



MICROPLAN<sup>TM</sup>







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When using MicroPlan on the KAYPRO:

1. When HOME and CANCEL keys are mentioned, use the ESCape key.
2. When the BACKSPACE key is referred to, use the DElete key.



# Preface

Welcome to the world of financial planning with MicroPlan. Whether you handle numbers, money, or people, MicroPlan can increase your power as a manager by saving you time and money. MicroPlan lets you plan and analyze to effectively measure performance, manage resources, and make sound business decisions. MicroPlan helps with the number crunching and lets you do the thinking.

Traditionally, financial planning--whether it be budgeting or calculating acquisition pro formas--took long laborious hours with pencil and calculator. Today, with the use of microcomputers and applications software like MicroPlan, providing solutions for businesses can be accomplished without difficulty--while saving time and money.

MicroPlan is a financial modeling tool that can be used in all types of business planning. Based on the concept of an electronic spreadsheet, MicroPlan is set up as a matrix, or table, with rows and columns. Data is entered and calculations performed according to the commands you give for each line. Instead of having to figure results item by item, MicroPlan will calculate the entire table by rows and columns. Having once created a table, you can make new assumptions by changing pieces of data. Recompute the results from the new data, and a "what-if" analysis is done, literally, in seconds.

MicroPlan is easy to use. An on-screen menu representing all of MicroPlan's commands is always available for fast, easy reference. On-screen help for every command is available at the push of a button for fast, easy access. With MicroPlan's built-in commands, ranging from simple mathematical functions to complex financial and statistical computations, you simply enter the desired command number--no typing skills are required. MicroPlan will ask you for any information necessary to complete the command and then show the results on your screen.

In addition to built-in commands, MicroPlan offers a sophisticated report generator with the flexibility to produce customized reports in minutes. MicroPlan's programming capabilities allow you to save a specific sequence of commands. You can then execute those commands simply by running the program. MicroPlan also provides excellent documentation of its table logic to help you keep track of your actions.

With MicroPlan's Add-On Consolidation Module, you can work with more than one table at a time, doing full table consolidations, variance analysis, or developing complex models such as integrated income statements, cash flow statements, and balance sheets.

MicroPlan makes financial modeling easier. With all of these features, it is easy to see why MicroPlan goes beyond the other electronic worksheets available on the market today. It provides you with the solutions you need in your business. MicroPlan is today's answer to financial modeling.

# Introduction

This MicroPlan manual is intended as a guide not only to learning MicroPlan, but also as a companion in using MicroPlan. As such the manual itself is divided into three sections. **Section I** is a tutorial on the MicroPlan Fundamentals designed to teach you how to use MicroPlan. **Section II** is the Advanced Usage Section that discusses the financial and statistical commands as well as MicroPlan's programming feature. **Section III** is a Command Reference Section which will serve as a valuable reference no matter what your level of expertise.

The best way to learn MicroPlan is in front of your computer. We suggest that you read through the first chapter, and then follow the step-by-step example in Chapter 2. Throughout the manual, examples are given to illustrate various concepts and to allow you to compare your results with ours. Below is an overview of the chapters included in the MicroPlan manual.

**Chapter 1** is an introduction to MicroPlan. This chapter gives you information that you will need to set up, install, and load MicroPlan on your microcomputer system. It also gives you an explanation of the MicroPlan screen, the HELP command, and directions for moving your cursor while using MicroPlan.

In **Chapter 2** you are immediately taken to a "hands-on" learning situation by going through an actual Five-Year Forecast step-by-step. You will learn the basic steps associated with building a MicroPlan table and will print a simple report.

In **Chapter 3** you will learn how to build a MicroPlan table to your specifications. You will learn how to vary the table size, how to enter row and column descriptions, and the different options available for data entry. You will also learn how to save and load your tables for future use.

**Chapter 4** shows you MicroPlan's built-in mathematical commands. You will see how easy it is to use these commands, or to write your own formulas. Chapter 4 also covers the computing commands that let you see calculated results instantaneously.

**Chapter 5** takes you through the process of formatting and printing reports. In this chapter you will see the kinds of report options that make MicroPlan's report generator unique.

**Chapter 6** discusses the different modes available in MicroPlan and how to use them. Other commands that you will find helpful in your advanced usage, including how to interface MicroPlan with a word processor, are also discussed.

The financial commands covered in **Chapter 7** illustrate the real power of MicroPlan. In this chapter, you will learn how to calculate internal rates of return, discounted cash flows, and loan amortizations. All of these commands are built-in for easy use.

**Chapter 8** introduces MicroPlan's new statistical commands. These commands make complex statistical analysis simple, in the traditional MicroPlan style.

