, and letters of the alphabet. Some commands are simple and do not provide options; others, however, elicit several options from which you may choose. This is the purpose of the Command line. If you initiate a single function command, that command will be executed. If you initiate a complicated command which offers several options when you have pressed

'CLEAR' plus the letter of the command, abbreviations of the options will appear on the command line to prompt you of your choices. When you select the next letter you may still be confronted with further choices. You'll quickly get used to this mini-menu system, you'll even learn to like it.

The Basics of Entering Data

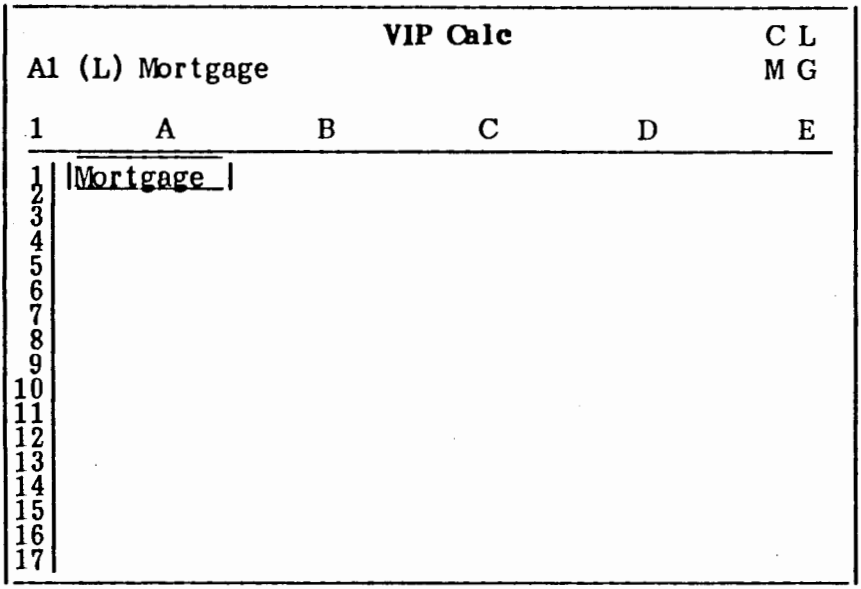
A simple example will help you get started making a worksheet. (By now you should be good and bored with introductory blah.) Let's get to work.

When creating your worksheet there are essentially three types of information you will be supplying. One category is the names and titles you will be giving your columns and rows of figures. This category is called "Labels". Another category consists of the numbers you will be working with, such as house payment amounts, etc. This category is titled "Values." The third category is the formulas you will use to combine the numbers you have supplied, such as adding certain numbers, taking the sum of others, averaging others, and so on. This category is naturally entitled "Formulas", and is subsumed under the rubric "Values". Each category has its own special input rules. This is so that the program can be sure which one you intend.

- Labels

Let's begin to give some shape to your worksheet. With the cursor in cell A1 type the following: Mortgage. You will see on the Entry line the word "Mortgage". Nothing will yet be on your worksheet. Instead, you are still preparing your entry. Until you press 'ENTER' or any arrow key to "set" your

entry into your worksheet, you may press 'BREAK' (the universal abort command) to cancel your entry, or you may backspace by pressing 'SHIFT"@' to change your entry. Let's press 'ENTER' to set the entry. Now the worksheet will look like:



The word "Mortgage" on the Entry line has now been moved both to cell A1 and to the Status line. The Status line now tells the current cursor position, A1, the nature of the entry, here a (L)abel, and then the contents of the cell, here the word "Mortgage". The Status line will always tell the contents of the cell where the cursor is, giving this information.

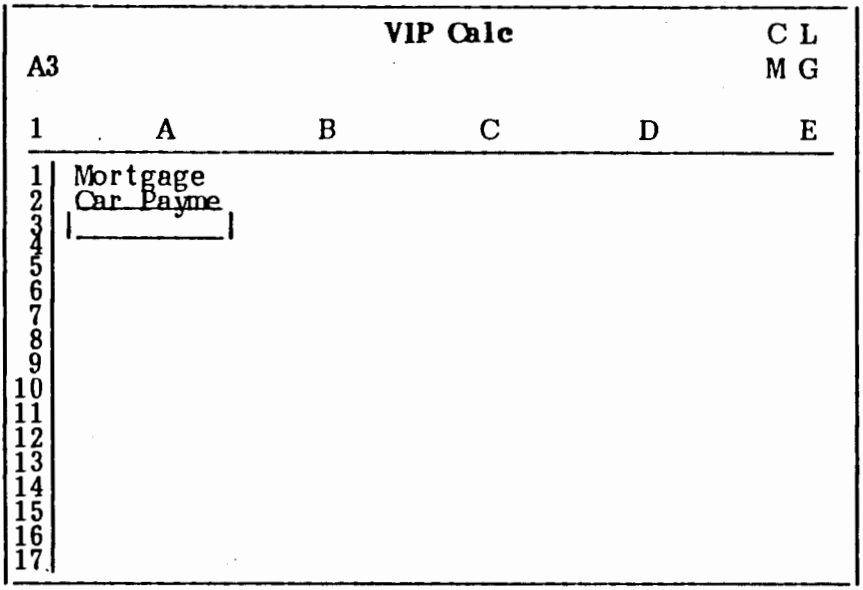
Now let's move the cursor to cell A2 by pressing the down arrow once. Did you hold the 'DOWN ARROW' key down too long? You heard the key beep sound more than once? You were listening to the type-ahead feature. VIP Calc has a type-ahead buffer which will hold up to 256 keystrokes. If you input text faster than the screen can react, your keystrokes will go into the type-ahead buffer, and when the system has caught up it will continue to perform according to the keystrokes in the type-ahead buffer. For example, if you held the 'DOWN ARROW' key for a while, you would hear several thumps as the system registered each entry of a 'DOWN ARROW' key. After you have let up on the key the cursor will continue to move down until the type-ahead buffer has been exhausted. You can stop the "dump" of the type-ahead buffer at any time by pressing 'BREAK'.

You will find type-ahead a very powerful tool at times. It works with regular keystrokes and command keystrokes. You will learn to take great advantage of type-ahead as you get more experienced.

The "thumps" you heard are called key beep. If you don't like the thuds, you can turn them off by pressing 'CLEAR' twice to enter the command mode, then typing "BEEP" and then 'ENTER'. Do it again and the thuds will return.

Now where were we? Yes. Get that cursor back to cell A2. The Status line should only contain the

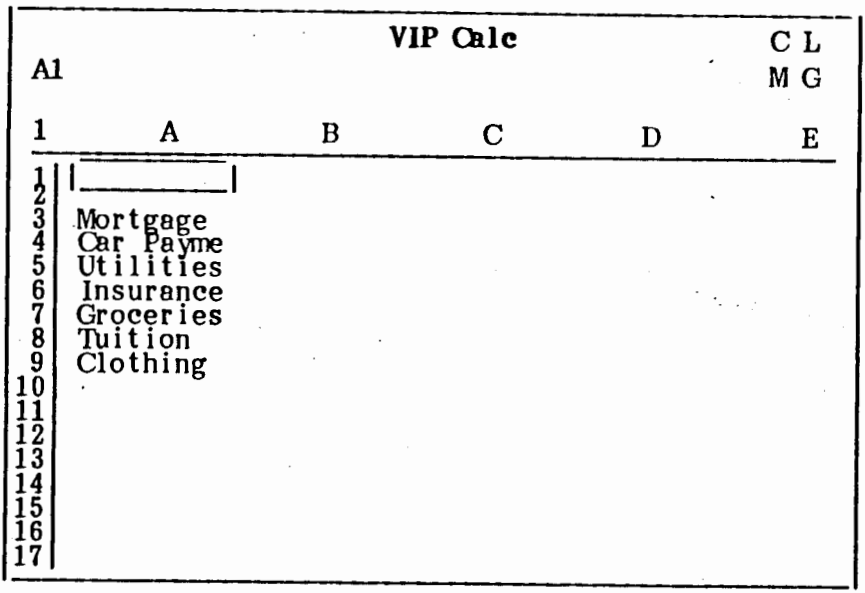
prompt "A2" and the Entry line is blank. Type: Car Payments. The Entry line will now have the phrase "Car Payments". Now press 'DOWN ARROW' once. What happened? Your worksheet should look like:



First note that the cursor is not on cell A2, but on cell A3. This is because to set the entry in the worksheet you pressed the 'DOWN ARROW' instead of 'ENTER'. When you press an arrow key to set an entry, the entry is set, and the cursor moves to the next cell in the direction of the arrow key you pressed. In this case the cursor moved down to cell A3.

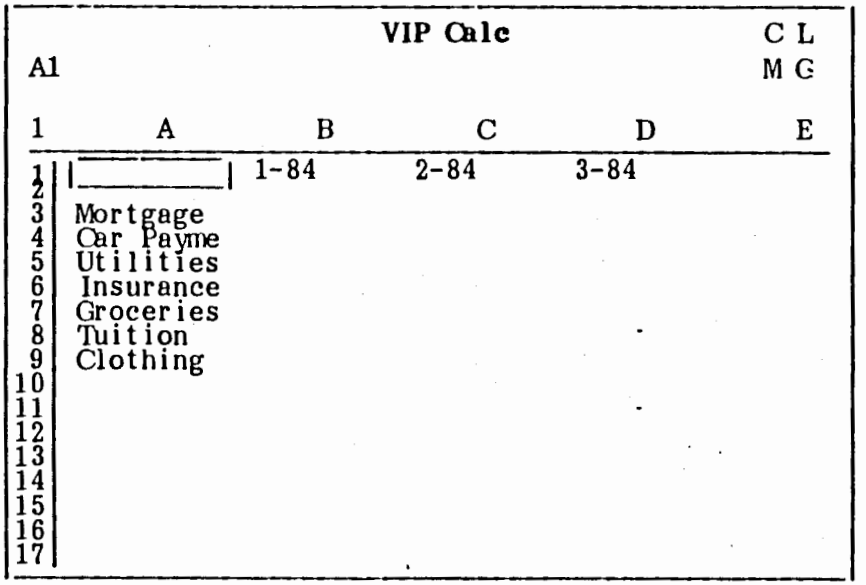
What happened to your phrase in cell A2? Nothing happened to it; it is still there. You'll remember that each cell is only nine characters wide to start. What you see in cell A2 are the first nine characters of your phrase. Move the cursor back to cell A2. Now on the Status line is your whole phrase "Car Payments". Your entry has been entirely stored, but the display is limited by the cell size. You can have an entry of up to 255 characters long for each cell. Although it will not all be displayed, it will saved with the file and can be used for a detailed commentary to your worksheet. Later you'll learn how to expand your cells to accommodate up to 81 characters.

Let's fill up a few more rows in column A to get a simple household budget. For convenience we'll start the budget at row three instead of row 1. First clear your worksheet by pressing 'CLEAR' twice and typing "Clear" and pressing 'ENTER'. Press 'BREAK' and you have a clean worksheet. Now fill in your worksheet:



That takes care of the budget items. But what of the time period for calculating the budget. We'll calculate a budget for a year, putting the months across the top row. In cell B1 type: "1-84, and in the next eleven cells continue with the months. You will note that the number sequence was preceded by a quotation mark. This is because you are entering a Label for a column, the month and year. You do not want the numbers to represent a Value (if it did it would be a negative 83, i.e., 1 minus 84). Anytime you wish to enter a number as a label it must be preceded by a quotation mark The Status line will

then indicate that you are entering a (L)abel.
After you have move the cursor back to the beginning of the file your worksheet should look like this:



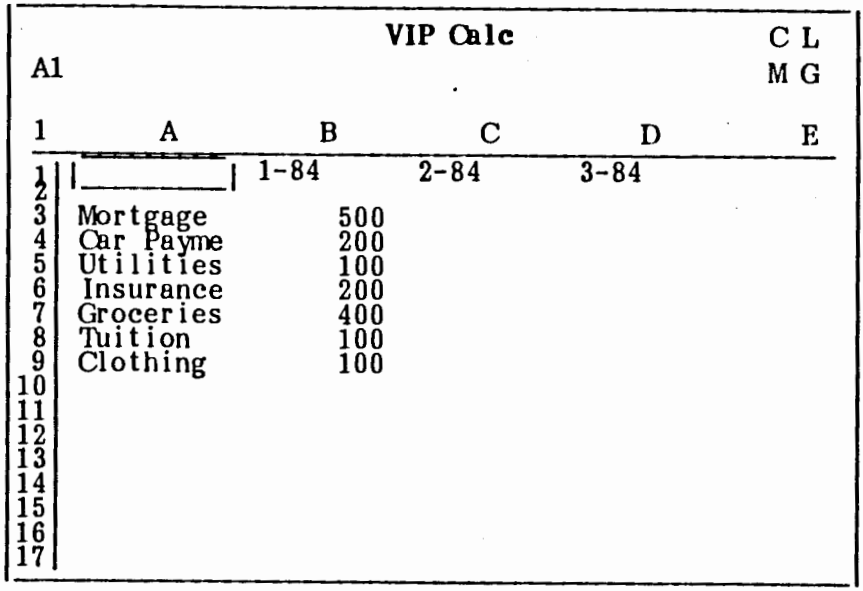
Of course, not all months can fit on the screen at once. You can use the 'RIGHT ARROW' to scroll the remaining months onto the screen.

Notice that all labels are flush to the left of the cell. Later on you will learn how to change that and other formats to fit your needs.

- Values

It's now time to get an idea of what our budget is by putting some numbers in the worksheet. As we have seen, numbers can be used as Labels. Usually, however, numbers are being used for their mathematical Values for calculations. Thus, whenever you enter a number not preceded by a quotation mark the system presumes that you are entering a Value. The Status line shows a (V) and the Entry line displays the Value you are entering. Otherwise, Values are entered much like Labels: by entering the data and pressing 'ENTER'. However, unlike Labels, you cannot finish entry of Values by pressing one of the arrow keys.

Let's put some figures in the worksheet for the first month:



As you see, contrary to Labels, numbers are automatically flushed to the right. This is done so that as numbers get bigger, they can extend further to the left in the column, as is the custom. The placement of the number and other format considerations will be discussed later.

Now you have the beginnings of a simple home budget. In the next lesson we will learn more about making the budget work for us, and how to make it attractive.

Lesson Three: FORMULAS, FORMATS AND REPLICATION

— Formulas

We now have a simple home budget for one month, January 1984. Like other home and business calculations, the home budget is not so simple. If we were to just assume that our expenses would remain the same for each month during the whole year, the final calculation and all intermediate steps would be simple and hardly worth worrying about. Unfortunately, inflation changes our monthly expense totals. We therefore will want to adjust our monthly budget needs to reflect expense increases due to inflation. For our example we will assume a modest inflation rate of 6% per year. Now to use the power of VIP Calc.

Normally you would calculate the monthly inflation rate from the yearly rate, multiply the previous month's expense by the monthly inflation rate and enter the new number in the next month's column. This is a tedious way to calculate a budget. You would have to do this calculation for each expense, and for each month.

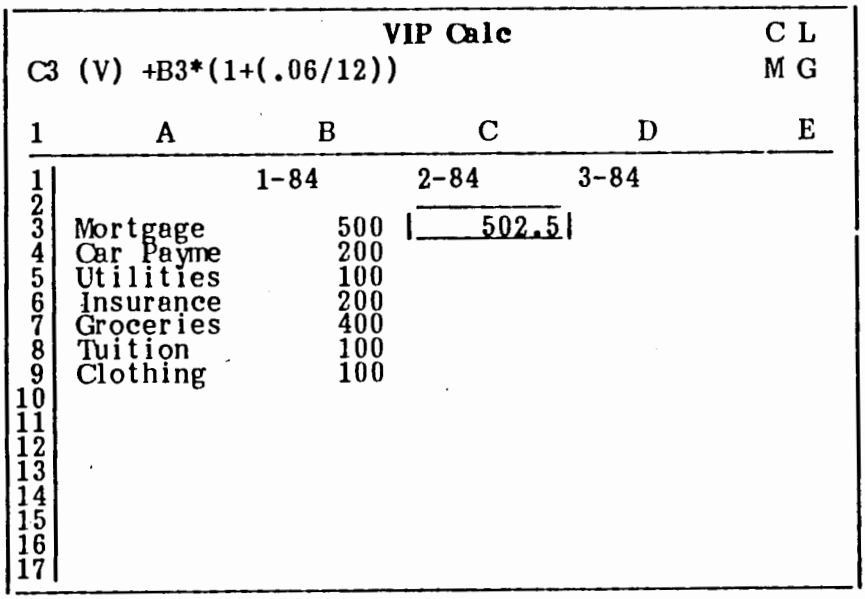
The spreadsheet has taken the tedium out of such calculations. It allows you to enter formulas so that the spreadsheet will do the calculations for you. What's more, you can "replicate" the formulas so that you do not have to enter the same formula over and over again. More on replication later.

Formulas take a variety of shapes, but the concept is simple. The aim is to generate a numeric result in a cell by creating a formula for that cell which performs, on one or more other cells, mathematical operations such as addition, subtraction, multiplication, division, or other more sophisticated functions. You add the contents of

one cell to those of another, multiply a cell by a constant, or any of a myriad other mathematical operations and show the result in the cell containing the formula. The mathematical functions which can be used range from simple arithmetic through built-in complex functions such as that for calculating the sum of a series of numbers. (These latter functions are discussed separately in a chapter devoted to Functions.)

In our budget example, we could continue to put newly calculated amounts in the columns for the months of February, March, etc. Instead, let's let the system calculate the ensuing monthly amounts for us based on a formula, beginning with February. In cell C3 enter: +B3*(1+(.06/12))'ENTER'. .

The "+" sign tells the system that the letter that follows is not a Label, but part of a formula. A straight letter will always be a Label, so the "+" sign is used as an indicator. After the "+" sign is a formula telling the system to multiply the amount in cell B3 by 1.005 and place it in cell C3. The figure 1.005 is derived as the factor to reflect an interest rate of 6% over a twelve month period. Once you press enter you will see:



The cursor still resides in cell C3. The Status line indicates this cursor location, and it tells that cell C3 contains a formula. You will note, however, that the display at cell C3 is not of the formula, but of a number, in fact it is a display of the number obtained from the calculation using the formula.

This is precisely how VIP Calc is supposed to work. Any time you have entered a formula in a cell location, the display will be of the result of the

calculation. However, when you position the cursor at the cell, the Status line will show the formula which underlies the cell. Now, if you alter the formula, the number displayed will instantly reflect the change. You can try this by changing the formula in any way.

As of yet the formula has not been explained, and it needs to be. An industry standard for formula calculations has arisen which is slightly different than the norm for mathematical calculations. In spreadsheets, all calculations are normally done from left to right, irrespective of mathematical function. Thus the formula 1 + 2 / 3 does not equal one and two-thirds, but 1 (1+2 divided by 3). If you want some portions of a formula to be performed before some other calculation, you either have to place them in the correct order, or you must include the precedent calculation within parentheses. This is clearly illustrated in the calculation underlying cell C3: +B3*(1+(.06/12)).

The first element is +B3, which has already been explained. This is multiplied (*) by the next element. This element is itself comprised of two elements, 1 plus the result of .06 divided by (/) 12. The double sets of parentheses are necessary to assure that the calculations are done in the right order. If there were no parentheses, the formula would look like: +B3*1+.06/12. Instead of having +B3 multiplied by 1.005, you would get B3 times 1, plus .06 divided by 12, a significantly different result. You must therefore be mindful to carefully frame your formulas.

A special kind of formula, system supplied functions, are discussed at the end of this chapter.

-- Calculation Sequencing

Calculations and recalculations are performed automatically by VIP Calc, initially down column A, then column B, and so on down the columns. You can control all aspects of this calculation sequence.

The system is set up to automatically do recalculations after each entry. Recalculation after each entry is time consuming, since it takes time for the system to recalculate sixteen digit precision. At times you may wish to turn off automatic calculation. This is especially true when you are setting up a worksheet from a template from some book. You want quick entry without having to wait for recalculation after each entry. Switching to manual recalculation is governed by the Global command discussed in the Command summary later in this manual. Recalculation is forced by pressing '!'.

You might also wish, for some reason, to have calculations first performed along rows rather than down columns. This may be because of a special way you have created your formulas. It may be necessary to calculate along rows first to avoid circular or forward references which cannot be resolved. Change of the re-evaluation order is also governed by the Global command.

There may also be times when you wish to force a recalculation. This can happen when a particularly intricate formula will not yield accurate results the first time through recalculation. This is usually caused by using the inappropriate re-evaluation order. Manual forced recalculation is also required when you have turned off automatic recalculation. To force recalculation at any time, press '!'.

What should have become apparent is that it is possible to create a worksheet which will not give accurate results. This can be done in many ways, the two most common of which are circular references and forward references. Circular references are formulas which refer to each other. Neither can be properly resolved since neither depends upon an independent value. Forward references are formulas which refer to cells further on in the evaluation order. A problem arises since the source cell is evaluated prior to the cell referred to, thus potentially leading to inaccurate results when the value of the cell referred to changes. These and other problems which can arise when creating worksheets are discussed thoroughly in works devoted to electronic spreadsheets, with many hints to successful worksheet creation. We refer you to those works listed in Appendix A.

Now that we have our basic formula to increase each of the budget items adjusted for monthly inflation, we can go ahead and fill the formula into each cell, changing the cell reference as appropriate. Of course, this can get tedious. Thus, there is a command which will make this task easy. It is called the Replicate command.

— Commands in VIP Calc

So far you have learned of data entry. Data entry is the primary task in creating a worksheet. Proper and convenient entry and comparison is aided by several commands which let you change the format of the display, let you insert or delete columns, rows and cells, let you juxtapose different parts of the worksheet, let you save, load and print worksheets and let you perform other important tasks. Commands can be divided into three types. The first is cursor control commands. These are the arrow keys described above. The second set of commands are the Menu commands. The final set of commands are the Command Mode commands.

Menu commands are initiated by pressing 'CLEAR' once. Upon pressing 'CLEAR' a menu of commands appears on the Command line from which you may choose the appropriate command. Menu commands are the frequently used commands for actually creating and manipulating parts of your worksheet. Many of the Menu commands themselves have sub-commands which also appear on the Command line once the command is initiated. Prior to execution all commands may be broken out of by pressing 'BREAK'.

Command mode commands, instead of specifically affecting the contents of your worksheet, generally have to do with the screen display, saving, loading and printing files and controlling the buffer. These commands require more for execution than the selection of a letter. Instead the user must enter a word or phrase. Command mode commands are initiated by pressing 'CLEAR' twice. Pressing 'CLEAR' twice brings up the prompt "Command:" on the Command line followed by an edit cursor. 'BREAK' will also break you out of Command mode commands.

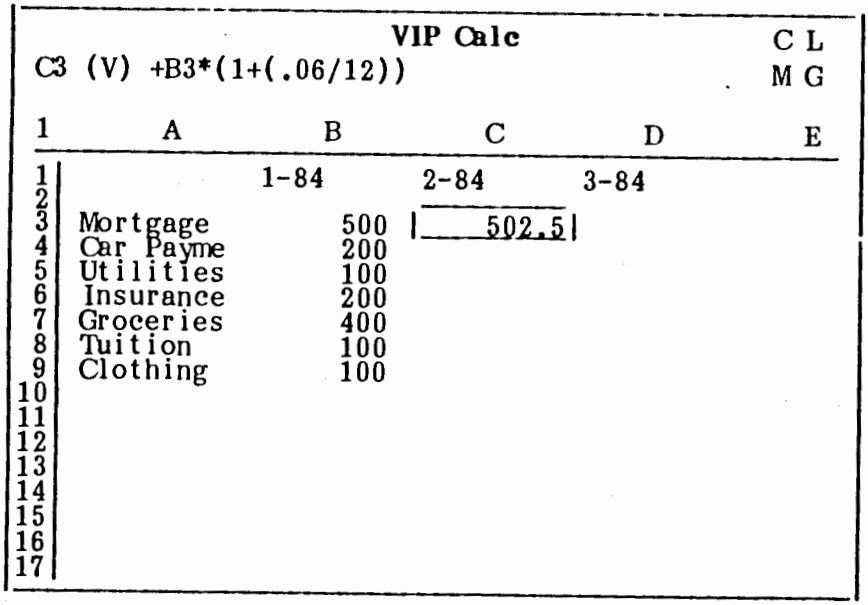
— Help Tables (Disk Only)

Extensive help tables are available with disk versions of VIP Calc to make it easy to learn and use. All Help Tables are governed by the '?' key. The help tables are contained on the diskette which must be in the drive if you wish to consult help. By pressing '?' in the data entry mode you will elicit a Help Table explaining cursor commands and other directional commands. By pressing 'CLEAR'-'?' you will elicit a Help Table explaining the meanings of the Menu Commands. Several of the Menu Commands also have a '?' selection which, when pressed, will elicit a Help Table explaining the sub-commands of that command. By pressing 'CLEAR' twice and then '?'-'ENTER' you will elicit a Help Table of Command Mode commands. These tables will make learning to use VIP Calc quite simple.

— Menu Commands

Many of the Menu commands control how you view the data in your spreadsheet and allow you to manipulate that data. You not only wish to enter data, you also want it to look a certain way for a better display or presentation. The Global, Format and Colomn Width commands are particularly helpful for this. The Global command controls how data throughout your entire worksheet is displayed. The Column Width command controls the display width of a particular column. The Format command controls the format of a particular cell.

Let's look at how these commands affect your worksheet. Your worksheet currently shows columns of nine characters each, with Labels flushed to the left and Values flush to the right, in the default format:



But what if you wished the first column, column A, to be 12 instead of 9 characters wide to accomodate your wider labels such as "Car Payments"; and what if you wanted the titles in row 1 to be centered instead of flushed to the left; and finally, what if you wanted the dollar amounts to show the decimal places.

To initiate any of these changes you must first press 'CLEAR'. On the Command line will appear the command key Menu for the various Menu commands at your disposal. From these you may choose the letter

of the command you desire. Here let's first change the width of column A. First put the cursor in column A. After pressing 'CLEAR' press 'C'. You will be prompted "Column Width". Here enter '12'-'ENTER'. You will see column A extend to a width of 12:

```
                              VIP Calc                          C L
C3 (V) +B3*(1+(.06/12))                                         M G

1          A              B              C             D
--------------------------------------------------------------------
 1|                    1-84          2-84          3-84
 2|
 3| Mortgage               500 |      502.5|
 4| Car Payments           200
 5| Utilities              100
 6| Insurance              200
 7| Groceries              400
 8| Tuition                100
 9| Clothing               100
10|
11|
12|
13|
14|
15|
16|
17|
```

Next let's change the display to the dollar and cent format. First press 'CLEAR', and then 'G' for Global. With Global commands you can change the format of all the displays in the grid, not just one column or one cell. When you have pressed 'G' a new menu will appear on the Command line, all being different functions which are to be performed on the entire grid. The 'F' selection governs formats of the cells, our concern here. When you press 'F' a new sub-menu appears giving you the format selections. You will notice among them the "$". This command will give the dollars and cents format to all non-label numbers displayed. Press it to get:

```
                         VIP Calc                     C L
C3 (V) +B3*(1+(.06/12))                               M $

1          A            B          C          D
------------------------------------------------------
 1                    1-84       2-84       3-84
 2
 3  Mortgage        $ 500.00 |$ 502.50|
 4  Car Payments    $ 200.00
 5  Utilities       $ 100.00
 6  Insurance       $ 200.00
 7  Groceries       $ 400.00
 8  Tuition         $ 100.00
 9  Clothing        $ 100.00
10
11
12
13
14
15
16
17
```

The result of your Global command has been to change all the dollar amounts for your budget to the dollar format. The Global format flag on the status line has changed from "G" for the general format to a "$" for the dollar sign format. Notice that the numbers in row 1 were not changed. This is because those numbers were entered as Labels rather than Values or the result of a formula. The "dollars & cents" Global format only applies to numbers entered as Values or numbers representing the result of formulas. From now on, whenever you enter a Value, the "$" format will apply unless you change the Global Format again or unless you change the Local Format of the particular cell with the Local Format command.

Let's illustrate how the Local Format command is used to change the format of a particular cell. Local Format commands are similar to the Global Format commands. The same formats are offered. The difference is that, as opposed to Global commands which apply to the entire worksheet, Format commands become "attached" to the cell in which they have been used. This is so even if you change the contents of the cell. The format set by the Format command has precedence over the format set with the Global command. To change the local format you must use the Format command. If you wish to return to the Global format you would select the Default format. (Local Formats may be Replicated too.)

As an example, lets change the format of an individual cell. Here let's center the month/year titles. Place the cursor over cell C1, the first cell to be changed. Next press 'CLEAR' and then 'F' to initiate the Format command. A menu will appear much like that for the Global command above. Press 'C' for centered. You will see that the title is now centered. Note also that on the Prompt line, after the cell location indicator you are informed of the special format of the cell, here "C".

The rest of the formats are similarly generated by placing the cursor over the desired cell and using the Format command. Refer to the Command summary for a discussion of each of the menu selections of these commands and further hints on their use.

— Replication

So far entry of your data has been slow, maybe even tedious. Each amount has been entered in each cell, and so on and so forth. The replicate command was designed to alleviate this tedium, and eliminate the difficulty connected with making repeated calculations.

The Replicate command allows you to copy the labels, values, formats or formulas from one cell or group of cells to a whole column or row. The power of this command will become obvious very fast. In our examples so far we have entered one formula, that in cell C3:

VIP Calc

C3 (V) +B3*(1+(.06/12))

C L
M $

1	A	B	C	D
1		1-84	2-84	3-84
2				
3	Mortgage	$ 500.00	$ 502.50	
4	Car Payments	$ 200.00		
5	Utilities	$ 100.00		
6	Insurance	$ 200.00		
7	Groceries	$ 400.00		
8	Tuition	$ 100.00		
9	Clothing	$ 100.00		
10				
11				
12				
13				
14				
15				
16				
17				

You will recall that this formula allows calculation of the effects of inflation on your monthly costs. Since this inflation rate has been assumed for the entire year you would have to fill it in every cell for every month and every expense to make the calculations for the entire year. Furthermore, since the formula would have to work on the immediately preceding cell in the same row, you would have to change the cell reference in the formula each time you entered it in the succeeding cell. The Replicate command takes care of all of this for you.

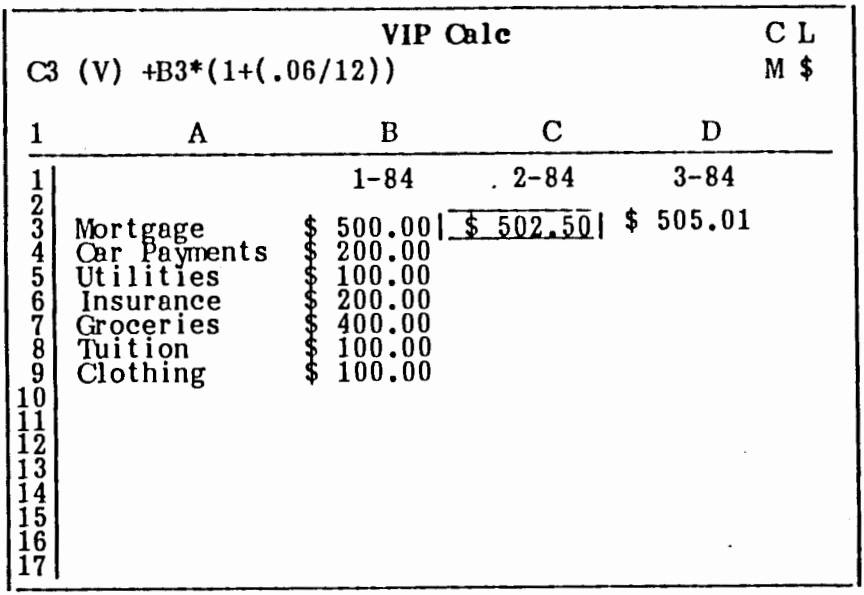
An example will show best how it works. We want to replicate the formula in cell C3 accross the entire row, to reflect the increases due to inflation on the previous month's expenses. To begin, place the cursor on cell C3 and press 'CLEAR' to obtain the Menu. Among the selections is the 'R' command for Replicate. Press 'R'.

In order to replicate your formula, the system will need to know the area to be copied, the "Source Range", and the area to which it will be copied, the "Target Range". You will first be prompted for the Source range. You may enter the cell or group of cells, or if it is just one cell you may press 'ENTER' with the cursor on the cell you desire to be copied. Here, with the cursor in cell C3, press 'CLEAR', then 'R'. A cursor will now appear on the entry line, awaiting entry of the source range. Since your source range is just one cell, namely C3, type "C3" and then press 'ENTER'. You will see that the entry line shows "C3...C3:" indicating that the source range is the cell C3. The periods indicate an ellipsis between start and end of the range and are automatically inserted by VIP Calc. The colon separates the source range from the target range, which you must now enter. Since we want to copy the formula in cell C3 for the months of March through December, located in cells D3 through M3, we must

enter that range. This is done by entering D3, followed by a period, and then M3. Do this and press 'ENTER'.

If this were a Label or numeric Value, the replication would occur immediately, with the specified label filling the area desired. Formulas, however, are different. Formulas contain references to the contents of specific cells. However, the formula for one cell may not rely on the old cell reference, but on a new cell. This is true in the example here. The results in cell D3 are obtained not by multiplying the figure in cell B3 by a formula, but by multiplying the figure in cell C3 by the same formula. The Replication command will automatically make the changes in reference necessary to allow correct calculation. This is done through the Relative feature. This feature causes the system to treat any cell reference in a formula to be replicated as a relative reference which must be incremented once for each cell into which it is copied. Thus, when the formula in cell C3 is copied to cell D3, the reference in the formula to B3 changes to C3 to reflect the shift of one cell.

This feature is selectable after you have indicated the target range. You may select not to have relative replication. This will depend on the formula you have created. In this case we will want to select Relative, resulting in:



Let's do one more replication. Since our formula applies not only to row 3, but also to rows 4 through 10, we can replicate the formulas in cells D3 through O3 into those rows. This is done by first specifying the source range: D3...O3, and then specifying the target range.

Replicating into a rectangle is done somewhat differently than replication into a row or column. The target range is specified as the first cell of the first row to the first cell of the last row, here C4...C9. When the replication is done, use the Goto command to put the cursor at M9:

VIP Calc

M9 (V) +L9*(1+(.06/12))

C L
M $

1	I	J	K	L	M
1	8-84	9-84	10-84	11-84	12-84
2					
3	$ 517.76	$ 520.35	$ 522.96	$ 525.57	$ 528.20
4	$ 207.11	$ 208.14	$ 209.18	$ 210.23	$ 211.28
5	$ 103.55	$ 104.07	$ 104.59	$ 105.11	$ 105.64
6	$ 207.11	$ 208.14	$ 209.18	$ 210.23	$ 211.28
7	$ 414.21	$ 416.28	$ 418.36	$ 420.46	$ 422.56
8	$ 103.55	$ 104.07	$ 104.59	$ 105.11	$ 105.64
9	$ 103.55	$ 104.07	$ 104.59	$ 105.11	$ 105.64
10					
11					
12					
13					
14					
15					
16					
17					

Replicate gives you the power to make calculations you never dreamed of, with an ease that is hard to believe. Sometimes replication makes calculating so much fun you'll do it just for the heck of it!

— Time Saving Formula Functions

There are several functions which can be made part of formulas when using VIP Calc. These functions are system-supplied operations which may be used to perform special tasks, such as determining the sum of a column or row, finding the average of several figures, or performing logical operations. Many of these operations go beyond the simple arithmetic operations allowed by the system; others only bring into one command frequently used formulas to save you the effort of typing them in each time.

Functions are used just like formulas. They consist of the "@" symbol, plus the name of the function. Since '@' indicates a value entry, no "+" sign is needed. Functions are usually performed on an "argument" which must immediately follow the function and which must be enclosed by parentheses. The argument may be one number or a series of numbers or data. These are the locations or values which will be operated on.

The entire list of functions is contained in the section devoted to them. Here let's go through an example using one of the most common of these, the @SUM function.

@SUM is used to find the sum of a series of numbers. We can use it with our example to sub-total each of the expenses we have listed, and then to find the grand total of all our expenses during the year.

@SUM takes a series of arguments. This means that when you use this function you must tell it to what it applies. The series is contained within parentheses, and each element of the series is separated by a comma. If you are specifying a sequence of cells, you may list them separately, separating them with commas, or you may give the

first cell coordinate, a colon, and then the last cell coordinate.

Here we want to find the sum of the values in cells B3 to M3, and so on to B9 through M9. We also want to then find the sum of these sub-totals. The first step is to create the formula to find the first sub-total. In cell N3 put: @SUM(B3:M3). When you press 'ENTER' the sum of cells B3 to M3 will appear in cell N3. To get the rest of the sub-totals, replicate cell N3 into cells N4 to N9.

To get the grand total you have to put a new @SUM formula in cell N14: @SUM(N3:N9). This will give your total yearly expenses. Here's what you get:

VIP Calc

M14 (V) @SUM(M3:M9) C L M $

1	J	K	L	M	N
1	9-84	10-84	11-84	12-84	Subtotal
2					
3	$ 520.35	$ 522.96	$ 525.57	$ 528.20	$6167.78
4	$ 208.14	$ 209.18	$ 210.23	$ 211.28	$2467.11
5	$ 104.07	$ 104.59	$ 105.11	$ 105.64	$1233.56
6	$ 208.14	$ 209.18	$ 210.23	$ 211.28	$2467.11
7	$ 416.28	$ 418.36	$ 420.46	$ 422.56	$4934.22
8	$ 104.07	$ 104.59	$ 105.11	$ 105.64	$1233.56
9	$ 104.07	$ 104.59	$ 105.11	$ 105.64	$1233.56
10					
11	----------	----------	----------	----------	----------
12					
13					
14			GRAND TOTAL		$19736.90
15					
16					
17					

As you will see when you look at the section on formula functions, there are many such functions to help you with your many tasks. Look them over and see what you can use.

— The Repeating Label Command

Notice the line of dashes across the worksheet. Although this could have been created by typing dashes in every cell, it is more easily done using the Repeating Labels command. This command repeats a sequence of characters across the full cell width, and it can be replicated.

To use it, press 'CLEAR' and then '-'. Now you can press any sequence of characters and then press 'ENTER'. Any character, excluding function markers, may be used. To get a cell of dashes, press '-' and then 'ENTER'. To extend the dashes across the worksheet, replicate the cell.

Lesson Four: WINDOWS

It has become obvious that even with the greatest display size available with VIP Calc you often cannot view your entire worksheet at one time on the screen. This can be troublesome if you want to remember the titles of your categories as you view columns normally off the screen, or if you wish to compare the effects of changing the formula in column A and watching the results in column O or BK. A command has been created to take care of these concerns: the Window command.

— Your Many Windowed Worksheet

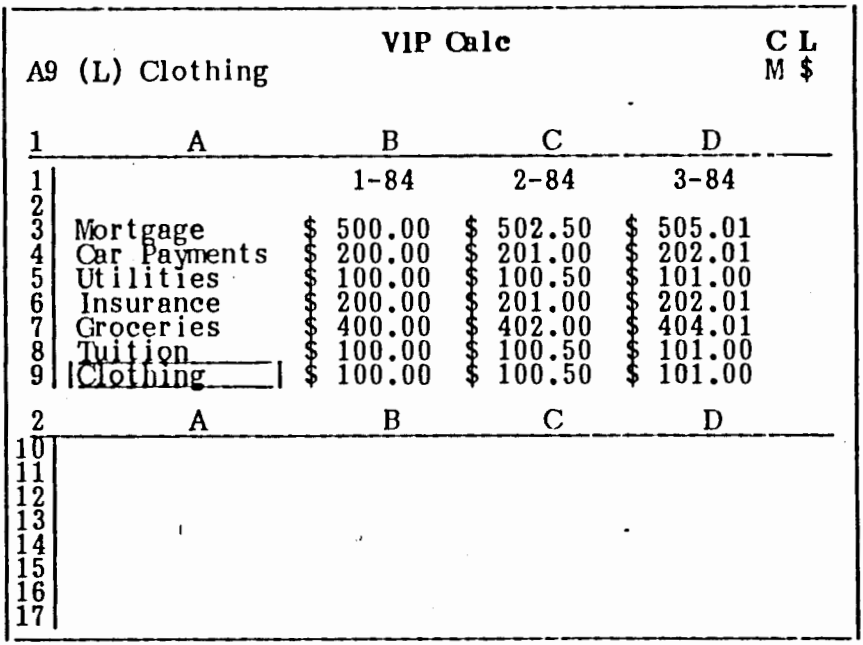
Sometimes you need to compare different portions of your spreadsheet which are not on the screen at the same time. You may even wish to compare more than one portion of your spreadsheet. To do this you may use the Window command.