**Chapter 9** provides advanced users with the ability to create personalized templates for their own applications. In this chapter, you will see how MicroPlan's programming feature can save you precious time in producing your reports.

**Section III** of the MicroPlan manual is a Command Reference section that provides you with a detailed explanation of all MicroPlan commands. The Command Reference section outlines the prompts and defaults for each command, and also references page numbers for related information in **Sections I** and **II**.

The MicroPlan manual will be a constant companion to you while you are learning the features and benefits of MicroPlan. After you have become familiar with MicroPlan you will want to refer back to this manual for help with a specific command or application. In any case, don't be afraid to experiment--the best way to learn MicroPlan is to use it.



# Chapter 1

## Getting Started

Chapter 1 is an introduction to the fundamentals of MicroPlan. Before you build your first spreadsheet there are things about the general operation of MicroPlan that you need to know. This chapter will teach you how to install and load MicroPlan on your computer system. You will learn the location and use of terminal control keys, as well as the importance of backing up your system and data diskettes.

### Getting Started

To use MicroPlan you will need the following:

1. Operating Systems:

CP/M(version 2.2 or later)	CP/M 86
MP/M	MP/M 86
IBM-DOS	
(for the IBM Personal Computer)	

2. Your computer should have 64 kilobytes (K) of random access memory (RAM). The minimum quantity depends on the size of the operating system (a minimum of 128K is required for the IBM Personal Computer). Under CP/M, MicroPlan requires a full 48K for operation. You can also use MicroPlan on MP/M, however, it can only be used with 48K user banks. Contact your dealer for additional help in installing MicroPlan on MP/M.

3. Your system must have at least one floppy disk drive. Two drives are preferred. About 150 kilobytes (K) of storage capacity is required to handle MicroPlan's system files on disk. For your own tables and program storage, you will need additional room.

4. You will need a screen display that has at minimum, "cursor addressing" and "clear screen" features. Your display should also have a minimum of an 80 x 24 character screen. Consult your dealer or the terminal user manual about these features.

5. You will need a printer for printing reports.

## Making A Working Copy of MicroPlan

Copying MicroPlan for any reason other than for your own back-up violates copyright laws. Each copy of MicroPlan is serialized. Your copy number appears on the screen each time you use MicroPlan. Only you have this registered copy of MicroPlan. Each copy you make of MicroPlan also shows this identification number, making it easy to identify the source of an unregistered copy.

You should keep the original diskette issued by Chang Labs as a back-up diskette. Make a copy of MicroPlan for your daily work. Use this copy so that you will always have the master disk as a back-up in case your working disk fails due to wear or accidental erasure. The following procedure will help you make a working copy of your MicroPlan diskette.

1. Follow the instructions that come with your operating system to format a diskette.

2. Place your master operating system diskette in drive "A" and your blank formatted diskette in drive "B". In response to the **A>** prompt, type **SYSGEN**. The SYSGEN command copies the operating system onto your blank diskette.

Please note that the instructions for creating a system disk may be different for your system. Verify this step by consulting your system manual.

3. On CP/M systems, make sure you have the copying program PIP.COM on your newly formatted diskette. You can transfer the PIP.COM file by typing:

**A>PIP B:=A:PIP.COM**

4. Now insert your newly made system disk in drive A and the master MicroPlan diskette in drive B. (For CP/M systems, type **^C** to clear the drive.) Type in the following command:

For CP/M systems: **A>PIP A:=B:\*. \*[V]**

For IBM DOS systems: **A>COPY B:\*. \* A:**

5. Put the MicroPlan master diskette away for safe keeping. Label the new diskette as your MicroPlan working diskette.

## Loading MicroPlan

If you purchased MicroPlan from a local dealer, they will help you set up MicroPlan to work with your microcomputer system.

To install MicroPlan for your system:

1. Be sure your computer is turned on.
2. Insert your MicroPlan system diskette in drive A.
3. The MicroPlan CUSTOM routine customizes MicroPlan for use with your specific terminal. It also gives you information about the location and use of certain terminal keys. For most systems with built-in screens, you can skip this step and go directly to step 4.

During the CUSTOM procedure, be sure to WRITE DOWN these key assignments when they are displayed on the screen.

Type **CUSTOM** <Return>

BACKSPACE:\_\_\_\_\_

CANCEL:\_\_\_\_\_

MOVE CURSOR:\_\_\_\_\_

When you type CUSTOM, your screen will show the following:

-----  
-----

MicroPlan installation procedure  
(C) COPYRIGHT 1981 Chang Laboratories Inc.