The Window command allows you to divide your text into up to 8 separate screens, each of which looks at a different part of the worksheet. This allows you to change a formula or figure in one portion of your worksheet and immediately see the result in other related portions. For example, you might wish to see how the change in one expense affects your net assets, your gross earnings, and any number of other results which might normally not be on the screen at the same time.

These windows are just like the regular grid, and all commands which will work on the grid as a whole, except commands for printing or saving the spreadsheet, will work separately on each of the windows. You may find the Goto command of particular help. Although all the windows scroll separately, you can also choose to have any two of the windows scroll simultaneously.

You may create vertical and/or horizontal windows. Windows are created from the position of the cursor. To create a horizontal window, place the cursor in the row which is to become the top row of your window, and then press 'CLEAR' to get the Command Menu. Then press 'W' for the Window command. Next press 'H' for horizontal. The display will then be divided into two windows, each numbered in the sequence of creation. The cursor will move up one row from where it was place to the source window.

If we wanted to create a window in our example, say at row 10, we would place the cursor in row ten, press 'CLEAR' 'W' and then 'H' for a horizontal window. The results would look like:



Notice that the cursor moved to cell A9 from cell A10. This is normal. You are in window 1. To get to window 2 press ';'. The ';' key will successively move you through the windows no matter the number.

To start, windows scroll independently. Separate scrolling is useful, for example, to see other portions of your budget and compare them with those in Window 1. You can synchronize the scrolling of two windows by placing the cursor in one of the windows which is to scroll and pressing 'S' after pressing 'W' from the Command Menu. After pressing 'S' you will be prompted to supply the window number of the window to control the scrolling of the window containing the cursor. Enter your selection and press enter. You will now be asked whether you want the windows to scroll 'H'orizontally, 'V'ertically or 'B'oth. Again, make your selection. Now the designated windows will scroll together in the indicated direction(s). To end synchronized scrolling, press 'U' from the Window command.

To return to only one window, select '1' after pressing 'W' from the command menu.

— Locking Titles

You have noticed that as you scrolled to see the months in your budget not on the screen, your budget item titles scrolled off the screen to the left, making it difficult to remember what the amounts stand for. One particularly helpful function of the Window command is to "freeze" your titles, horizontal or vertical, or both, in place so that they will stay on the screen while you scroll to see cells not on the screen. This is done just like any other window creation.

Lesson Five: PRINTING, SAVING & USING WORKSHEETS

Now that you know the fundamentals of how to make a nice worksheet, you probably are wondering how you can print it, save it for later use or combine it with another program. Your worksheet has two separate aspects. One is the underlying commands for formulas, formats and display options which you have generated to create your worksheet. The second is the display of the results of the underlying formulas, etc. This dichotomy is important since the underlying commands cannot be printed, only saved, while the results can be both printed and saved.

You are able to save either aspect, the commands or the results, to tape with the tape and disk versions and to disk with the disk version. Saving of the results is a function of printing, and will be discussed later. Saving the underlying worksheet is a Command Mode command.

— Saving Your Worksheet

The underlying commands and data for your worksheet may be saved to tape or disk. To initiate a save of your worksheet, first press 'CLEAR' twice to enter the Command Mode. In the command mode you may enter several different commands discussed later in the Command Mode command summary. Saving to tape or disk is governed by a series of related commands. Here they will be shortly discussed to get you started; a more detailed discussion is contained in the command summaries.

To save to tape, ready your cassette machine, press 'C-S' (for "cassette save") from the Command line, input a name for the worksheet which you are saving, up to eight letters, and press 'ENTER'. Your worksheet will be saved to the tape with the name given. To reload the worksheet, first clear your worksheet if it is not already clear (with the Clear command). Next ready your cassette, press 'C-L' (for cassette load) from the Command Mode and press the "play" button on your cassette recorder. The worksheet will load in.

Saving to and loading from a disk is similar. Place a data diskette in your drive, enter the Command Mode, and type 'D-S' (for disk save) plus a name for your worksheet, up to eight characters, then press 'ENTER'. Your worksheet will then be saved to the disk. To reload it, clear your worksheet, then type, from the Command Mode, 'D-L' (for disk load) plus the name of the file and press 'ENTER'. If you are not sure of the name of the file, type 'D-I' (for disk inventory) from the command mode and a directory of the contents of the disk will be displayed.

When your worksheet is saved to disk, it is assigned an extension of "SHT" to indicate that the file contains data for your worksheet. This also distinguishes it from files of the worksheet display "printed" to the disk, which are given the extension "VIP". This is important because files "printed" to disk cannot be reloaded to create a worksheet; only "SHT" programs will create a worksheet when reloaded.

— "Printing" Your Worksheet Display

Obtaining hard copy of your worksheet results can be important for your records, for your work or for comparison of results. Printing can be done in two ways: directly through VIP Calc or indirectly through VIP Writer. The same procedure is followed. The only difference is that the file is "printed" to the printer or to tape or disk.

The fundamentals of printing are quite simple. (A considerable section is devoted later to printing so that you can learn all the fine points.) VIP Calc prints the display of your worksheet only. It will print the screen exactly as it appears, with all your special formats (ignoring windows). The system prints your worksheet as a box, printing from the upper left hand corner to the lower right hand corner. You specify these two corners and the system will do the rest.

To begin, you must place the cursor at the cell from which you wish to begin printing. You may start printing from any cell. Then you will press 'CLEAR'-'P' to initiate printing. You will be asked whether you wish to print to the printer or to cassette or disk. If you select cassette or disk, you will be asked for a file name; once you have input a file name, or if you selected printing to the printer, the system will await input of the lower right hand coordinate where printing is to end. Press 'ENTER' to print your entire worksheet or input the coordinate of the last cell you desire to have printed and press 'ENTER'.

If you selected the printer, your worksheet will be sent to the printer a row at a time, limited only by the size of the paper - width and length. If the worksheet is longer than one sheet of paper, it will continue to be printed on successive sheets of paper until it is exhausted. Similarly, if the worksheet

is too wide to be printed on one sheet of paper, after all the rows have been printed, the system will return to the first row and resume printing at the column where it left off.

That's the basics. If you desire to alter the margins or use special features of your printer, you will have to consult the section devoted to printing in the command summaries later in this manual.

However you have formatted your text, if you choose to save your print file rather than print it, the print file will be "printed" to tape or disk just as it would be printed on paper. This is so that you can load the file into the VIP Writer for easy inclusion in a memo or report. Of course, once in the Writer, you can change anything, add or change control codes, treating it just like any other Writer file. To make matters simpler, printed files are automatically saved with a default extension of "VIP". "VIP" is the default extension of VIP Writer and other Library programs.

— Printing Your Worksheet Commands

Although you cannot directly print the commands underlying your worksheet using VIP Calc, your worksheet is saved in an ASCII format. This means that it is saved in readable form. Thus, if you wished, you could load it into your VIP Writer to get a printout of it, or even to edit it. In order to do this you will have to know that the 'CLEAR' key is represented as a slash in the file. Thus, if you wish to edit the file and put in a command, use the slash character.

N O W W H A T ?

Now that you have gotten through this short tutorial, you should have a lot of questions about what kind of commands and functions are at your disposal, and how you can best use them. Great!

The rest of this manual is devoted to a summary of all the commands and functions available with VIP Calc, plus several appendices both summarizing information given in the manual and adding useful information. First to be discussed will be all the Menu commands. Next all Command Mode commands will be covered. Then come the Functions, and finally the Appendices.

As was stated earlier in this manual, calc-type programs have become very standard, and many books have been written about them. Therefore advice on how best to create worksheets to meets your needs, and what type of pitfalls to avoid when creating worksheets will be left to those excellent works. Consult Appendix A for a list of several popular and excellent works.

Depending on your experience, you will almost certainly wish to consult one of these works, since they contain many, many fine suggestions, hints, guidelines and warnings which will have to be heeded, not to mention the books of templates which make your job so much simpler. We highly recommend that you use one of those books along with this manual.

COMMAND SUMMARIES

Now that you have an idea of how a worksheet is made, you can begin to master the commands available with VIP Calc. These commands allow you to save and print your files, edit your worksheet and individual entries, use advanced built-in formulas, and many other things not even touched on in the tutorial section of this manual. There are three types of command summaries: a Menu Command summary, a Command Mode Command summary and a Function summary.

MENU COMMAND SUMMARY

The following is a complete summary of all menu commands available with VIP Calc, including all sub-commands, arranged in alphabetical order. For each command a discussion is provided of the function and proper use of the commands.

Menu Commands are those initiated by pressing 'CLEAR' once. This elicits a menu of available commands on the Command line, from which you may select any character. Many of these Menu Commands have their own menus with sub-commands. Some of the commands require input on the Entry line. Input on the Entry line may be edited using the Edit command. Whenever text is being input on the Entry line, you may erase to the start point by pressing 'SHIFT'-'Left Arrow'.

ARROW COMMANDS

Function: A whole family of arrow key commands allows you to move virtually anywhere on the worksheet with ease. And since the hi-res displays are somewhat slower to react to single cell movements, you will quickly learn to depend on the arrow commands which provide for greater movement.

Command Structure: The following commands move the cursor as described:

'LEFT ARROW'	Cursor to the Left
'RIGHT ARROW'	Cursor to the Right
'UP ARROW'	Cursor Up
'DOWN ARROW'	Cursor Down
'SHIFT''LEFT ARROW'	Screen Left
'SHIFT''RIGHT ARROW'	Screen Right
'SHIFT''UP ARROW'	Screen Top
'SHIFT''DOWN ARROW'	Screen Bottom
'CLEAR''LEFT ARROW'	Page Left
'CLEAR''RIGHT ARROW'	Page Right
'CLEAR''UP ARROW'	Page Up
'CLEAR''DOWN ARROW'	Page Down
'CLEAR'-'SHIFT''LEFT ARROW'	Left of Worksheet
'CLEAR'-'SHIFT''RIGHT ARROW'	Right of Worksheet
'CLEAR'-'SHIFT''UP ARROW'	First Cell of Worksheet
'CLEAR'-'SHIFT''DOWN ARROW'	Last Cell of Worksheet

The paging commands move you in increments of the screen size minus one column or row.

BLANK 'CLEAR'-'B'

Function: The Blank command serves to permanently erase the contents of the cell highlighted by the cursor, whether Label or Value. Local formats, however, are not affected.

Command Structure: Position the cursor over the cell to be erased and press 'CLEAR'-'B', then press 'ENTER' or one of the arrow keys to implement the command. Pressing any other key will abort the command.

COLUMN WIDTH CHANGE 'CLEAR'-'C'

Function: This command is used to change the width of all the cells in individual columns of the worksheet. It is to be distinguished from the Global command which changes the widths of all columns in the worksheet.

Command Structure: To change the width of a particular column, position the cursor in column to be affected and press 'CLEAR'-'C'. The system will then wait for you to enter the new width and press 'ENTER'. The affected column will then have the new width.

DELETE 'CLEAR'-'D'

Function: The Delete command is used to delete entire rows or columns. When this command is performed the row or column is permanently deleted. The effect of a row deletion is to move all rows below the deleted row up; the effect of a column deletion is to move all columns to the right of the deleted column to the left.

After a row or column is deleted, all coordinates on the worksheet are changed to reflect the deletion. The worksheet is also recalculated. If any cell refers to a cell in the deleted row or column, "ERROR" will appear in the cell.

Command Structure: To delete a row or column, position the cursor in the row or column to be deleted and press 'CLEAR'-'D'. This will elicit on the Command line the prompt: "DELETE: R C". If you press 'R' the row will be deleted; pressing 'C' will delete the column. In either case you will be prompted "Are you sure?" Press 'Y' to delete the row or column.

EDIT 'CLEAR'-'E' (64K only)

Function: The Edit command is used to change the contents of a cell on the Entry line without having to retype the entire contents. Both Labels and Values may be edited. Editing means inserting or deleting characters within the text. This command is particularly helpful when long strings, such as a complex formula, need a minor correction.

Command Structure:

There are two complementary edit commands. One is for editing an entry as you are typing it in for the first time. The second edit mode is for editing strings which are already cell contents. Both edit modes are entered by typing 'CLEAR'-'E'.

When you are editing a current entry, the cursor will be at the end of the line; when editing existing cell contents, the cursor will be at the beginning of the line. In the edit mode, any character typed will be inserted at the point of the cursor. Backspacing the cursor by pressing 'SHIFT"@' will delete the character at the position of the cursor. Since you often will wish to insert or delete in the middle of the line, several arrow commands allow you to move about on the line. Pressing the 'Left Arrow' or 'Right Arrow' will move you left or right one character. The 'Up Arrow' will move you to the beginning of the line and the 'Down Arrow' will move you to the end of the line. If your line is longer than the screen display width (32, 51, 64 or 85), when you reach the end of the screen with the cursor your text will scroll as you press the arrow keys.

FORMAT 'CLEAR'-'F'

Function: The Format command controls how the contents of individual cells are displayed on the screen and printed. This format control is called Local Format to distinguish it from the Global Format which applies to the whole worksheet. The Local Format holds precedence over the Global Format command.

A Local Format may be assigned to each cell of the worksheet. Whenever a cell's contents have been assigned a Local Format, the Status line will indicate the special format whenever the cursor is over the cell. This format does not affect the contents of the cell, only its appearance. The full precision of any value is used for calculation, irrespective of the Local Format.

Local Formats are assigned to the cell. Local Formats are cleared by using the Format command to return the cell to the default Format, or by clearing the entire worksheet with the Clear command from the Command Mode. Local Formats may be replicated. Replication is the fastest method to set the Local Formats of an entire column or row. If you desire to do this you should do so while the cells are still blank.

Command Structure: The Format command provides several selections for creation of a Local Format, and the means to return from that format. The Format command is initiated by pressing 'CLEAR'-'F'. This elicits a command menu with several selections. The selections, with the effect of the selections, are as follows:

C Centered Format With this Local Format the cell contents are centered within the cell rather than flushed to the left or right as in the general format.

D Default Format This command returns the cell contents to the Global Format from the Local Format which was assigned.

G General Format This Local Format is the one with which the program begins. Numbers are flushed right, and show the maximum precision possible within the cell width minus one space (the one space is retained to show the sign of the number - positive or negative). Labels are flushed left.

I Integer Format This Format sets numeric entries to the integer format rather than the default general format.

L Left Alignment Format This command is used to flush cell contents to the left. Numbers are flushed to the left side plus one space for the sign of numbers.

P Protected Format To help protect against unintentional destruction of cell contents, the user is allowed to set a Local Format to protect the cell contents. When a cell is protected, you will not be able to change its contents until you unprotect it.

R Right Alignment Format With this command cell contents are flushed to the right side of the cell.

U Unprotect Cell Format This command is used to unprotect cells protected with the Protect Format.

$ Dollars and Cents Format This command causes all numbers to be displayed in a "dollars and cents" formats, being rounded to two places after the decimal point. If the number is an integer, ".00" is added.

* Graph Format When this format is selected, the integer value of numeric cell contents is displayed

in the cell with a graph character for creation of graphs. The default graph character is an asterisk, but the default may be changed by pressing 'CLEAR' twice to enter the Command mode, typing "Graph" and then the character to be used as the graph character. Graph display is limited by the cell width. (See the Graph command in the Command mode summary.)

GLOBAL 'CLEAR'-'G'

Function: The Global Command controls the display and calculation precedence of the entire worksheet. The Global Command is overridden by any Local Format, and by the Column Width command ('CLEAR'-'C') discussed above.

Command Structure: The Global Format command presents options for determining the calculation precedence and the display format. It is initiated by pressing 'CLEAR'-'G', upon which several sub-commands are presented. The options, with their individual command structures, are:

C Columm Width This command is used to set the column width of the entire worksheet. The minimum column width is 2; the maximum width is 81.

Since labels and values are often nine or so characters long, the column width affects how the cell contents are displayed. When the column width has been set shorter than a label, the label is truncated. When the label is set shorter than the current display of a value the number cannot be displayed, the cell will display greater than characters to indicate that the number is too great to be displayed. To display the number change the column width to 16 allow full display of the 16 digit precision number.

F Format This command presents the same options as the Local Format command above except for the Protect and Unprotect options. Of course, these options apply to the whole worksheet or window rather than to one cell. See the Format Command.

O Order of Recalculation The order of recalculation command allows you to specify that you wish to have the worksheet calculated along columns or along rows.

Initially, VIP Calc is set to evaluate the worksheet by columns. Calculation is begun in cell A1 and continues down column A to the last entry, then calculation is resumed with cell B1 down column B and so on. This columnar calculation mode is indicated on the Command line with a C.

Because worksheets are sometimes designed incorrectly, or may have to be designed specially, calculation down columns may lead to an error where calculation along rows may lead to the correct result. Thus, if this situation is encountered, you may select Row calculation rather than Column calculation. When you select Row recalculation, the "C" on the Command line is replaced by an "R".

Selection is done by pressing 'C' or 'R' from the sub-command menu present when you press 'O' in the Global command.

R Recalculation Automatic / Manual This command is used to allow you to specify whether you wish VIP Calc to recalculate the worksheet each time a value is entered, or whether it should recalculate only when you press '!'. Manually forced recalculation allows speedier entry of values and formula since recalculation of the entire worksheet will not have to occur after each new entry. Instead, only the formula at the cursor position is recalculated. This saves time when you are entering formulas and text. This time saving is especially important since VIP Calc features 16 digit precision. To update the entire worksheet in the Manual mode you must press '!' each time until you restore Automatic recalculation.

Automatic recalculation is the default. Manual recalculation is selected by pressing 'M' from the sub-menu. Press 'A' to return to the Automatic mode.

GOTO 'Greater Than'

Function: The Goto command is used to move the cursor to any indicated cell on the worksheet.

Command Structure: The command is initiated by pressing 'Greater Than', which elicits the prompt "Go to coordinate:". You then must specify the cell to which you desire to move the cursor, giving first the column, then the row coordinate.

HELP '?'

Function: VIP Calc has available several different help tables to summarize commands. These tables are only available with the disk version, and are contained on the diskette. The program diskette must be in the drive in order to access help. Help may be obtained when moving around the worksheet, when starting to access Menu Commands, within several Menu Commands and when accessing Command Mode commands.

Command Structure: When moving about the worksheet, you may press '?' with the program disk in the drive to elicit a help table of arrow commands and other frequently used commands. To obtain a help table of Menu commands, press 'CLEAR'-'?'. To obtain a help table within several Menu commands, select '?' from the sub-menu if available. To get help with Command Mode commands press 'CLEAR' twice, then '?' and 'ENTER'.

INSERT 'CLEAR'-'I'

Function: The Insert command is used to insert a complete row or column into your worksheet. When invoked, this command will insert a blank column at your cursor position, or a blank row at your cursor position. You then may make entries in that row or column just like any other.

Command Structure: To insert a row or column, place the cursor in the column or row before which you wish to insert and press 'CLEAR'-'I'. On the Command line will appear a choice of "R" for row and "C" for column. Press either key and you will be prompted "Are you sure?" When you press 'Y' the insertion will be made automatically.

LOCATE 'CLEAR'-'L' (64K only)

VIP Calc has a very sophisticated global Locate command. Locate allows you to Locate any Value, Label or the result of a Formula. In addition, it uses a masking capability that allows you to locate a string regardless of whether it is uppercase, lowercase, or any mixture. The Locate command also has a Wild Card character which, when used in the string to be located, will act as a "don't care" character.

— Locate String

To perform any Locate function the cursor must first be moved to a position in the textfile above the string to be located or to the top of the textfile - only strings below the cursor can be located. To Locate a character or string of characters, press 'CLEAR'-'L'. The system will prompt: "Locate: L V" to allow you to choose to look for a Label or a Value. Now type any string of text, up to 28 characters long, which you wish to locate within the text buffer (this could include 'ENTER's, control codes and markers). When you are finished, press 'ENTER' to actually locate the string. When the string is located, it will be displayed on the screen with the cursor after it. By pressing 'CLEAR'-'N' you will command the system to continue to the next occurrence of the string within the text buffer. For easy location, hold the 'CLEAR'-'N' to continue to the end of the text buffer. If the string is not found, "None located" will be displayed.