### \*\*\* Terminal Menu \*\*\*

A ADDS (VIEWPOINT)	B BEEHIVE 150/152
C BEEHIVE 157/160/162	D DEC VT100
E HAZELTINE 1420/1520	F HAZELTINE 1400/1410/1500
G HEWLETT PACKARD 2621A/P	H IBM 3101
I LEAR SIEGLER	J SOROC 120/140
K TELEVIDEO 912	L TELEVIDEO 920
M TELEVIDEO 925/950	N TELEVIDEO 910
O WYSE	P ZENTEC
Q OTHER	R ADVANTAGE
S XEROX 820	T ZENITH Z19
U VG MINDLESS TERMINAL	V VISUAL 200
W RADIO SHACK MODEL II	

PLEASE ENTER SELECTION (1 LETTER):

-----  
-----

Select the appropriate terminal and press the <Return> key.  
If your terminal is not on this terminal menu, consult your dealer for help.

4. Now you are ready to bring MicroPlan up on your screen.

Type **PLAN** <Return>

Your screen will show the following:

```

-----
-----
MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 1 <--
ENTER COMMAND:

```

ROW	1	2	3	4	5	
1	0.0	0.0	0.0	0.0	0.0	1 format:
2	0.0	0.0	0.0	0.0	0.0	2 data:
3	0.0	0.0	0.0	0.0	0.0	3 math:
4	0.0	0.0	0.0	0.0	0.0	4 finance:
5	0.0	0.0	0.0	0.0	0.0	5 print:
6	0.0	0.0	0.0	0.0	0.0	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

```

-----
-----

```

## Customizing Reports For Printer

MicroPlan works with all brands of printers. Technically, MicroPlan prints all reports to the CP/M LST: device. Therefore, if you need to interface your system with a particular printer for printing MicroPlan reports, you should check your system manuals for details, including baud rate settings and cable requirements.

You can print reports that are up to 99 columns wide, or up to 256 characters. The report width is limited by the printer and is controllable through MicroPlan options.



To select the report width, use the row title width, column width, and number of columns options in the OPTIONS (B1) command. The width of printed reports in MicroPlan is simply calculated as follows:

**Report Width = Row Title Width + Column Width \* Number of Columns**

If you set the options to a width that is greater than can be handled by your printer, then the printed results would not be meaningful. Therefore, you should set options that are appropriate for your printer.

MicroPlan is now ready to help you in solving your problems.

### The MicroPlan Screen

When MicroPlan comes up on the screen you will notice that the screen is divided into several sections.

ROW	1	2	3	4	5	
1	0.0	0.0	0.0	0.0	0.0	1 format:
2	0.0	0.0	0.0	0.0	0.0	2 data:
3	0.0	0.0	0.0	0.0	0.0	3 math:
4	0.0	0.0	0.0	0.0	0.0	4 finance:
5	0.0	0.0	0.0	0.0	0.0	5 print:
6	0.0	0.0	0.0	0.0	0.0	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

MicroPlan Table

The major portion of the screen displays the **MicroPlan Table**. Each row of the table has been labeled with row numbers on the left side of the screen. MicroPlan has 12 blank spaces following each row number that are used to display row description. Row descriptions can be up to 40 characters in length. Each column of the table is also labeled with column numbers, with dashes on both sides. You can enter a two-line column description for each column that can vary from 4 to 20 characters for each column.

At the top of the MicroPlan screen are the Status Line, the Data Pointer, and the Command Line. The **Status Line** gives you information about MicroPlan's current mode, the current computing order, and the current row and column ranges. Unless you set it up otherwise, these options will default to the NORMAL mode; a computing order of rows before columns (R/C); and a range of 50 rows and 20 columns.

The **Data Pointer** tells you the row or column to be used to store the results of your next command. In this manual, the row or column that is shown by the data pointer is referred to as the **CURRENT** row or column.

The **Command Line** will prompt you for a command number. Simply enter the command number that you wish to use and press <Return>. The command will automatically be entered and will prompt you for any additional information that is needed to execute the command.

## Manual Conventions

In this manual, you will notice the use of certain words and symbols to indicate actions to be used in MicroPlan. These conventions are explained below:

- |          |  |
|----------|--|
| <Return> | Carriage return  |
| <CANCEL> | Use your cancel key to cancel a command after you have finished using the command. You can also use the cancel key to cancel a command if the <Return> has been entered and you realize that you have entered an incorrect command. The CANCEL key may be labeled with HOME, CAN, or a similar label depending on your keyboard. |
| BKSP     | Use the backspace key to correct typing errors if you have not yet pressed the <Return> key. On different keyboards this key may be labelled DEL, RUB, RUBOUT or a similar label.  |

## CURSOR KEYS

Indicates keys that direct the movement of the cursor. In most cases these keys are the up, down, left, and right arrow keys.