— Locate Masked String

Often you will wish to Locate a word but you won't know if all or any part of it is in uppercase

(capitalized). For example, you might wish to find all occurrences of the word "receipts", but you know that sometimes it is partially capitalized. With VIP Calc there is no need to do two or more separate searches. Instead you may use the Mask capability with the Locate command so the system will ignore the case of the string to be searched. Mask is initially enabled when the program starts, as indicated by the "M" on the entry line. It is toggled by pressing 'CLEAR'-'M'. The mask cannot be enabled or disabled while actually performing the Locate function.

— Locate String Using Wild Card

Often you will need to Locate a word that you think you may have misspelled, or the spelling of which you are not sure. To do this you must be able to replace the question-raising characters with surrogate characters which the system will ignore except for the purpose of determining word length. These surrogate characters are called Wild Card characters. To illustrate the use of the Wild Card character during Locate, suppose the string to be located is a formula which has been replicated with relative references, for example, 99*b1/33, 99*C1/33 and so on. To locate the formula you would use the Wild Card character instead of the cell column letter when entering the string. The 'RIGHT ARROW' generates the Wild Card character while you are using the Locate command.

Using the above example, the procedure would be as follows: Type 'CLEAR' 'L' 'L' for Locate Label. Then type "99*'RIGHT ARROW'1/33'ENTER'". The system will search through the text buffer to locate "99*?1/33" (? stands for the wild card character), and locate the first such formula.

MEMORY USED AND LEFT 'CLEAR'-';'

Function: Data input by you into VIP Calc consumes bytes. A byte equals one character. Worksheets are extremely memory intensive, requiring quite a bit of memory for anything fairly sophisticated. Whenever you desire to determine the amount of work area which remains you may use this command.

Command Structure: To display on the Command line the number of bytes used and the number of bytes left for use press 'CLEAR'-';'.

MOVE 'CLEAR'-'M'

Function: This command is used to move a complete column or row to another part of the sheet. You will be required to indicate which row or column should be moved to which place in your worksheet. Location references in formulas are all altered to correspond to any new coordinates resulting from the move.

Command Structure: The Move command is invoked by typing 'CLEAR'-'M'. The system will then request the coordinates of the origin and destination of the Move by prompting "From...To" on the Command Line. To specify the origin of the move, type the coordinate in. Pressing '.' will confirm the origin, and three periods will appear after the origin coordinate. Now you may specify the destination by typing it in.

The system determines whether a row or column is being moved by which coordinate has been changed. If the row number has been changed, a row move is indicated; if the column number has been changed a column move will be performed. If both row and column coordinates have changed, the move will be aborted since the system cannot tell whether a row or column is to be moved. Once the coordinates have been entered, press 'ENTER' and you will be asked "Are you sure?" Press 'Y' and the move will be implemented. The cursor will return to its location prior to the move.

When moving a row or column one simple rule must be remembered. If a column is being moved to the right or a row is being moved down, you must specify a destination coordinate one row down from or one column to the right of the destination to which the row or column is to be moved. This is made necessary by the manner in which the move command is implemented. When moving a row up or a column to the left, the exact position must be indicated.

In any move you must be mindful that circular or forward references may be created, leading to inaccurate results.

NEXT 'CLEAR'-'N'

Function: This command continues the Locate command to locate the next occurrence of the string last sought. See the Locate command.

Command Structure: This command is implemented by pressing 'CLEAR'-'N'.

PRINTING 'CLEAR'-'P'

Up until now you have been primarily concerned with creating your worksheet. One possible goal, however, has been to print a report using your printer. Before you print your text you generally need to prepare it to meet your needs. Preparation of your text can be divided into two segments: system oriented page formatting functions (Format Parameters) and printer oriented functions (Printer Control Codes). Before we go into print preparation in depth, however, you should be aware of the fundamental Print command structure.

- Fundamental Print Command Structure

VIP Calc will "print" your worksheet either to the printer or to your tape or disk system. Worksheets "printed" to tape or disk are for use with other pure ASCII programs such as the VIP Writer. VIP Calc is designed to automatically print your worksheet perfectly centered on 8 1/2 by 11 inch pages of continuous-feed paper, and has a single sheet pause option to allow the use of single sheets of paper as well. The margins and print length are preset for perfectly formatted text. What will be printed is the Screen Display of your worksheet exactly as it appears on the screen, including all your special display formats. Thus, the contents of your wide columns will appear as they do on your screen, as will the dollar and cent formats, etc.

Printing with VIP Calc, as with other worksheets, is done from upper left hand to the lower right hand corner of your worksheet. Printing begins from the cursor position. You may print the entire worksheet by placing the cursor in the top left-most position of your worksheet, or you may print any "box" on your worksheet bounded by your cursor at the upper left and the specified cell of your worksheet at the

lower right. Printing is done accross the first row until the system exhausts your margins. It then goes to the next row, and so on, until it reaches the bottom margin. If you had more rows than will fit on one page, the system will formfeed to the next sheet of paper, and then continue until the rows have all been printed. Then, if there were more columns than fit within your left and right margins, the system will start again from the first row where it left off printing columns, and continue until all the rows have been printed, and so on until the whole worksheet is printed. Your control of the printer will determine, to an extent, the number of sheets of paper which it will take to print your worksheet.

To print, move the cursor to the position from which you wish to begin printing, move your paper in your printer to top of form (the system will give you your top margin) and press 'CLEAR'-'P'. The system will then ask if you wish to print to the printer or to disk or tape. If you press 'T' or 'D' you will be asked a file name, following the filename rules for saving files to tape or disk (see the Command Mode Commands section). Since these files will be usable with other VIP Library programs, the default extension is "VIP". Once you have selected the file name, or if you pressed 'P' for printer, the system will await input on the entry line of the coordinate for the lower right hand corner of your worksheet where printing will end. Once you enter the coordinate and press 'ENTER' the text will be sent to the printer or "printed" to tape or disk. Everything will then be "printed" except Comments, or text enclosed by No-Print markers. You can even print those if you use the Print Comment and No-Print Print features.

Holding the 'SPACE BAR' will pause printing. Printing can be resumed by pressing any key. Press 'BREAK' to stop printing and exit to the worksheet.

- Advanced Printing Functions

Just printing your worksheet in the normal print font is important for obtaining hard copy of your calculations. However, many will wish to spruce up the appearance of the worksheet, or wish to use a compressed font to fit more on a page, or use some special feature of the printer. To do these things requires a deeper understanding of techniques to control all margins and printer control codes. Margins and many other format parameters are controlled by VIP Calc itself and are changed by changing the system defaults. Print font, underlining, superscripts, etc., are printer controlled features which, for implementation, require that you send the proper printer control code as defined by your printer. First will be discussed format parameters. Then the means for imbedding control codes will be explained.

— Function Markers

VIP Calc uses several markers to set off strings of text for special purposes. The contents of cells started with these markers, except P Code markers, are not printed, nor do they interfere with any calculation. All markers are Labels and for proper entry must be preceded by a quotation mark to indicate Label status. All markers except P Code markers must begin a new cell. Each of these markers is discussed in its own section below.

— Important

The Following Sections discuss and give examples of the use of Function Markers. To facilitate the printing of this Tutorial the examples given to illustrate the proper use of Function Markers use underlined printable characters (e.g., n,/,u,k) in place of the actual Function Markers described for

each function (the underline indicates that the character underlined is a function key and must be preceded by pressing 'CLEAR'). This is because Function Markers are either non-printable characters, or are characters which would command the printer to perform the function itself while printing the Tutorial. Therefore, when reading examples PLEASE mentally substitute the Function Marker as described in the text for the printable character used in its place.

- Page Formatting

Introduction

VIP Calc controls the various aspects of page formatting such as margins, line spacing, pagination, headers and page length. These formatting elements are called Print Format Parameters. These Parameters have been preset with default values to allow the novice a perfectly printed page without even having to consider the format parameters. Still, the more experienced user will periodically desire to change these default values to implement more sophisticated formatting, and the system also allows for this.

These parameters are listed below, along with the default values initially defined by VIP Calc.

Elements of Page Formatting

— Changing Margins

Before entering into a discussion of the method for altering default values, it would be helpful for you to understand a little bit about the reasons the original default values for the left and right margins were chosen. Printers offer several different options for printing text. Most smart printers offer several print fonts to allow different means of emphasis. To do this, the printer uses a different amount of space to print the same character, and this affects how you format your text.

The normal 8 1/2 by 11 inch sheet of paper allows the printer eight inches of usable space per line. When in the normal print font, the printer prints ten characters per inch (cpi). With the total line length of eight inches, the printer is thus capable

of printing 80 characters per line. The sizes of the other print fonts alter these figures. In the elongated (double-wide) font the printer can type 5 cpi, thus giving a total of 40 characters per eight inch line. In the elongated-compressed font the printer is capable of printing 8.3 cpi, for a total of 66.4 (67) characters per eight inch line. The twelve pitch option is a 12 cpi format, for a total of 96 characters per eight inch line. The fifteen pitch option is a 15 cpi format, for a total of 120 characters per eight inch line. Finally, in the compressed font, printers can handle 16.7 cpi, for a total of 132 characters per eight inch line.

Since you are usually in the normal font, we had to choose the proper default margins to use within the 80 character per line maximum. The common practice is to have a 64 character line, leaving an eight character space to the left and right of the text for a margin. Thus, we have set the left and right margins to 8 and 72 (8+64=72; 72+8=80). However, if you wish to use another font you will have to change your margins accordingly. For example, if you wished to use the compressed font, you would set your margins to a left margin of 0 and a right margin of 132.

— Changing Default Parameters

There are several important things which must be known about Format Parameters. Every time the system is started up the Format Parameters contain their default values. The current value of all parameters will be displayed if you press '.'-'ENTER' from the Command Mode. All format parameters will stay with the system until actually changed. Merely turning off a parameter will not change it. Thus, if you have altered the format parameters in a worksheet, printed that worksheet, and then cleared the buffer and started a new worksheet, unless you change the parameters as they existed in the textfile that you just printed, the format parameters will remain as they were set in the printed textfile until changed or until the system is turned off. This could cause problems since you may not remember your parameters.

Alteration of the default values is accomplished in either of two ways:

1) You may at any time alter any parameter by going into the Command Mode and entering the parameter syntax listed below. This is a very quick and convenient way to change any Format Parameter. It does, however, have one major drawback: if Format Parameters are changed in this manner, they do not become part of the textfile buffer, and therefore are NOT saved when you save the textfile to tape or disk.

EXAMPLE: 'CLEAR'-'CLEAR' 'L'-'M'-'2' 'ENTER' will change the default left margin parameter, or the previous left margin, to a new left margin of zero.

2) Parameters may also be changed by entering a Format string. A Format string is composed of a Format marker, which is represented as an inverse "k" (a magenta block in the 32 display), followed by

format parameters and terminated by an 'ENTER'. Format strings can be placed in any cell, but to affect the cells in a row, it must be placed before them in the row. Format strings are not printed in the text.

Format strings are Labels and are created by generating a Format marker at the beginning of a cell after a quotation mark to initiate Label entry. To generate a Format marker, press 'CLEAR'-'K'. Next type the parameter desired using the syntax listed in the table below. Then type the desired value to be assigned (within the limits listed under the same table heading). Many parameters can be typed in a single cell, but each parameter MUST be separated by a comma; there is, however, no required order for entering FORMAT parameters. The Format string MUST be terminated with an 'ENTER'.

The following example is a Format string which sets the left margin to 6, the right margin to 96, the line spacing to 2, the top margin to 4, the bottom margin to 88, and single sheet pause on.

EXAMPLE: kLM6,RM96,LS2,TM4,BM88,PAy'ENTER'
k = Format marker.

The above example of a Format string is the first of many examples to follow that use a "k" to represent a Format marker. Remember that the Format marker is generated by pressing 'CLEAR'-'K' and is represented on the video display as an inverse "k" (a magenta block in the 32 display.)

The syntax of the format parameters, and the 'Y', 'N', 'A', 'E', 'O', 'L', 'C', 'R' and 'T' electives can be typed in either upper or lower case. Format strings will not be printed. When the textfile is saved to tape or disk, the Format strings will be saved as well, so the print format you've chosen will not be lost.

If a Format error is encountered by a system when your worksheet is being printed, printing will cease and an error prompt will appear giving the nature of the error and the cursor will rest in the cell where the error was detected. When a Format error is encountered in the middle of a page, printing must be resumed from where you began. To resume printing, first correct the error encountered. Next go to the top of the file and re-commence printing.

RULE: When you intend to rely on the Default value of a parameter for most of your textfile, but need to use a different value for a special purpose such as setting the bottom margin to a different length for just one page of your file, you MUST set the default value in a Format string prior to setting the new value in the file. If you don't do this, the system will apply the newly programmed value to the whole textfile, for example, applying your special bottom margin to all pages in your file. Once programmed, the new parameter will control until reprogrammed.

- Format Parameters

The following is a list of the format parameters, all of which can be changed. The status of all parameters will be displayed by pressing 'CLEAR' twice to enter the Command Mode, then typing '.'-'ENTER', or the syntax of any parameter followed by 'ENTER'.

EXAMPLE: 'CLEAR'-'CLEAR'BD'ENTER'

The current status of all parameters will be displayed on the screen.

Parameters can be changed if, instead of pressing 'ENTER' after typing the syntax, you type the substitute parameter.

EXAMPLE: 'CLEAR'-'CLEAR'BD5'ENTER'

This example changes the printer baud rate to 2400 baud.

All parameters can be reset to their default values either by putting an "@" in a Format string, or by pressing '@'-'ENTER' from the Command mode.

Parameter	Syntax	Default Value	Limits
Baud Rate	BD	3	1=110,2=300,3=600 4=1200,5=2400,6=4800,7=9600
Footer Line	FL	62	1-255 0=Suppress
Footer Status	FS	A	A, E, or O
Header Line	HL	4	1-255 0=Suppress
Header Status	HS	A	A, E, or O
Linefeeds(after CR)	LF	N	Y or N
Line Spacing	LS	1	1-255
Margin Bottom	BM	60	2-254
Margin Left	LM	8	0-255
Margin Right	RM	72	10-255
Margin Top	TM	6	1-253
No-Print Printing	NP	N	Y or N
Nulls	NL	0	0-255
Page Length	PL	66	3-255
Page Number	PN	1	1-65535
Page Number Line	PG	0	1-255 0=Suppress
Page Number Placement	PP	C	L C R or T
Print Comment	PC	N	Y or N
Printer Handshaking	PH	Y	Y or N
Single Sheet Pause	PA	N	Y or N
Word Length (printer)	WD	8	7 or 8

A = All; E = Even; O = Odd; Y = Yes; N = No
L = Left; C = Center; R = Right; T = Toggle

The Baud parameter allows you to alter the speed with which you can send your file to the printer. It is governed by the ability of your printer to handle the selected baud rate (see your printer manual).

Linefeeds are needed by some printers (see your manual) to advance the paper to print the next line.

The No-Print Printing parameter, when enabled by putting "NPY" in the Format string, commands the system to print all text between No-Print markers.

Nulls are empty characters required by some printers to give them time to move to the beginning of the next line for printing (see your printer manual). Some refer to nulls as line delays.

For Page Number (PN), Page Number Line (PG), and Page Number Placement (PP), see below.

The Print Comment parameter, when enabled by putting "PCY" in the Format string, commands the system to print all comments (discussed below) along with the rest of the text.

The Printer Handshake feature allows you to send your text to a printer that does not require handshaking (see your printer manual) or through the RS-232 port directly to a terminal without waiting for handshaking signals which are used by printers. The default is PH on ("Y") for normal printing.

The Single Sheet Pause function is useful for anyone having a printer which requires or allows the user to insert single sheets of paper for printing instead of using continuous feed paper. This function is enabled by putting "PAy" in the Format string. When enabled the system will stop printing at the end of each page. Printing will not be resumed until you press any key (except the space bar or 'BREAK') after inserting more paper.

The Word parameter is provided as a convenience to those few persons whose Color Computer has a 7-bit printer driver (early versions only), and whose printer distinguishes between 7-bit and 8-bit word lengths. You will know this applies to you if your printer works with all your BASIC programs but it prints "garbage" with VIP Calc. VIP Calc has an 8-bit printer driver to conform to other VIP Library files. To alleviate this problem you could switch your printer to 8-bit when using VIP Calc.

- Pagination

Initially, the system suppresses pagination. If you wish to print page numbers, set the Page Number Line (PG) parameter (within a Format string) to the line on which you wish the page numbers to appear (e.g., PG62). You may specify placement of the page number (initially centered) at the left or right hand side or the center of the page by setting the Page Number Placement (PP) parameter to "L", "R" or "C". You may also alternate left and right sides of the page by setting the Page Number Placement parameter to "T". Page numbers will then appear on the right side of odd numbered pages and the left side of even numbered pages.

Page numbers will always start with number 1 unless you specify another page number with the Page Number (PN) parameter within a Format string (e.g., PN7) and will be printed centered on the page on the line you specified with the PG parameter. If you wish to start with a different page number, set the Page Number (PN) parameter to the desired number (less than 65535). If you wish to temporarily suppress page numbers, set PG to zero (0). Page numbers will still be incremented, but will not be printed. If you wish to re-enable page numbers, reset "PG" to the number of the line on which you want the page number printed on the page from which pagination is to resume.

EXAMPLE 1: kpn3,pg4,ppr
EXAMPLE 2: kpg0
k = Format marker

Example 1 sets the line on which the page number will be printed to line four, specifies that the page number will be printed at the right-hand side of the page, and sets the page number to 3. Example 2 suppresses page numbers.

- Printer Oriented Functions

Text formatting with Format Parameters allows you to fully control margins, headers, footers and several other page formatting features. However, there are many printer features available, depending on your printer, which are not system controlled, but are printer controlled. These printer controlled features, such as bold face, italics, compressed characters, elongated characters, superscripts, subscripts, underlining and backspacing, are implemented by transmitting printer control codes to the printer. Because these control codes are different from the ordinary letters of the alphabet, punctuation, numbers, etc, they must be "imbedded" into your textfile in special ways when you need them. This is so that you can use any printer to do anything. Before discussing exactly how to send your printer control codes, you should first understand a little bit about how printers work. This starts with an understanding of the ASCII system.

- The ASCII System

VIP Calc is totally ASCII compatible. This means that everything that you put into the buffer is in the ASCII form. ASCII is a standard for symbols used in communications, the acronym standing for American Standard Code for Information Interchange. The ASCII standard potentially contains 256 symbols which are represented by numeric values from 0 to 255 decimal (0 to FF hexadecimal).

Before going on with this discussion you should become familiar with the chart in Appendix E. The standard ASCII character set is comprised of ASCII symbols from decimal 0 through 127. The first column gives the first 128 ASCII symbols in order; the second column states the manner in which the ASCII symbol is displayed in the 32 display when properly generated; the third columns gives the display in the hi-res screens; the fourth column gives the decimal numeric equivalent of the ASCII symbol, and column five gives the hexadecimal equivalent; the sixth column explains common functions of some of the control codes; and the final column is the MOST important: it is the column which explains how to generate the ASCII symbol and its numeric equivalent with VIP Calc through your Color Computer keyboard. Thus, from Appendix E you can see that to generate the ASCII symbol "A", with the numeric value 65 decimal (41 hex) which is stored in the buffer, you press the "A" key. The screen display in all displays shows the letter "A".

The first 32 ASCII symbols, with numeric values from 0 to 31 decimal, are control characters. They were specifically devised to be used to control functions of devices which accept ASCII data. The next 96 ASCII symbols, from 32 to 127 decimal, are the alphabet, in upper and lower case form, the numbers, and the conventional symbols seen on the

typewriter keyboard such as the colon, the ampersand, the dollar sign, etc. In every system adhering to ASCII the ASCII symbols represented by the numbers from 32 to 127 decimal will be the same.

As you can see, when you press a key on the keyboard, what you are really doing is putting a number into the buffer, that number being the numeric equivalent of the ASCII symbol you have generated. It just so happens that the letters of the alphabet and other standard keyboard symbols ARE the ASCII symbols themselves. Thus, when you press the "7" key, you have generated the ASCII symbol "7", which is represented on the screen as a "7".

How is "7" represented in your buffer? By looking in Appendix E you can see that the numeric equivalent for the ASCII symbol for "7" is decimal 55 (37 hex). (Actually the buffer contains the binary equivalent of the decimal number 55. For convenience we will refer to decimal numbers when referring to buffer contents.) Thus when you press "7", your buffer receives a decimal 55 in the appropriate memory location.

Since "7" is itself a number, why isn't it sent to the buffer as a decimal 7? Because the "7" on your keyboard and the "7" on your screen are merely symbols, the ASCII symbol "7" to be precise, and this symbol has been assigned the numeric equivalent of decimal 55 in the ASCII system. Decimal 7, on the other hand, is not the numeric equivalent of a "7" at all, but, as you can see from Appendix E, is the numeric equivalent of the ASCII symbol Control G, which is represented on the screen by an inverse apostrophe, and is not generated by pressing "7", but by pressing 'CLEAR'-'SHIFT' 'G'.

Well then, instead of pressing the 7 key to get an ASCII 7, can you press its numeric equivalent 55? No! By pressing 55 you generate TWO bytes of data

for your buffer, both being the numeric equivalent of the ASCII symbol for "5", which is decimal 53 (35 hex).

Get it now? To generate any given decimal equivalent of an ASCII symbol, go to Appendix E, find the decimal column and locate the number, then go to the last column to see how that decimal equivalent is generated. Follow the instructions in the last column to send the proper decimal value to the buffer.

You should now understand how ASCII symbols relate to their numeric equivalents, and how numeric equivalents are generated. This is important for proper use of your printer since you will have to generate decimal equivalents to implement many printer functions.

— From Buffer to Printer

If you have your buffer chock full of text you want to have printed, your buffer will contain oodles of bytes, each containing a number from decimal 0 to 127 representing an individual ASCII symbol. Your printer is also programmed to work with the ASCII system, so when you hit 'CLEAR'-'P'-'P' to commence printing, your buffer sends its numbers one by one to the printer. The printer receives the numbers and interprets them for printing.

Many of the numbers, specifically decimal 32 to 127 (the alphabet, etc.), are printed by the printer as their ASCII equivalents. Not all numbers sent to the printer, however, are intended for printing. Take the ordinary space for example. When you press the space bar, you generate the ASCII symbol for space, which ain't much. Into your buffer goes a decimal 32 (20 hex). When the space goes to the

printer, your buffer sends the decimal 32 to the printer. The printer receives the decimal 32, and in response it skips a space during printing. Thus, the decimal equivalent for the ASCII symbol for space does not have the printer "print" anything; instead, decimal 32 commands the printer to do something, i.e., skip a space.

Other ASCII symbols, and their numeric equivalents also serve as commands to the printer. Recall that the ASCII symbols from 0 to 31 are called control symbols. These symbols were designed to be used to control functions. With few exceptions, smart printer manufacturers have therefore taken these control symbols and adopted them to control certain functions within the printer. They are called Control Codes. This is great! By generating these control codes and putting them in your buffer you can send them to the printer while printing and control the printer functions! Now for the bad part: Although the numeric equivalents will always bring forth the same ASCII symbol, printer manufacturers do not use the same ASCII symbol and its numeric equivalent for the same printer function. This lack of uniformity requires that you carefully read your printer manual to see what the proper numeric equivalents are to implement the desired functions. This lack of standardization also stops us from supplying a chart showing how to uniformly affect certain printer functions.

A look at a typical smart printer shows that the user may choose from normal, elongated, compressed and other print modes and fonts, not to mention using superscripts, graphics and special character sets that the printer provides. To implement these functions requires that the printer be sent the proper control codes. The printer manual for your printer should have a control code summary chart which tells you which control codes will implement which functions. The chart should list the

functions, and in columns next to the functions give the decimal and/or hexadecimal equivalents for the ASCII Control symbol which will implement the function. It is from this chart that you derive the control codes to use to make your printer dance.

VIP Calc allows you to imbed these printer control codes right into your textfile with P Code markers (discussed below). Imbedding control codes with P Code markers requires entry of the actual ASCII or numeric equivalent of the code. An example should help here. The DMP 200 Printer manual states that to start an underline requires that the printer be sent the control code which is a decimal 15. This does not mean that you type "15" for the printer code. This would only send the printer two bytes of data, one a decimal 49 (hex 31) for the ASCII symbol for "1", and a decimal 53 (hex 35) for the ASCII symbol for "5". Instead, you must go to Appendix E, look in column four for decimal 15, and look in column seven for the correct manner of generating a decimal 15 to be sent to the printer. Appendix E shows that to generate a decimal 15, which is the numeric equivalent of the ASCII Control O, you must press 'CLEAR' 'SHIFT' 'O'. This will produce a section symbol (an inverse "/" in the 32 display) on the screen. When you generate a decimal 15 the system will store the decimal 15 in the buffer, and it will be sent to the printer when you print your buffer. This is how printer control codes between P Code markers are handled. Use the procedures outlined above when you opt to use P Codes to imbed control codes rather than using the printer driver.

Before going on to the specifics of P Code markers and other print commands, a word about a few common print control code practices. Many printers require that certain control codes always be preceded by an ESCAPE code. Read your printer manual to see which, if any, of your printer functions require the use of the ESCAPE code. When the ESCAPE code is required,

its decimal equivalent, 27 (generated by pressing 'CLEAR'- '@' in the lower case mode ONLY) MUST be placed before the control code for the new print font or mode to be used. Another common control code usage is to have one control code to turn on a function and another to turn off the same function. Thus, with the TRS-80 DMP 200 printer a decimal 15 starts underlining while a decimal 14 ends underlining. Some printer manuals explain that an ESCAPE plus a letter will work as a control code. Note that the letter MUST BE uppercase (uppercase characters have different decimal numeric equivalents than their lowercase counterparts - see Appendix E).

- Control Codes in the Text 'CLEAR'-'0'

Printer control codes are required to allow you to use the full potential of your printer such as the compressed print format. Printer control codes are imbedded in the textfile with special markers called P Code markers. These markers are represented as an inverse "0" (a buff block in the 32 display) and are generated by pressing 'CLEAR'-'0'. Technically, these markers set aside a string of codes which is sent to the printer, but is not treated as printable text. This is important to note, as the system displays all printable text in the worksheet. Non-printable P Code strings are shown in the Status Line ONLY when you have the cursor over the cell. P Codes also serve a very useful purpose. Since only the columns width of cell contents is printed, you would often be forced to count characters and then place the P Code string. Instead, VIP Calc will search your string for all P Code strings and send them to the printer, irrespective of where they are located in the string and apply them to the portion of the string printed. Of course, if you want a string to be printed double wide from the start, you'd better put the correct control code at the start of the string.

P Code marker pairs can be used anywhere within the worksheet, but ONLY in Labels. P Code information cannot be put in cells with Values, whether numbers, formulas or functions. If you desire to affect cells with Values, you must include P Code information in a preceding cell as a Label, or at the end of the preceding Label. To turn the feature off, the P Code information must be placed at the beginning of a succeeding Label or as a Label in a succeeding cell.

Below are three examples of how P Code markers might be used to imbed control codes within the worksheet. If a P Code is to begin a cell, it must be preceded by a quotation mark.

Remember! These are only examples. Please substitute your particular printer's codes as generated according to Appendix E in place of the symbols used.

EXAMPLE 1: This is an 0X0underline0Y0 test.'ENTER'

0 = P CODE marker.
X = Control code to turn on underline.
Y = Control code to turn off underline.

The example below uses codes to boldface numbers. Notice that the P Code information to turn on boldface ended the preceding Label cell, and that the P Code information to turn off boldface preceded the succeeding Label cell. Notice also that more than one code can be placed within P Code pairs.

EXAMPLE 2: Boldface is on0;X0 123456789
0;Y0Boldface is off.

0 = P CODE marker.
; = ESCAPE code.
X = Code to turn on boldface.
Y = Code to turn off boldface.

The next example switches print sizes with codes.

EXAMPLE 3: "0;Z0

" = Label indicator.
0 = P CODE marker.
; = ESCAPE code.
Z = Code for alternate print size.

Certain printers require that some or all control codes be preceded by an escape code in the control sequence. escape is generated from the keyboard, in the lowercase mode ONLY, by pressing 'CLEAR'-'@'.

RULE: P Codes may not be used in cells containing formulas. If you desire the results displayed in these cells to printed in bold, underlined, or whatever, you must be sure to include the proper printer code in the next previous cell not containing a formula.

RULE: P Code markers must be used in pairs...OR ELSE!

- Underlining, Backspaces, Superscripts & Subscripts

— Underlining

Underlining has obvious advantages for emphasizing text, etc. VIP Calc supports underlining for all printers. Underlining is a printer-controlled feature. There are essentially two ways that printers control underlining: automatic or with backspaces. If your printer supports automatic underlining, you can use the on/off control codes. If your printer does not support automatic underlining, this section will prove helpful. In fact, some printers do not support underlining at all, in which case this section will be of no avail. (See your printer manual.)

Automatic control of underlining is through use of printer control codes to turn on and off underlining before and after the text you want underlined. This is easily accomplished by generating the numeric equivalents of the correct control codes in your printer driver or between P Code markers.

The second method, used with older printers that do not support underlining directly, requires that your printer supports backspace characters because the print-head must be backspaced over the text to be underlined the exact number of spaces of the text being underlined, and then the same number of underline characters must be sent to the printer (underline characters are generated by pressing 'SHIFT"UP ARROW' - see Appendix E). To do this with VIP Calc you must place all backspace and underline characters between P Code markers. This is required to force the system to backspace and underline, since without the P Code markers, only the first nine or so characters of the cell would be printed, and the remaining portion of the string would be ignored.

EXAMPLE 1: 0#0Underlining is turned on and off.0$0
EXAMPLE 2: Underlining with backspaces0bbbbbbbbbbbb
bbbbbbbbbbbbbb_____
0

0 = P CODE marker.
# = Code for underline on.
$ = Code for underline off.
b = Backspace character.
_ = Underline character.

— Backspacing

Backspacing, a printer controlled feature, can have other uses besides underlining. Placement of tilde's and other diacritical marks usually will require you to backspace the printhead for proper placement. Owners of some printers will want to use backspaces to make use of the printer's double strike capability if your printer does not have an automatic double-strike capability. The backspace character (decimal 8) is generated by pressing 'CLEAR'-'SHIFT' 'H' (see Appendix E - Note that some printers do not have an actual backspace character, but instead force you to indicate the number of micro-dots which you wish to backspace).

EXAMPLE: Double strike0bbbbbbbbbbbbbDouble strike0
0 = P CODE marker.
b = Backspace character.

In this example the backspace characters are used to allow printers which do not support it directly to double strike the phrase "Double strike". Between P Code markers are placed the same number of backspace characters as there are characters in the string "Double strike", and then that string is sent to the printer again so that it will type over the first string to affect double strike.

-- Superscripts and Subscripts

Superscripts and subscripts are printer controlled features. You can only have them if your printer allows you to. If your printer supports superscripts and subscripts (see your printer manual), they are enabled by incorporating the control codes in your printer driver or between P Code markers just like other printer functions enabled by printer control codes. Note that some printer manuals refer to superscripts as half-reverse linefeeds, and to subscripts as half-forward linefeeds.

- Pause Print Markers 'CLEAR'-'='

The Pause Print function is a special feature which allows you to pause the printer for such special applications as changing thimbles or daisy wheels on letter quality printers. This Pause Print function is intended for use with daisy-wheels, TTY's, and other non-buffered printers. The Pause Print function will usually not work properly on any printer that uses a buffer to store text. Experiment with your printer to see if the Pause Print function will work with it.

The Pause Print function is enabled by using the Pause Print marker between P Code markers. The Pause Print marker is generated by pressing 'CLEAR'-'=' and is represented by an inverse "=" (an orange diagonal block in the 32 display). When the system encounters the Pause Print marker (between P Code markers) it stops printing at that point. After you have completed the task of changing the thimble or whatever, you may restart printing by pressing any key.

EXAMPLE: The printer will stop here.0=0
0 = P Code marker.
= = Pause Print marker.

- No-Print Marker 'CLEAR'-'N'

VIP Calc provides a means to segregate portions of your text from that which you want to be printed, without deleting the segregated text from the file. Text to be segregated is placed between No-Print markers. These markers must be at the beginning of a cell and must be preceded by a quotation mark to indicate Label status. To generate a No-Print marker, press 'CLEAR'-'N'. The No-Print marker is represented by an inverse "n" (an orange block absent the lower right-hand corner in the 32 display). When the printer encounters the first No-Print marker it ignores the following text until it encounters another No-Print marker which toggles the system back to resume printing from that point.

EXAMPLE:
nAll of this text, which was preceded by the first No-Print marker, is text that WILL NOT BE printed.'ENTER'
nThis text, which was preceded by a the second No-Print marker, WILL BE printed.

n = NO-PRINT marker.

Text set off with No-print markers may be printed if you set the Print No-print parameter to 'Y'. The Print No-print parameter is discussed above.

- Headers & Footers 'CLEAR'-',' & '.'

Headers, and Footers are lines of text used for various purposes. Headers usually are lines of text which you would want printed at the top of every page. Footers are the same, except that they usually go at the bottom of the page.

VIP Calc allows Header and Footer lines within the worksheet. These lines are created in a separate cell which are begun with a Header or Footer marker after a quotation mark. The Header marker is represented as an inverse "," (a yellow block in the 32 display), and is generated by pressing 'CLEAR'-','. The Footer marker is represented as an inverse "." (a red block in the 32 display), and is generated by pressing 'CLEAR'-'.'. Headers and Footers can be as long as you wish up to 255 characters.

To use Header lines proceed as follows: Go to a cell and start with a quotation mark, followed by 'CLEAR'-','. Next, type the text which you wish to appear as the Header. Terminate the line with an 'ENTER'. The Header will be printed on line four of the printed page. You can, however, change the line on which the Header will be printed by setting the "HL" parameter to the desired line. To suppress the header, set "HL" to zero. Unless otherwise specified, when not suppressed, the Header will be printed on every page. The system also permits you to specify that the Header be printed only on odd or even pages. To specify Odd, set the HS (Header Status) parameter to O; to specify Even, set it to E; to return to printing the Header on All pages, set "HS" to A.

EXAMPLE: ⊥This is a header.'ENTER'
⊥ = Header marker.

To use Footer lines proceed as follows: Go to a cell and start with a quotation mark, then 'CLEAR'-'.'. Now type the text which you wish to appear as the Footer. Terminate the line with an 'ENTER'. The Footer will be printed on line sixty-two of each printed page. You can also change the line on which the footer will be printed by setting the "HL" parameter to the desired line. To suppress the footer, set "FL" to zero. The Footer Status "FS" parameters A, E, and O govern printing Footers on All, Even, or Odd pages, with the default being All as with Headers.

EXAMPLE: .This is a footer.'ENTER'
. = Footer marker.

As the system prints the textfile, when it comes to the line on which the Header or Footer line is to be printed, it will print the most recent Header or Footer line that was encountered. This allows you to change Header and Footer lines by placing additional Header or Footer lines elsewhere within the worksheet.

If you suppress Headers or Footers, they remain suppressed until you set the "HL" or "FL" parameter to a value other than zero (0).

RULE: "HL" and "FL" cannot be set to appear on the same line if they are to be printed on the same page.

- Comment Markers 'CLEAR'-'+'

VIP Calc permits you to make a commentary to what you have written by putting non-printable Comments in your worksheet. Such a commentary can often be helpful if you are writing a document which will be used several times and you want to remember why you put some formula, title or other piece of information in, or you want to remind yourself of other alternatives, etc. For example, you might wish to place comments in your worksheet as instructions to your secretary or other user of the program. Comment markers must be placed at the beginning of the cell to be devoted to the comment, and the Comment must be terminated by an 'ENTER'. The Comment Marker, an inverse "+" (a green diagonal block in the 32 display), is generated by pressing 'CLEAR'-'+'. Your Comment may be any length up to 255 characters. When the printer comes to a Comment marker, it ignores the contents of the cell containing the comment marker.

EXAMPLE: +This is a comment.'ENTER'
+ = Comment marker.

Text set off with a comment marker may be printed if you set the Print Comment parameter to 'Y'. The Print Comment parameter is discussed above.

- Formfeeds 'CLEAR'-'/'

The Formfeed marker is represented by an inverse "/" (a cyan block in the 32 display), and is generated by pressing 'CLEAR'-'/'. It must must be placed at the beginning of a cell. Formfeeds are commands to the printer to skip lines until it reaches the top of the next page for printing. Formfeeds are used where you wish to print a partial page and automatically feed the paper to the top of the next page. The Formfeed should be placed at the beginning of the cell in the row following the point at which you wish that page to end. Nothing else should be in that row.

PROGRAMMABLE FUNCTIONS 'CLEAR'-'X'

Programmable Functions are powerful functions which can be used to create any chain of commands you can dream up. Many of the commands contained in VIP Calc are themselves complex combinations of functions. The Replicate command is one good example. With programmed functions you can customize your own commands of equal power.

You may create as many "newly created commands" (Programmed Functions) as you have cells in your worksheet. All of these new commands are stored in your worksheet and can be used whenever you wish. These Programmed Functions are created by incorporating any combination of the commands, functions, modes or keystrokes in VIP Calc.

Some examples will greatly clarify the usefulness of this feature and the mechanics of its use. But first an outline of how to "create a command." To begin, place your cursor in the cell in which you wish the programmed function to be stored. Programming of each Programmable Function option is initiated by typing in a quotation mark since programmed functions are Labels. Next press 'CLEAR'-'Z' which puts a programmable function marker on the entry line. The marker is an inverted "z" in the hi-res modes and a vertical half-block in the 32 display. Next enter the number of times that you wish the function to be executed, followed by a comma. If you do not give a number, the function will be executed once. Now proceed to enter the keystrokes comprising your programmed function. Follow the rules given below for entry of keystrokes. The last keystroke of your programmed function will usually be a carriage return, since a carriage return universally completes an entry. To enter a carriage return, do not press 'ENTER'; instead press 'CLEAR'-'SHIFT"M'. This is because pressing 'ENTER' itself terminates entry of the

function. Once you have finished entry of your function, programming the function, press 'ENTER' and it will be entered into your worksheet at the cursor position.

When you want any of your Programmed Functions to be executed, place the cursor in the desired position from which the function will execute, and press 'CLEAR'-'X'. Now enter the coordinate in which the particular programmed function to be executed resides and press 'ENTER'. It will then be executed the number of times specified in the programmed function. You may press 'BREAK' at a time to stop execution of the function.

If you want to change any portion of your function you can use the Edit command to insert, delete or change things. This is especially useful for changing the number of times that the function is to be executed.

The following are some special programming rules for inputting various characters:

1) Control codes 'CLEAR'-'SHIFT"@' and 'A-Z' (decimal 0-26) 'CLEAR"@' and 'CLEAR' 'SHIFT' 'CLEAR' are entered by pressing the key sequences found in Appendix E. They may only be input when you are in the lowercase mode. These control codes contain many of the commonly used print features, such as carriage returns, line feeds, formfeeds and the like. The important ones, such as carriage returns the 'BREAK' key and the 'CLEAR' key, are discussed below.

2) The clear key is generated by pressing 'CLEAR'-'SHIFT"L', and it is represented as an inverted comma.

3) Since 'ENTER' completes input of a

programmed command, if you wish to imbed an 'ENTER' in your programmed command you must input it by pressing 'CLEAR'-'SHIFT"M'.

4) When programming a function you may need to execute a 'BREAK' from the Command mode. Pressing 'BREAK' itself when programming the Function will not program the Function to break, but instead will break out of the programming procedure altogether. To program the function to break, 'BREAK' must be entered as 'CLEAR'-'SHIFT"C'.

5) Arrow keys which are meant to move the cursor are input not by pressing the arrow key but by first pressing 'CLEAR' and then the arrow key.

6) Programmable Functions begin execution from the cursor position in the worksheet. Thus, Command Mode commands must be preceded by two 'CLEAR' keys. '/'-'ENTER' exits the Command mode.

7) You MAY program Programmed Functions into other Programmed Functions, or even allow a perpetual execution loop of a programmed function. However, if you do imbed another programmed function, you must end the sequence with an imbedded 'ENTER'.

8) Loading files from tape or disk may not be made a part of a programmable function since these activities halt execution of the programmed function.

Now you know the rules. But what good is a programmed function you ask? Lots. Here are a couple of examples to help you get to know the power of programmed functions.

— Printing Multiple Copies

One purpose to which many of you will put programmable functions right away is printing multiple copies of your worksheet. This is a very simple function to perform.

First move the cursor to a cell in which you wish to place your programmed function. You might wish to place all your programmed functions in a certain block of cells which you will not have need for. For this example lets move the cursor to A20. Next enter a quotation mark for a Label, and the system will await your input on the Entry line. Press 'CLEAR'-'Z' to get the programmed function marker. The next step is to give the number of times you wish the function to be performed. Since we want 50 copies of the worksheet, type "50" and then a comma. Now for the command. Press 'CLEAR'-'SHIFT' 'L' for the 'CLEAR' key, then 'P' 'P' for printing and the coordinate of the last cell to be printed, here let's say M10, and 'CLEAR'-'SHIFT' 'M' for the required 'ENTER'. To complete programming and enter the programmed function in cell A20 press 'ENTER'. This function does the same thing you would do if you were to press the keys to print 50 times.

Now you have programmed a function which will print fifty copies of your worksheet automatically whenever you execute it. To execute it, ready your printer, move your cursor to the cell from which you wish to begin printing your worksheet, then press 'CLEAR'-'X' followed by the coordinate of the cell containing the programmed function to be executed, here A20, then press 'ENTER'. You will get 50 copies of your worksheet. You may press 'BREAK' at any time to stop the function.

— Duplicating Complex Formulas

Many of you have special complex formulas that you frequently use in your worksheets, but you do not use them in consecutive cells, so the replicate command is of little help. You have to type them in anew at each location. Instead of having to type them in anew each time you may create a programmable function which inputs them wherever executed. To do this you would allocate a few cells as your special formula cells, and then place programmed function in the cells.

Programming the function is simply done by moving your cursor to the cell to be programmed, and enter a quotation mark, then press 'CLEAR'-'Z'. Since you will probably only wish the formula to be entered once, you may next type '1' and a comma, or go straight to entering the formula by typing it as you would in any cell. The last programmed keystroke would then be 'CLEAR'-'SHIFT' 'M' as the 'ENTER' to be used to input the formula in the desired cell. Lastly, press 'ENTER' to finish programming of the function.

Now, when you need that special formula, move your cursor to the cell to contain the formula and press 'CLEAR'-'X', plus the coordinate of the cell containing the programmed function with the formula, and press 'ENTER'. The programmed function will be executed, saving you many, many keystrokes. This is just a slight hint at the power of programmable functions to supplement the replicate command.

— Automatically Save and Print Hardcopy

Many of you will habitually close out work on your worksheet by saving it to tape or disk one or more times, printing a hard copy, and then clearing the worksheet to start anew. This or any other common close-out sequence can be easily programmed so that it will be done automatically by the system as you do other things!

For example, suppose that you have two disk drives, and you wish, when closing out, to save your worksheet to a work disk and a backup disk, print the worksheet, and then clear your sheet. Here is one way to do it. Go to the desired clear cell, here A1, and type: '"CLEAR'-'Z' '1' ',' 'CLEAR' 'SHIFT' 'L' 'CLEAR' 'SHIFT' 'L' "D-S (filename and extension) :-0" 'CLEAR' 'SHIFT' 'M' 'D-S-:-1' 'CLEAR' 'SHIFT' 'M' '/'-'CLEAR' 'SHIFT' 'M' 'CLEAR' 'SHIFT' 'L' 'P' 'P' '(your end coordinate for printing)' 'CLEAR' 'SHIFT' 'M' 'CLEAR' 'SHIFT' 'L' 'CLEAR' 'SHIFT' 'L' 'C-L-E-A-R' 'CLEAR' 'SHIFT' 'M' 'Y' and press 'ENTER'. This sequence programs a function to automatically enter the Command Mode, save the file to the disk in drive 0, save the file to the disk in drive 1, exit the Command Mode and commence printing the worksheet through the coordinate given, and finally enter the Command Mode and clear your worksheet. This function is programmed to execute once. If the file you are saving already exits on the disk and you wish to save over it, you must put a 'Y' in the proper places in the function.

Now, to execute the function. Move the cursor to cell A1 and press 'CLEAR'-'X' and then the coordinate of the cell containing the function, here "A1". The system will perform your function. Although this function will take a little longer to type in the first time, since this function will be saved with your worksheet, each time you work with

the worksheet you can close out simply by pressing 'CLEAR'-'X' 'A1' without ever re-typing the function back in.

This again is only one example of a close out sequence. Following this example you can easily customize your own.

REPEATING LABELS 'CLEAR'-'-'

Function: The Repeating Label command is used to fill a cell with the same character or characters regardless of the column width. This command is commonly used with the Replicate command to draw lines on the worksheet to set off various portions.

Command Structure: The command is begun by placing your cursor in the cell to be affected and pressing 'CLEAR'-'-'. The system will then await entry of the character(s), such as a dash. When you press 'ENTER' the characters will be repeated across the cell, regardless of width.

REPLICATE 'CLEAR'-'R'

The Replicate command is used to copy a label, value, formula, or format to another cell or group of cells. This command can be used to copy a cell into one or more cells or a series of cells into other cells.

The Replicate command works on a source range and copies the source range into a target range of a row or a column. A range can be one cell or a series of cells in a column or a row. When the Replicate command is invoked, three things will be requested: the source range, the target range, and, for formulas which refer to other locations, whether the formula should be changed relative to the new location or whether it should remain unchanged.

Command Structure: The Replicate command is initiated by placing your cursor at the cell from which replication is to begin and pressing 'CLEAR'-'R'. This will bring a cursor on the Entry line with a prompt on the Command line requesting your source range. You must now specify the source range by entering the cell coordinate of the starting point of the source range.

Once the starting point is determined, you may complete indication of the source range in either of two ways. If you only wish to replicate one cell, you may press 'ENTER'. Then the Entry line will show the start point, followed by three periods and ended with the end point, here the same location. If the end point is other than the same cell as the starting point, you must first press '.' to indicate that the source range is more than one cell. This will result in the display of three periods after the source range start point location on the Entry line. To complete the source range entry, or enter the end-point coordinate. Then press 'ENTER'.

Once you have pressed 'ENTER' the system will prompt you for the target range. The rules for specification of the target range mirror those for specification of the source range. Indicate the start on by entering the coordinates. Next press 'ENTER' if it is only one cell or '.' if you wish to specify a different end point. Specify the end point by entering the end cell coordinate. Finally, press 'ENTER'.

If you are replicating a row or column into a rectangular area, the source range is specified as the starting and ending cells of the row to be replicated. The target range is given as the first cell of the first row or column of the area to be replicated into, and the first cell of the last row or column of the area to be replicated into. An example of this type of block replicating was given in Lesson Three of the tutorial section.

Once you have finished this sequence, if the cell contents to be copied are a label or a number, the replication will be carried out. However, if the string to be replicated is a formula with reference to another cell, the system will inquire whether you wish to have the reference altered to reflect the relative change in cell reference, or remain the same. Thus, the portion of the formula concerned will be highlighted and you will be promped: Relative Y/N. Press 'Y' if you wish a relative reference and 'N' for no relative reference. (The relative reference feature was illustrated above in Lesson 4.)

SORT 'CLEAR'-'S' (64K version only)

Function: The Sort command allows you to sort the cell contents of your rows and columns in numerical or alphabetical order. This allows you to put names, amounts and the like into a meaningful order for comparison of results. It is usually done to obtain a printout of the results. After you have sorted, the contents of rows or columns are re-arranged in alphabetical or numerical order according to your criteria.

Command Structure: Sorting is done with items in columns or rows. You may specify which rows or columns are to be sorted and how much of the rows or columns is to be sorted. Before sorting, first turn off automatic recalculation by using the Global command. It is also advisable that you save your file as it exists before the sort. This is necessary since formulas will often be moved out of sequence, leading to wierd results.

To begin the sort press 'CLEAR'-'S'. You will be prompted "From...To". You are being asked to give the coordinates of the first and last rows or columns to be sorted. After you specify the first coordinate, press '.' and three periods will appear after which you are to enter the last coordinate. After specifying the last coordinate press 'ENTER'. The system knows that you are specifying a row or column sort by the identical row or column coordinate in both references.

After you have specified the rows or columns to be sorted the system will prompt "Record size?" The system is now asking you for the amount of the rows or columns that you wish sorted. You are to answer with the number of cells from the start cell of the initial row or column that you desire sorted and press 'ENTER'. This feature allows you to leave other contents of that row or column intact. If you

press 'ENTER' without inputting a number the system will sort the entire row or column.

The system will now ask "Sort:cell?" You are being asked to specify the cell by which the rows or columns are to be sorted. Thus, if you wish to alphabetize the names of your salespersons and their names are placed in column A, beginning with cell A3, you would enter A3 as the field and press 'ENTER'

The next question is whether you wish the sort to be done in ascending or descending order, that is, from A to Z or from Z to A. You will be asked "Ascending Y/N?" Press 'Y' for ascending or 'N' for descending and press 'ENTER'. Now the specified portions of the rows or columns will be sorted.

It is highly recommended that this sort procedure be the last step you take, and that you save your worksheet before you sort. This is advisable since the sort rearranges your formulas in an order different from that which you originally created, thus leading to potential miscalculations.

Multi-layered sorts, that is, a sort of rows or columns according to several criteria, may be accomplished using a programmable function. The process would be to chain together as many sorts as there are criteria for the sort. This would essentially entail several identical sorts except that the "Field" would be different.

WINDOW 'CLEAR'-'W'

Function: The Window command is a powerful feature which allows you to bring into view parts of your worksheet which are normally not on the screen at the same time for instant comparison of results arising from changes. You may divide the screen into upto sixteen separate windows (eight in the 32K version). Each will be numbered in the sequence of creation. Each window is a separate unit which may be affected by the commands available for the entire worksheet. Windows may be scrolled independently or they may be linked to scroll together.

By properly juxtaposing portions of your worksheet, you will hardly have to move in the sheet at all to make changes and watch the results. As a hint, you should attempt to create vertical worksheets, that is, worksheets using as few columns as possible. This will allow you to use the vertical bit scrolling feature of VIP Calc, and avoid any redrawing of the screen. You will find that the proper use of windows, cursor movement commands, and manual recalculation will greatly speed up use of VIP Calc.

Command Structure: The Window command is cursor oriented in that windows are affected from the current cursor position. A window will be created horizontally by the insertion of another Column border in the row above the cursor location. A window will be created vertically by the insertion of a new Row border in the column to the left of the cursor position. To create a window, first move your cursor to the row or column from where you want the window to begin and press 'CLEAR'-'W'. This will elicit the prompt "Window: 1 H S U V" on the Command line. You may select a 'H'orizontal window, a 'V'ertical window, '1' window, 'S'ynchronized scrolling and 'U'nsynchronized scrolling.

When a window is created, the cursor will move to the original window. The window in which the cursor resides is the window which will be affected by the implementation of any commands. You may go from window to window by sequentially pressing ';'.

Synchronization of windows is done from the Window menu. In synchronization, scrolling in one window causes scrolling in another. The control is one-way: scrolling in the controlled window does not cause scolling in the controlling window, although you can purposely make two windows control each other. Thus, if you wish to have window two scroll when you scroll window one, you would place the cursor in window two and synchronize it with window one with the Window command.

To synchronize scrolling, first place the cursor in the window which you wish to have controlled. Then press 'S' from the Window menu. You will next be asked whether you wish the synchronization to be 'H'orizontal, 'V'ertical or 'B'oth. Once you have determined the direction of synchronization, you will be prompted for the number of the window which will control scrolling. Unsynchronization of windows is done similarly, except that it is initiated by pressing 'U' from the Window menu.

Synchronized windows are only synchronized with arrow key cursor movements, not with the paging commands, the GOTO command, or other express cursor movement commands.

You may return to only 1 window by pressing '1' from the Window menu. This will eliminate all windows and will return you to the window in which the cursor resides.

If you clear the worksheet or change display formats while you have windows, all windows will be eliminated and the system will return to one sheet.

COMMAND MODE COMMAND SUMMARY

Command Mode commands generally control tape and disk access, display options, text buffer clearing, and alteration of format parameters. The Command Mode is a special mode entered by pressing 'CLEAR' twice. When you do this the cursor will appear on the Command line at the top of the screen after the "Command:" prompt.

Disk users of VIP Calc may obtain a help menu of command mode commands by inserting the program diskette in the drive and typing '?' 'ENTER' from the command mode. Tape users may refer to the Command Mode command summary in Appendix C.

These functions generally require input of character strings for performance and thus the need for the Command line as a convenient place for such input. Input on the Command line for Command Mode commands is limited by the screen display: 21 characters for the 32 display, 40 characters for the 51 display, 53 for the 64 display and 74 for the 85 display. As in BASIC, 'SHIFT"Left Arrow' will delete any input on the Command line and allow you to begin your input over again. The Command line will also provide necessary prompts when you are using the Command Mode.

Command Mode commands are progressive in that you do not automatically exit from the Command Mode when the current command has been executed; instead, you remain in the Command Mode in case you wish to perform other commands. To exit the Command Mode you may either press 'BREAK' or '/'-'ENTER'.

BASE COMMANDS

VIP Calc allows numeric entry in several number bases: binary, octal, decimal and hexadecimal. To change the base, press 'CLEAR' twice to enter the Command Mode, then press the number of the base you desire to use, 2, 6, 10 or 16 and press 'ENTER'. If you have figures in your worksheet, they will be converted to whichever base you have chosen.

BUILT-IN CALCULATOR

As a convenience VIP Calc contains a command to test or evaluate the results of formulas or mathematical expressions. This gives you a quick calculator, and is very simple to do. Enter the Command mode, type a space, then the formula or mathematical expression to be tested or evaluated and press 'ENTER'. The result will be displayed on the command line.

CHANGE SCREEN COLOR COMMAND

You may also select from several different display colors. You may have a green or white screen (green or orange in the 32 display). In the hi-res displays you may also invert the display for light characters on a dark background. To change the color, type 'C' and then 'ENTER' from the Command Mode. To invert the display or return it to the non-inverted display press 'I' 'ENTER' from the Command Mode.

CLEAR WORKSHEET COMMANDS

There are two options to choose from when clearing your worksheet, plus one other buffer-related command:

'C-L-E-A-R'	Clears entire worksheet.
'E-M-P-T-Y'	Clears all data but not formats.
'E-N-D'	Exits the program back to BASIC.

You may clear your worksheet in either of two ways. The first allows you to totally Clear your worksheet of everything so that you can start with a clean slate. The second method allows you to Empty the data while retaining all the special formats you have created. To use either, type "Clear" or "Empty" from the Command mode and press 'ENTER'. You will be prompted "Are you sure?" You must press 'Y' to confirm.

If you should desire to conveniently, but permanently, exit the program to BASIC, you may use the End command. To do so, type END 'ENTER' from the Command Mode. You will then be prompted "Are you sure?". Press 'Y' to confirm and exit.

DEFINABLE MATRIX COMMAND

VIP Calc originally starts with a worksheet with 63 columns by 255 rows. This is the standard size worksheet suited to most needs. However, for several reasons you may choose to use a worksheet of a different size. VIP Calc allows a worksheet with up to 512 columns by 1024 rows for maximum versatility.

Your worksheet size is determined both by your special needs and by the amount of memory that you have available. This was discussed in the section on Memory Management in Lesson One.

Such memory considerations are closely tied to your actual needs. Some types of worksheets require only a few columns but many rows. In traditional worksheets, which were limited to 255 rows, it was possible to run out of rows for data entry long before you ran out of memory. With VIP Calc, although the worksheet is initially set for 255 rows, you can set it for any number of rows, up to 1024. Thus, if you are creating a checkbook ledger, there is no need to use more than a few columns, but you would need the number of rows your memory would allow. This can be done easily using the Matrix command.

The Matrix command allows you to limit the size of your worksheet by specifying its lower right-hand corner. For example, to create a worksheet with 100 columns and 500 rows, enter the Command Mode and type: MATRIXCV500'ENTER'. "CV" is the 100th column. When you use the matrix command, it completely clears your entire worksheet. Thus, be sure to save anything of value before using the command.

DISK AND TAPE ACCESS COMMANDS

DISK FILE ACCESS

— Disk Commands and System Defaults

The VIP Calc initializes with a default extension of "/SHT" and a default drive number of ":0". These defaults can be changed at any time. The default extension assumes the last extension used and is changed by entering a new extension during any disk access ("DS" to Save, "DL" to Load or "DK" to Kill). The same is the case with the default drive number. Changing defaults will be discussed more in later sections.

— Displaying a Diskette Directory

To display a disk directory, mount a diskette in Drive 0 (default drive), type 'CLEAR' twice to enter the Command Mode, then press 'D'-'I'-'ENTER'. The directory for Drive 0 will be displayed in a two-column format with the drive number and number of free granules displayed on the Command line. If the number of entries exceeds 30 (1 page) the display will pause. To continue to the second page of entries press any key except 'BREAK'. A maximum of 68 entries are allowed. Each entry on the directory will be followed by a number indicating the number of granules allocated to the file on the disk, and the letter "A" for ASCII or "B" for Binary to indicate the nature of the file.

Sometimes, due to disk operating system failure or some other reason, your disk may have "crashed". VIP Calc permits you to Load files from a crashed disk. When you call up the directory of a crashed disk some of the files of the disk will be followed by an asterisk. Those files may not be loaded. The asterisk indicates that those files are bad. The

other files may be loaded. Be sure to load these files and save them on another disk. Once all the good files have been saved from the bad disk, you then should bulk erase the disk, re-initialize it and use it again to save files - if the disk has not been totally ruined. Do NOT save files onto a bad disk since they will not be saved properly! If you have VIP Disk-ZAP you should be able to fix the underlying error.

If you wish to display the directory for a drive other than Drive 0 type 'D'-'I' followed by the drive number and then press 'ENTER'. The directory will be displayed for the drive number that you specified.

EXAMPLE: DI3'ENTER'

This example will display the directory for the diskette mounted in Drive 3.

— Saving a Worksheet to the Diskette

Worksheets may be "saved" to the diskette in one of two forms. The underlying commands and data used to create the worksheet may be saved to the disk to later be recalled for additional work. The display of the worksheet may also be "printed" to the disk for use when writing documents using VIP Writer. This latter function is a part of the print command and is discussed in that section. The disk save discussed in this section applies only to the underlying commands and data used to create the worksheet. To distinguish the two, worksheets saved to disk have the default extension of "SHT" for "worksheet data", while the displays "printed" to disk are given the extension of "VIP" to indicate compatibility of use with other VIP Library and other ASCII-compatible programs.

When VIP Calc saves a worksheet to a specific drive it first checks to see if the file already exists on the diskette mounted in the drive specified. If the file exists the system will save the new worksheet over the old one. If the file does not exist the worksheet will be saved to the diskette mounted in the drive specified. VIP Calc always verifies when it saves to disk to assure that your worksheet has been saved error free.

Important

From time to time the Color Computer operating system may error while saving the worksheet. "Error" will be displayed on the Command line and the Error warning signal will sound. If an error such as this should occur, resave the worksheet on both the same diskette and a backup diskette as well. Errors during the save, if undetected, would cause you to lose all of your hard work. To avoid a calamity of this sort it is recommended that you always save your files on two separate diskettes. Then if you have difficulty with one of your files, you will still have a copy of your work.

Diskettes are cheap; your time isn't!!

Only your entire worksheet may be saved. To save your worksheet, move the cursor to cell A1 and press 'CLEAR' twice to enter the Command Mode. Mount a formatted diskette in Drive 0. Do NOT use the VIP Calc master diskette. Type 'D'-'S' followed by the filename (not to exceed 8 characters) and press 'ENTER'. The prompt "Old file will be erased. OK?" will appear. Pressing 'Y' will cause the Save; pressing any other key will abort the Save.

EXAMPLE: DSTESTNAME'ENTER'

In this example the worksheet "Testname/sht" will be saved on the diskette mounted in Drive 0, and "File

saved" will be displayed on the command line. Press 'BREAK' to return to the Text Mode.

If you wish to use a different extension such as "/TXT", type the extension after the filename.

RULE: Extensions must be preceded with a "/" or "."

EXAMPLE: DSTESTNAME/TXT 'ENTER'

In this example, the worksheet "Testname/txt" will be saved on the diskette mounted in Drive 0.

If you wish to save your worksheet to a diskette mounted in a drive other than Drive 0, type ":" followed by the number of the drive on which you wish your file to be saved.

RULE: Drive numbers must be preceded by a ":".

EXAMPLE 1: DSTESTNAME:1'ENTER'

EXAMPLE 2: DSTESTNAME/TXT:2'ENTER'

In example 1, the file Testname/sht will be saved on the diskette mounted in Drive 1. In example 2, the file Testname/txt will be saved to the diskette in Drive 2.

After you have saved a textfile to disk, the filename, extension, and drive number are stored in a buffer and are retained for later use. To display the filename press 'CLEAR' twice to enter the Command Mode, then type 'D'-'N' 'ENTER'. The last name, extension and drive number will be displayed on the Command line.

Because the filename is retained, you can save the same textfile without entering the filename, extension, or drive number each time. To save a textfile using the existing filename type 'CLEAR'

'CLEAR' 'D' 'S' and press 'ENTER' 'Y'. Your file will be saved to the diskette mounted in Drive 0 with the previous filename, here "Testfile/sht".

To save a textfile using the existing filename to a diskette mounted in a drive other than Drive 0, type 'CLEAR'-'CLEAR'-'D'-'S'-':' then the Drive number, for example, '2', and press 'ENTER' 'Y'. Your file will be saved to the diskette mounted in Drive 2 with the previous filename, here "Testfile/sht".

You may change the default diskname, extension and/or drive from the Diskname command by entering the new name after typing 'D-N', and then pressing 'ENTER'. This will change the filename for automatic diskfile command execution.

— Loading and Merging Worksheets from the Diskette

VIP Calc allows you to load any worksheet file from diskette for further work. There are two types of load: file loading and file merging. File loading first clears the system of any previous worksheet and then loads the worksheet you specify. File merging loads the specified worksheet over any worksheet currently in the system, leaving intact cells not used by the new worksheet. The merge-file option allows you to overlay worksheets for more versatility.

Files to be loaded or merged are the files with the extension "SHT". You may not, however, reload worksheet displays "printed" to diskette (those with the extension of "VIP") since these files are meant only for transfer to and use by ASCII-compatible programs. (These "VIP" files are discussed with the Print command.)

To load or merge any worksheet saved in ASCII press 'CLEAR' twice to enter the Command Mode then type 'D'-'L' for load or 'D'-'M' for merge, followed by the filename and drive number, then press 'ENTER'. If no extension is specified the default extension will be used. As your worksheet is loading an asterisk will flash on and off on the command line indicating that your worksheet is loading and being processed. When loaded, the message "File loaded" will be displayed on the Command line. Press 'BREAK' to exit to the worksheet.

EXAMPLE: DLTESTNAME/SHT:0'ENTER'

The VIP Calc will look for the file Testname/sht on Drive 0. If the file is found the system will be cleared and the file will be loaded from the diskette. A warning will sound and the "File not found" message will appear on the Command line if no such file exists, such as, for example, when you type in the incorrect name. If you used 'D'-'M' rather than 'D'-'L', the file would be loaded without first clearing the system.

As mentioned earlier, the filename, extension and drive number are retained, allowing you to load the previously entered worksheet by typing 'D'-'L' or 'D'-'M' and pressing 'ENTER'.

EXAMPLE 1: DLTESTNAME/SHT:2'ENTER'
EXAMPLE 2: DM'ENTER'

Example 1 will load the file Testname/sht from the diskette mounted in Drive 2. Example 2 will merge the previously entered worksheet, in this case Testname/sht, from the diskette mounted in Drive 2.

— Renaming Disk Files

The system will allow you to rename your disk files without having to resave your files. All file name rules discussed above apply concerning filenames and extensions. To rename your file enter the Command Mode, type 'D'-'R' plus the file name you want changed and then press 'ENTER'. After you have pressed 'ENTER' the system will respond with the prompt: "New file name?" You may then type in the new file name and press 'ENTER'. The system will then rename your file.

EXAMPLE: DRTESTFILE 'ENTER' NEWNAME 'ENTER'

This example renames the file "Testfile/sht" to "Newname/sht."

— Killing Worksheets

To kill a worksheet from the diskette, press 'CLEAR' twice to enter the Command Mode, then type 'D'-'K' followed by the filename, extension and drive number, and press 'ENTER'. The system will respond with "Are you sure?." A 'Y' response will kill the file. Any other response will exit to the Command Mode.

EXAMPLE: DKTESTNAME/SHT:0 'ENTER' Y

This example will kill the file Testname/sht from the diskette mounted in Drive 0.

As with all other commands, "DK" will kill the previously entered worksheet if you type 'D'-'K'-'ENTER' and answer the "Are you sure?" prompt with a "Y".

EXAMPLE: DK'ENTER' Y

This example will kill the previously entered worksheet Testname/sht from the diskette mounted in Drive 0.

— Transferring Tape Files to the Diskette

VIP Calc supports cassette I/O. This allows you to load any worksheet from tape and transfer it to the disk, or vice versa. See below, Loading Worksheets From Tape.

TAPE FILE ACCESS

— Saving Worksheets to Tape

Worksheets may be "saved" to tape in one of two forms. The underlying commands and data used to create the worksheet may be saved to tape to later be recalled for additional work. The display of the worksheet may also be "printed" to tape for use when writing documents using VIP Writer. This latter function is a part of the print command and is discussed in that section. The tape save discussed in this section applies only to the underlying commands and data used to create the worksheet.

To save, first move the cursor to the top of your file, and press 'CLEAR' twice to enter the Command Mode. Place the recorder in the record mode, type "CS" followed by a filename not to exceed eight characters and press 'ENTER'. If no filename is used, the worksheet will be saved with the last filename used. If no filename has been used so far, the worksheet will be saved without a filename. The file contents, beginning from the first cell, will be saved to the tape. When the worksheet has been saved, the system will return to the Command Mode. To display the last filename used, press 'CLEAR' twice to enter the Command Mode, then type 'C'-'N'-'ENTER'. The last filename will be displayed on the Command line.

Sometimes after you have begun to save a worksheet you may decide that you want to abort the save. To do so press 'BREAK'.

— Loading or Merging a Worksheet from Cassette

VIP Calc allows you to load any worksheet file from cassette for further work. There are two types of load: file loading and file merging. File

loading first clears the system of any previous worksheet and then loads the worksheet you specify. File merging loads the specified worksheet over any worksheet currently in the system, leaving intact cells not used by the new worksheet. The merge-file option allows you to overlay worksheets for more versatility.

You may load or merge worksheets saved to tape; you may not, however, load a file "printed" to tape. To load or merge a worksheet from tape, press 'CLEAR' twice to enter the Command Mode. Ready the cassette recorder, type "CL" for load or "CM" for merge, followed by 'ENTER', then press "Play". The filename will appear on the Command line. When the file is loaded, the Command line will show the message "File loaded" with the cursor after it. Press 'BREAK' to go back to the worksheet. If an error occurs during loading, "Error" will be displayed on the Command line, the error detect warning will sound and the system will return to the Command Mode displaying the partially loaded worksheet. To start over you should clear the buffer and try loading again. If you are still unsuccessful, see below.

If you wish to break out of a tape load or merge, press 'BREAK'. If no file or no leader has been found by the system when loading, the "S" prompt for "searching" will remain on the screen until the system is reset. Press the reset button and the system will return with the cursor on the Command line.

— Recovering Worksheets from Bad Tapes

Sometimes, because of a bad tape, bad line connection, or some other problem, your file saved to tape will be bad. The system allows you to recover most of your saved file. VIP Calc uses the same ASCII tape format as the Color Computer. The tape format consists of one start block followed by separate data blocks. If a particular data block causes an error during loading, the rest of the worksheet can be recovered by proceeding as follows:

1) After loading the worksheet and encountering the error, note the position of the tape counter to mark the spot.

2) Rewind the tape to the beginning of the file and re-load the tape just to the point where the filename appears on the Command line.

3) Fast-forward the tape to the place where the error occurred.

4) Unplug the earphone plug to listen to the tape to position it at the beginning of the next data block.

5) Plug the earphone plug back in and press "Play". The remainder of the worksheet will load in with the exception of the block of data with the error.

If the error occurs in the initial start block which serves to tell the system that a file has begun, you may still load the file by doing the following:

1) Take a tape containing any textfile created and saved with the VIP Calc and load it just to the point where the filename appears on the command line.

2) Return to the original tape and locate the bad initial block. Unplug the earphone plug to listen to the tape to position it at the beginning of the next data block.

3) Begin to load the defective textfile with the first good block.

4) Once the file has loaded, you may make any repairs if necessary, and then resave the file with the original filename.

DISPLAY FORMAT PARAMETERS

Print parameters are discussed in the section devoted to printing. The current status of the print format parameters may be displayed at any time by entering the command mode and pressing '.' and 'ENTER'. The parameters will be displayed in a two column format.

You may change any of these parameters by typing the syntax followed by the new status, such as "BD5" and then 'ENTER'. The parameter menu will again be displayed with the change made. You may also change all the parameter back to their defaults by typing '@' 'ENTER' from the command mode.

DISPLAY OPTIONS

For 64K versions users, VIP Calc offers many display options to suit your particular needs. You may at any time switch between one of several hi-res displays, or you may select the standard Color Computer 32 by 16 display. Each of these is selected by entering the command mode and typing the number of the display size, 32, 51, 64 or 85, and pressing 'ENTER'. In addition you may select wide or narrow characters in the 64 display by typing 64N or 64W and pressing 'ENTER'. Of course, if you have Dumped the hi-res displays for extra memory, you may no longer select them.

You may also select from several different display colors. You may have a green or white screen (green or orange in the 32 display). You may also invert the display for light characters on a dark background. To change the color, type 'C' and then 'ENTER' from the Command Mode. To invert the display or return it to the non-inverted display press 'I' 'ENTER' from the Command Mode.

DUMPING THE HI-RES DISPLAYS

The eight hi-res displays offered by VIP Calc are software generated and consume around 9K of work area which you may need to use. VIP Calc allows you to opt not to use the hi-res displays and instead use the memory devoted to them for your worksheet. When you choose this option it is permanent. You will have to reload the program to re-obtain use of the hi-res displays. You do not have to choose to have the extra memory until the system gives you the "Not enough memory" message when your work area is full. When you want to have the extra memory, save your worksheet out and then enter the Command Mode and type Dump'ENTER'. You will then be prompted "Are you sure?" Press 'Y' to dump. The dump command totally clears any data, so you must be sure to save it before dumping. Remember that if you have created a worksheet after having dumped because of a shortage of memory, you will have to dump before loading that worksheet or it will not load in.

EXIT COMMAND MODE

To exit from the Command Mode you may do either of two things. You may press '/'-'ENTER' or 'BREAK'. Both will return you to the worksheet.

EXIT VIP CALC

If you should desire to conveniently, but permanently, exit the program to BASIC, you may use the End command. To do so, type END 'ENTER' from the Command Mode. You will then be prompted "Are you sure?". Press 'Y' to confirm and exit.

FIX DECIMAL PLACES

The fix command is used to truncate fractions display to the number of places after the decimal point desired, taking you out of the floating point display. This command only affects the display, and not the number in memory. Fix is a global command, and will apply to all number except those set to the dollar sign format. To fix the number of decimal places displayed, enter the command mode and type "FIX" followed by the number of places you wish after the decimal point, then press 'ENTER'. Zero returns you to the floating point display.

FIX PRECISION (64K only)

VIP Calc allows 16 digit, or double, precision in the 64K version. This means that you can have numbers calculated accurately up to incredibly high or low amounts. Most of you, however, do not need this great of precision. Eight digit, or single, precision, the same as that which comes with BASIC, will do just fine for almost all monetary calculations; double precision is useful for scientific applications.

Because of this, VIP Calc comes with a default of single precision, but offers you a choice in the 64K version. We chose single precision because it is the most commonly used and because the calculating time for single precision is over four times as fast as that for double precision.

64K version users may at any time change the precision to double precision by entering "DOUBLE" 'ENTER' from the command mode. To go back to single precision, enter "SINGLE" 'ENTER' from the command mode.

GRAPH CHARACTER COMMAND

VIP Calc allows you to express numeric values in graph form (see the Global Command above). The default character for graph display is an asterisk. This may be changed by entering the Command Mode and typing "Graph", the desired character and then pressing 'ENTER'. Function markers may not be used as graph characters.

Disk owners may obtain a help menu of command mode commands by inserting the program diskette in the drive and typing '?' 'ENTER' from the command mode.

INVERT DISPLAY COMMAND

The invert display command allows hi-res display users to obtain a dark background with light characters in the hi-res displays. To implement this command press 'CLEAR' twice to enter the Command Mode, and then press 'I'-'ENTER'.

TOGGLE KEY BEEP

VIP Calc acknowledges each keystroke with a "thud". You may choose to turn this "key beep" off by entering the Command Mode and pressing 'B-E-E-P'-'ENTER'. This is a toggle command, so to turn the key beep back on you would type the same thing.

TOGGLE MASK FOR LOCATE

The Locate command discussed above has a Mask feature to allow the system to ignore whether a character is upper or lowercase. Initially the system recognizes case. This feature may be toggled by typing "Mask" and then 'ENTER' from the Command mode.

There are several functions which can be made part of formulas when using VIP Calc. These functions are system-supplied operations which may be used to perform special tasks, such as determining the sum of a column or row, finding the average of several figures, or performing logical operations. Many of these operations go beyond the simple arithmetic operations allowed by the system; others only bring into one command frequently used formulas to save you the effort of typing them in each time.

Functions are used just like formulas. They consist of the "@" symbol, plus the name of the function. Since '@' indicates a value entry, no "+" sign is needed. Functions are usually performed on an "argument" which must immediately follow the function and which must be enclosed by parentheses. The argument may be one number or a series of numbers or data. These are the locations or values which will be operated on, such as the number of which the square root will be obtained. Some functions, such as @PI have no argument.

Functions are listed below in a logical/alphabetical order with a short explanation of each. The list breaks the functions down into the type of argument which the function uses: none, one, a list and the logical operators. Since functions are specific applications which do not apply to everyone, they are only summarily explained. If you need more information about how best to use functions, we recommend that you consult the reference works set out in Appendix A, many of which give numerous examples of useful applications for functions.

- Functions Not Requiring an Argument

@NA and @ERROR: @NA is used to fill blank locations so that they are not evaluated by the system. The alternative is to leave the entry blank, which is evaluated as zero. This could lead to errors in calculations.

@ERROR causes "ERROR" to be displayed in the cell in which it is entered and in all cells which refer to it.

@PI: This function gives the value of PI to 16 digits.

@TRUE and @FALSE: are used to display -1 for True and 0 for false in the cell in which entered.

- Functions Which Require a Single Value as Argument

— Arithmetic Functions

@ABS(V): Gives the absolute value of the argument.

@EXP(V): Gives e (2.71828...) to the power indicated by the argument.

@INT(V): Gives the integer of the argument.

@LOG(V): Gives the natural Log of the argument (base e).

@LOG10(V): Gives the logarithm of the argument in base 10.

@SQRT(V): Gives the square root of the argument.

— Trigonometric Functions (64K only)

@SIN(V): Gives the sine of the argument.

@COS(V): Gives the cosine of the argument.

@TAN(V): Gives the tangent of the argument.

@ASIN(V): Gives the arc sine of the argument.

@ACOS(V): Gives the arc cosine of the argument.

@ATAN(V): Gives the arc tangent of the argument.

- Functions That Use a Series of Arguments

The following functions will take a series of arguments. The series is contained within parentheses, and each element of the series is separated by a comma. If you are specifying a sequence of cells, you may list them separately, separating them with commas, or you may give the first cell coordinate, a colon, and then the last cell coordinate.

Thus, the function @AVERAGE(B3,D3,F3,H3,J3,M3) will display the arithmetic mean of the values in the indicated cells; the formula @SUM(B3:M3) will display the sum of cells in row three from B3 through M3.

— Wholistic Functions

@AVERAGE(series): Gives the arithmetic mean of the list.

@COUNT(series): Gives the number of non-blank cells in the series.

@MAX(series): Finds the largest value in the series.

@MIN(series): Finds the smallest value in the series.

@SUM(series): Gives the sum of all values in the series.

Of all the functions, most will find these the most useful. They allow the user to employ alternative values in calculations.

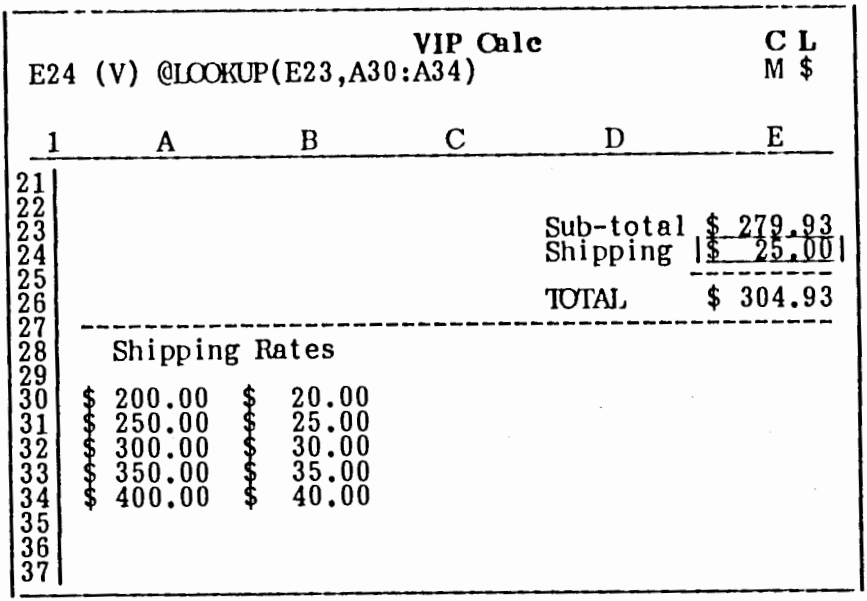
@CHOOSE: This function can be used to test results from a list of alternative inputs. @CHOOSE takes a series of arguments, the first of which is an index reference to the remaining arguments. For example, in the function @CHOOSE(C3,100,200,300,400), if the value of C3 is 3, the third of the remaining arguments, here 300, would be selected. If the value of C3 were zero or less, or greater than the number of remaining arguments, the value of @CHOOSE will be NA.

@LOOKUP: The @LOOKUP function allows you to base calculations on values which are looked up from a table. This is useful for looking up sales tax, shipping rates and the like. A two column or row table is created with values in one row or column corresponding to values in the other row or column.

@LOOKUP takes two arguments. The first argument for @LOOKUP is used as a reference for the table. The value of the argument is compared to those in the first column or row of the table, and when a greater value, if any, is found, the value of the item in the second row corresponding to the preceding entry in the lookup table row is the value of the @LOOKUP function. The second argument specifies the location of the lookup table as a range, giving the starting and ending cell coordinates separated by a colon.

An example should help. You might wish to use the lookup function to determine the shipping cost for an invoice. In the first column of the lookup table you would put the breakpoints for the shipping rates and in the second column you would give the

rate for that amount. The following is part of a sample invoice worksheet giving the sub-total, shipping cost and total amount:



The shipping cost is determined from the lookup table in columns A and B, based on the formula: @LOOKUP(E23,A30:A34). This formula takes the amount in the sub-total cell, E23, and compares it with cells A30 to A34. The amount of E23 is greater than $250 but less than $300. Thus, the value in column B corresponding to $250, here $25, is the value of the @LOOKUP function in cell E24. The amount in E24 is then added to the sub-total in E23 to give the total in E25.

@NPV Net Present Value. This function allows you to determine the net present value of future cash flow. It requires two arguments. The first argument is the interest rate involved. The second argument is a series of consecutive cell references containing the cash flows. The start and end cell are given divided by a colon.

— Comparative Functions

The logical functions are as follows with the result of the comparison:

'Less Than' True if the relationship is less than; false if not.

'Greater Than' True if the relationship is greater than; false if not.

'Equal To' True if the relationship is equal; false if not.

'Less Than' or 'Equal To' True if the relationship is less than or equal; false if not.

'Greater Than' or 'Equal To' True if the relationship is greater than or equal; false if not.

Not Equal To ('Less Than' 'Greater Than') True if the relationship is not equal; false if equal.

— Boolean Functions

The following functions perform the standard Boolean arithmetic functions.

@NOT: This is a Boolean function which produces a value which is the opposite logical value of its argument. It may only have one argument.

@AND: This Boolean function takes two or more arguments, each separated by a comma. The arguments may either be numbers or references to cells or a range of cells. The arguments are "anded" and the result is given.

@OR: The logical function OR takes two or more arguments, either numbers or references to cells or a range of cells. It performs an "OR" operation on the arguments and gives the results.

@XOR: The logical function XOR takes two or more arguments, either numbers or references to cells or a range of cells. It performs an "XOR" operation on the arguments and gives the results.

@IF: The @IF function takes two or three arguments, of which the first must be a non-zero number, a zero or NA. The value of the function depends on the values of its second and third arguments in relation to the first. If the first is non-zero, @IF has the value of the second argument; if the first is zero, @IF has the value of the third argument. If there is no third argument, the result is NA.

APPENDIX A

Reference Works For Making Better Use Of VIP Calc

No manual can hope to completely cover the variety of functions for which electronic spreadsheets have come to serve. Many works have been written to help teach how to make worksheets. Others have been written giving numerous templates for general and special worksheets. The following is a short list of useful reference works which we highly recommend if you should have any questions concerning proper creation of worksheets, or for sample templates for specialized purposes.

Anbarlian, Harry. An Introduction to Visicalc Matrixing with Apple and IBM. New York, NY: McGraw-Hill, 1982.

Bell, Donald H. The Visicalc Book for the IBM Personal Computer. Reston, VA: Prentice Hall, 1983. This is an excellent work which contains a tutorial, plus a detailed discussion of how to create worksheets and what kinds of difficulties to avoid.

Wolverton, Van. Visicalc User's Guide for the IBM Personal Computer. Sunnyvale, CA: Visicorp, 1981. This is the product manual for Visicalc. It contains a useful tutorial.

Trost, Stanley R. Doing Business With Visicalc. Berkeley, CA: Sybex, 1982. This is an excellent work which provides and explains templates for a tremendous variety of business uses.

Cobb, Douglas F. and Gena Berg Cobb. SuperCalc SuperModels for Business. Indianapolis, IN: Que, 1982. A book providing and explaining templates for use on SuperCalc, a program similar to Visicalc.

APPENDIX B

A Comparison of VIP Calc and Visicalc

Since Visicalc has become the industry standard, and since many of you are familiar with Visicalc, we thought it might prove useful to show how VIP Calc is similar to and differs from Visicalc.

VIP Calc has a very similar command structure to Visicalc. VIP Calc includes nearly every feature of Visicalc. VIP Calc differs, however, in three respects from Visicalc. First, instead of using the "/" key to initiate commands, VIP Calc uses the 'CLEAR' key. This was mandated both by the constraints of the Color Computer keyboard and by our desire to make VIP Calc command compatible with other VIP Library programs.

The second difference also arises from the need for command compatibility with other VIP Library programs. Certain commands, particularly "Storage" commands, have been altered from the Menu Command of Visicalc to the Command Mode of the VIP Library.

A third difference arises from the addition to VIP Calc of several features not available in Visicalc. Some of those features, relating to screen display commands, arise from the nature of the Color Computer's display and VIP Library's response to this display. Other features come from the general industry push to improve spreadsheet performance. Thus, VIP Calc has the following features which are not available with the standard Visicalc program:

16 (rather than 2) windows.
A Sort command.
A Protect cell command.
A Locate command.
Programmable functions.
A Column width command.

User definable matrix.
Up to 512 columns by 1024 rows (vs. 63 by 255).
Full control of print parameters.
Imbedding of printer control codes.
Up to 255 characters per cell.

These enhancements force a slightly different command structure than Visicalc, but this should be easy to assimilate.

Because of the similarities in command structure, Visicalc templates may be used with very little, if any, modification on VIP Calc.

APPENDIX C

COMMAND SUMMARIES

- MENU COMMANDS

(SEE THE HELP TABLES 'CLEAR' '?')

COMMAND	KEY(S)
Backspace	'SHIFT'-'@'
Blank Cell	'CLEAR'-'B'
Column Width	'CLEAR'-'C'
Command Mode	'CLEAR'-'CLEAR'
Continue Locate	'CLEAR'-'N'
Cursor down	'DOWN ARROW'
Cursor left	'LEFT ARROW'
Cursor right	'RIGHT ARROW'
Cursor up	'UP ARROW'
Cursor to left of screen	'SHIFT'-'LEFT ARROW'
Cursor to right of screen	'SHIFT'-'RIGHT ARROW'
Cursor to top of screen	'SHIFT'-'UP ARROW'
Cursor to bottom of screen	'SHIFT'-'DOWN ARROW'
Cursor to top of worksheet	'CLEAR'-'SHIFT''UP ARROW'
Cursor to end of worksheet	'CLR'-'SHIFT''DOWN ARROW'
Cursor to left of wksht	'CLEAR'-'SHIFT''LEFT ARROW'
Cursor to rgt of wksht	'CLR'-'SHIFT''RIGHT ARROW'
Delete	'CLEAR'-'D'
Edit	'CLEAR'-'E'
Format (local)	'CLEAR'-'F'
Global	'CLEAR'-'G'
Help	'?'

COMMAND	KEY(S)
Insert	'CLEAR'-'I'
Locate	'CLEAR'-'L'
Manual recalculation	'!'
Mem display memory	'CLEAR'-';'
Move column or row	'CLEAR'-'M'
Next occurrence to locate	'CLEAR'-'N'
Page back	'CLEAR'-'UP ARROW'
Page ahead	'CLEAR'-'DOWN ARROW'
Page right	'CLEAR'-'RIGHT ARROW'
Page left	'CLEAR'-'LEFT ARROW'
Print textfile from cursor position	'CLEAR'-'P'
Programmable function	'CLEAR'-'X'
Repeat label	'CLEAR'-'-'
Repeat last function	'SHIFT'-'@'
Replicate	'CLEAR'-'R'
Sort	'CLEAR'-'S'
Windows	'CLEAR'-'W'

— COMMAND MODE COMMAND SUMMARY

The following commands must be entered from the Command Mode. To enter to the Command Mode press 'CLEAR'-'CLEAR'. To exit the Command Mode press 'BREAK' or '/'-'ENTER'.

COMMAND	KEY(S)
Base	'B-A-S-E' (2,8,10,16) 'ENTER'
Built-in calculator	'SPACE' (formula) 'ENTER'
Cassette load	'C-L'-'ENTER'
Cassette name	'C-N'-'ENTER'
Cassette merge	'C-M'-'ENTER'
Cassette save	'C-S'-'ENTER'
Change display color	'C'-'ENTER'
Character size in 64 display	'6-4-W/N'-'ENTER'
Clear worksheet (total)	'C-L-E-A-R'-'ENTER'
Clear worksheet (data only)	'E-M-P-T-Y'-'ENTER'
Diskette directory	'D-I'-'ENTER'
Diskette kill	'D-K'-'ENTER'
Diskette load	'D-L'-'ENTER'
Diskette merge	'D-M'-'ENTER'
Diskette name	'D-N'-'ENTER'
Diskette rename	'D-R'-'ENTER'
Diskette save	'D-S'-'ENTER'
Display print parameters	'.'-'ENTER'
Dump hi-res	'D-U-M-P'-'ENTER'
Exit Command Mode	'/'-'ENTER'
Exit to BASIC	'E-N-D'-'ENTER'
Fix digits after decimal point	'F-I-X-(#)'-'ENTER'
Help	'?'-'ENTER'
Invert display	'I'-'ENTER'
Mask case in locate & sort	'M-A-S-K'-'ENTER'
Reset default format parameters	'@'-'ENTER'
Screen display mode select	'32/51/64/85'-'ENTER'
Set graph character	'G-R-A-P-H-(char)'-'ENTER'
Set worksheet size	'M-A-T-R-I-X' (cell) 'ENTER'
Toggle key beep	'B-E-E-P'-'ENTER'

— FORMAT PARAMETER COMMANDS

The following FORMAT parameters can be changed either by using the Command Mode or by using a Format line. Their status can be displayed by pressing 'CLEAR'-'.' from the Command Mode. The parameters may be reset to their default values by pressing '@'-'ENTER' in the Command Mode or with an '@' in a Format line.

PARAMETER	SYNTAX	DEFAULT VALUE	LIMITS
BAUD RATE	BD	3	1=110,2=300,3=600 4=1200,5=2400,6=4800,7=9600
FOOTER LINE	FL	62	1-255 0=SUPPRESS
FOOTER STATUS	FS	A	A, E, or O
HEADER LINE	HL	4	1-255 0=SUPPRESS
HEADER STATUS	HS	A	A, E, or O
LINEFEEDS(after CR)	LF	N	Y or N
LINE SPACING	LS	1	1-255
MARGIN BOTTOM	BM	60	2-254
MARGIN LEFT	LM	8	0-255
MARGIN RIGHT	RM	72	10-255
MARGIN TOP	TM	6	1-253
NO-PRINT PRINT	NP	N	Y or N
NULLS	NL	0	0-255
PAGE LENGTH	PL	66	3-255
PAGE NUMBER	PN	1	1-65535
PAGE NUMBER LINE	PG	0	1-255 0=SUPPRESS
PAGE # PLACEMENT	PP	C	L, C, R or T
PRINT COMMENT	PC	N	Y or N
PRINTER HANDSHAKING	PH	Y	Y or N
SINGLE SHEET PAUSE	PA	N	Y or N
WORD LENGTH	WD	8	7 or 8

A = All; E = Even; O = Odd; Y = Yes; N = No
L = Left; C = Center; R = Right; T = Toggle

— MARGINS FOR DIFFERENT PITCHES

The proper margins to be used for each of the standard print fonts are as follows:

ELONGATED.....(5 C.P.I.).....LM0,RM40
ELONGATED-COMPRESSED.(8.3 C.P.I.).....LM0,RM67
NORMAL.....(10 C.P.I.).....LM0,RM80
TWELVE PITCH.....(12 C.P.I.).....LM0,RM96
FIFTEEN PITCH.....(15 C.P.I.).....LM0,RM120
COMPRESSED.....(16.7 C.P.I.).....LM0,RM132

APPENDIX D SUMMARY OF MARKERS

MARK	KEY 32 DISPLAY	FUNCTION
COMM.	'+' gr diag.	Marks line for masking during printing.
FOOTER	'.' red	Marks line to be used as Footer on printed page.
FORMAT	'k' magenta	Marks line of format parameters to be altered.
FORMFD	'/' blue	Represents formfeed character used to bring paper to top.
HEADER	',' yel	Marks line to be used as Header on a printed page.
NO PR	'n' or 3/4	Marks start and end of text not to be printed.
PS PR	'=' or dg.	Marks position for print pause (non-buffered printers ONLY).
P CODE	'0' buff	Marks string of printer control codes (2 req'd).
PR FU	'z' stripe	Marks command string for programmable function.

APPENDIX E EXTENDED ASCII CHARACTER SET

The VIP Calc supports the full 128 character ASCII Character Set. The following table covers the first 128 characters, the Standard ASCII Character Set.

ASCII	32X16	HI-RES	DEC	HEX	KEY(S)
NULL	None	None	0	0	'CLEAR'-'SHIFT''@'
CTRL A	Inverse !	±	1	1	'CLEAR'-'SHIFT''A'
CTRL B	Inverse "	Moon	2	2	'CLEAR'-'SHIFT''B'
CTRL C	Inverse #	Lightning	3	3	'CLEAR'-'SHIFT''C'
CTRL D	Inverse $	Pi	4	4	'CLEAR'-'SHIFT''D'
CTRL E	Inverse %	Sigma	5	5	'CLEAR'-'SHIFT''E'
CTRL F	Inverse &	Check	6	6	'CLEAR'-'SHIFT''F'
CTRL G	Inverse '	Bell	7	7	'CLEAR'-'SHIFT''G'
CTRL H	Inverse (	Left Arrow	8	8	'CLEAR'-'SHIFT''H'
CTRL I	Inverse)	Rgt Arrow	9	9	'CLEAR'-'SHIFT''I'
CTRL J	Inverse *	Up Arrow	10	A	'CLEAR'-'SHIFT''J'
CTRL K	Inverse +	Dwn Arrow	11	B	'CLEAR'-'SHIFT''K'
CTRL L	Inverse ,	Formfeed	12	C	'CLEAR'-'SHIFT''L'
CTRL M	'ENTER'	Wedge	13	D	'CLEAR'-'SHIFT''M'
CTRL N	Inverse .	¥	14	E	'CLEAR'-'SHIFT''N'
CTRL O	Inverse /	Section	15	F	'CLEAR'-'SHIFT''O'
CTRL P	Inverse 0	Root	16	10	'CLEAR'-'SHIFT''P'
CTRL Q	Inverse 1	Reverse F	17	11	'CLEAR'-'SHIFT''Q'
CTRL R	Inverse 2	Empty Box	18	12	'CLEAR'-'SHIFT''R'
CTRL S	Inverse 3	Full Box	19	13	'CLEAR'-'SHIFT''S'
CTRL T	Inverse 4	Left T	20	14	'CLEAR'-'SHIFT''T'
CTRL U	Inverse 5	Right T	21	15	'CLEAR'-'SHIFT''U'
CTRL V	Inverse 6	≠	22	16	'CLEAR'-'SHIFT''V'
CTRL W	Inverse 7	Back Le Ar	23	17	'CLEAR'-'SHIFT''W'
CTRL X	Inverse 8	Back Rt Ar	24	18	'CLEAR'-'SHIFT''X'
CTRL Y	Inverse 9	Back Dn Ar	25	19	'CLEAR'-'SHIFT''Y'
CTRL Z	Inverse :	Back Up Ar	26	1A	'CLEAR'-'SHIFT''Z'
ESCAPE	Inverse ;	Two o's	27	1B	'CLEAR'-'@'
FS	Inverse '	Cent	28	1C	'CLR'-'SHT''CLEAR'
GS	Inverse =	Reverse E	29	1D	'CLEAR'-'SHIFT''1'
RS	Inverse '	Male	30	1E	'CLEAR'-'SHIFT''2'
US	Inverse ?	Man	31	1F	'CLEAR'-'SHIFT''3'

ASCII	32X16	HI-RES	DEC	HEX	KEY(S)
SPACE	Space	Space	32	20	'SPACE BAR'
!	!	!	33	21	'!'
"	"	"	34	22	'"'
#	#	#	35	23	'#'
$	$	$	36	24	'$'
%	%	%	37	25	'%'
&	&	&	38	26	'&'
'	'	'	39	27	"'"
(	(	(	40	28	'('
)	)	)	41	29	')'
*	*	*	42	2A	'*'
+	+	+	43	2B	'+'
,	,	,	44	2C	','
-	-	-	45	2D	'-'
.	.	.	46	2E	'.'
/	/	/	47	2F	'/'
0	0	0	48	30	'0'
1	1	1	49	31	'1'
2	2	2	50	32	'2'
3	3	3	51	33	'3'
4	4	4	52	34	'4'
5	5	5	53	35	'5'
6	6	6	54	36	'6'
7	7	7	55	37	'7'
8	8	8	56	38	'8'
9	9	9	57	39	'9'
:	:	:	58	3A	':'
;	;	;	59	3B	';'
<	<	<	60	3C	'<'
=	=	=	61	3D	'='
>	>	>	62	3E	'>'
?	?	?	63	3F	'?'
@	@	@	64	40	'@'
A	A	A	65	41	'A'
B	B	B	66	42	'B'
C	C	C	67	43	'C'
D	D	D	68	44	'D'
E	E	E	69	45	'E'
F	F	F	70	46	'F'

ASCII	32X16	HI-RES	DEC	HEX	KEY(S)
G	G	G	71	47	'G'
H	H	H	72	48	'H'
I	I	I	73	49	'I'
J	J	J	74	4A	'J'
K	K	K	75	4B	'K'
L	L	L	76	4C	'L'
M	M	M	77	4D	'M'
N	N	N	78	4E	'N'
O	O	O	79	4F	'O'
P	P	P	80	50	'P'
Q	Q	Q	81	51	'Q'
R	R	R	82	52	'R'
S	S	S	83	53	'S'
T	T	T	84	54	'T'
U	U	U	85	55	'U'
V	V	V	86	56	'V'
W	W	W	87	57	'W'
X	X	X	88	58	'X'
Y	Y	Y	89	59	'Y'
Z	Z	Z	90	5A	'Z'
[	[	[	91	5B	'SHIFT''DOWN ARROW'
\	\	\	92	5C	'SHIFT''CLEAR'
]	]	]	93	5D	'SHT''RIGHT ARROW'
^	↑	^	94	5E	'CLEAR'-'SHIFT''4'
←	LEFT ARROW	←	95	5F	'SHIFT''UP ARROW'
	Inverse @		96	60	'CLEAR'-'SHIFT''5'
a	a	a	97	61	'a'
b	b	b	98	62	'b'
c	c	c	99	63	'c'
d	d	d	100	64	'd'
e	e	e	101	65	'e'
F	f	f	102	66	'f'
g	g	g	103	67	'g'
h	h	h	104	68	'h'
i	i	i	105	69	'i'
j	j	j	106	6A	'j'
k	k	k	107	6B	'k'
l	l	l	108	6C	'l'
m	m	m	109	6D	'm'

ASCII	32X16	HI-RES	DEC	HEX	KEY(S)
n	n	n	110	6E	'n'
o	o	o	111	6F	'o'
p	p	p	112	70	'p'
q	q	q	113	71	'q'
r	r	r	114	72	'r'
s	s	s	115	73	's'
t	t	t	116	74	't'
u	u	u	117	75	'u'
v	v	v	118	76	'v'
w	w	w	119	77	'w'
x	x	x	120	78	'x'
y	y	y	121	79	'y'
z	z	z	122	7A	'z'
{	Inverse [	{	123	7B	'CLEAR'-'SHIFT''6'
|	Inverse \	|	124	7C	'CLEAR'-'SHIFT''7'
}	Inverse]	}	125	7D	'CLEAR'-'SHIFT''8'
~	Inverse ^	~	126	7E	'CLEAR'-'SHIFT''9'
Rub	Inverse LF AR RUB OUT		127	7F	'CLEAR'-'SHIFT'':'

APPENDIX F WHAT IF YOUR TV IS FUZZY

After loading your VIP Library program and using it for a while with your television you may be dissatisfied with the screen display when you are using the 51, 64, or 85 displays. You may notice that when you are using color you have a rainbow of colors on the screen instead of the background color of green or white that you wanted, making it nearly impossible to read your text. This inability to have a sharp, clear, crisp display is NOT a problem with VIP Calc, it is a problem of the your computer and your particular TV.

Unfortunately, most computers lack adequate hardware to give a good TV picture. Color pictures are made up of over a million separate dots, each a composite of blue, green and red. Although they may be easily controlled by the electronic techniques used to generate TV shows, most computers do not have the hardware to control that many dots. Instead computers divide the screen up into many fewer dots. For example, your computer divides it into a little over 6000 dots. This does not allow a high degree of resolution. Thus, when the background color is not a pure color, red, green or blue, the color cannot be controlled to be pure. Shadows and blooms of other colors mix in. This causes the black letters sometimes to be blotched or to have shadows so that they are difficult to read. The smaller the letters the greater the problem. Thus, the 85 display is sometimes very hard to read.

Of course the 85 display, and to some extent the 64 display, were not designed for entering and editing text unless you use a monitor. They were designed for formatting purposes. If you can use them to input text, so much the better.

There are some things that can be done to help make your TV displays more readable. First, you can use

the green background to avoid the problems associated with color mixing. You could also get a color monitor for better control of your display colors. Alternatively, you can use a black and white TV instead of a color TV. If all else fails, the 32 by 16 display will definitely work with your color TV.

Although many find the 32 by 16 display too small, others like it because it is easier to read, and since the lines are short, like those of a newspaper, editing is faster. Of course, the 32 by 16 retains the reverse video display used by your computer for displaying lowercase characters.

The final option is to buy a monitor, a special kind of video machine, for displaying your text.

APPENDIX G OTHER VIP LIBRARY PROGRAMS

Each of the programs in the VIP Library are specifically designed to create files compatible with other programs in the Library. With the Library you can perform the essential home business tasks and combine the results for many purposes.

The VIP Writer is one of the central programs in the Library. It contains the most sophisticated editing and printing features, and it is to be used to create all reports combining files created on other applicable Library programs. A companion to the Writer is VIP Speller. The Speller can be used to correct typos and misspellings in VIP Writer and other Library files.

VIP Calc is used to create financial or mathematical reports. It contains sophisticated print functions for independent printing of such reports. You may create files usable by the VIP Writer such as reports to be combined with other text.

VIP Terminal is a communications program capable of transmitting, receiving, saving and printing any ASCII file, including VIP Library files. ASCII files can be transferred to VIP Writer for further editing. The Terminal program also allows you to transfer files and programs to others.

VIP Database, like VIP Calc, has its own sophisticated print functions for independent printing of database files. You can also create files for use with the VIP Writer to create combined text and database files.

VIP Disk-ZAP is a disk repair utility designed to repair any kind of file created using the standard disk operating system, including all VIP Library files.

NOTES