## Choosing Commands

MicroPlan works by responding to commands in the form of numbers. For every command that you need to execute, there is a corresponding built-in MicroPlan command.

In addition to using the command numbers, MicroPlan will also respond to alpha characters that are codes for the regular numeric commands. So, if it is easier for you, simply use the "+" for the ADD command, an "F" for the FORMULA command, or any other single keystroke codes. A complete list of the alpha mnemonics is shown in Appendix A.

The MicroPlan MENU is always showing on the right hand side of your screen for easy reference. The main menu that you see when you bring MicroPlan up on the screen is organized into several groups. You will notice that these groups follow the logical order used to build a MicroPlan table. All commands followed by colons (:) have a related sub-menu.

```

-----
MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 1  <--
ENTER COMMAND:

ROW  -----1-----2-----3-----4-----5-----
1      0.0      0.0      0.0      0.0      0.0  1 format:
2      0.0      0.0      0.0      0.0      0.0  2 data:
3      0.0      0.0      0.0      0.0      0.0  3 math:
4      0.0      0.0      0.0      0.0      0.0  4 finance:
5      0.0      0.0      0.0      0.0      0.0  5 print:
6      0.0      0.0      0.0      0.0      0.0  6 status:
7      0.0      0.0      0.0      0.0      0.0  7 HELP
8      0.0      0.0      0.0      0.0      0.0  8
9      0.0      0.0      0.0      0.0      0.0  9 STOP
10     0.0      0.0      0.0      0.0      0.0 10 utility:
11     0.0      0.0      0.0      0.0      0.0 11 program:
12     0.0      0.0      0.0      0.0      0.0 12 stats:
13     0.0      0.0      0.0      0.0      0.0 13
14     0.0      0.0      0.0      0.0      0.0 14
15     0.0      0.0      0.0      0.0      0.0 15
16     0.0      0.0      0.0      0.0      0.0 16 format:
17     0.0      0.0      0.0      0.0      0.0 17 INSERT
18     0.0      0.0      0.0      0.0      0.0 18 DELETE
19     0.0      0.0      0.0      0.0      0.0 19 rows:
20     0.0      0.0      0.0      0.0      0.0 20 ROW TITLE

```

If you wish to see the commands in any of the sub-menus, simply enter the number of the group for which you want to see a sub-menu and press <Return>. For example, if you want to see the available commands under the heading of math, simply enter 3 and press <Return>. A new set of commands will appear in the menu on the screen. To get back to the main menu, simply press <Return>. Try it.

ENTER COMMAND: 3 <Return>

Tell MicroPlan to display the group of mathematical commands. MicroPlan will respond with the menu shown below.

-----  
-----

```
MODE=NORMAL ORDER=R/C ROW=1-50 COL=1-20
ROW 1 <--
ENTER COMMAND:
```

ROW	1	2	3	4	5	
1	0.0	0.0	0.0	0.0	0.0	40 math:
2	0.0	0.0	0.0	0.0	0.0	41 ADD
3	0.0	0.0	0.0	0.0	0.0	42 SUB
4	0.0	0.0	0.0	0.0	0.0	43 MULT
5	0.0	0.0	0.0	0.0	0.0	44 DIV
6	0.0	0.0	0.0	0.0	0.0	45 NEGATE
7	0.0	0.0	0.0	0.0	0.0	46 INVERSE
8	0.0	0.0	0.0	0.0	0.0	47 INTEGER
9	0.0	0.0	0.0	0.0	0.0	48 ROUND
10	0.0	0.0	0.0	0.0	0.0	49 CUMULATE
11	0.0	0.0	0.0	0.0	0.0	50 ABSOLUTE
12	0.0	0.0	0.0	0.0	0.0	51 ADD K
13	0.0	0.0	0.0	0.0	0.0	52 SUB K
14	0.0	0.0	0.0	0.0	0.0	53 MULT K
15	0.0	0.0	0.0	0.0	0.0	54 DIV K
16	0.0	0.0	0.0	0.0	0.0	55 SUM
17	0.0	0.0	0.0	0.0	0.0	56 GET
						57 FLOOR
						58 CEILING
						59

-----  
-----

ENTER COMMAND: <Return>

When you press <Return> without a command, MicroPlan will return to the original menu.



## Moving The MicroPlan Table

MicroPlan usually displays 17 rows and 5 columns on the screen at a time--even though your actual table size can be much larger. Physical limitations of the screen allow only a portion of the table to be displayed at any one time.

MicroPlan will automatically move the screen to show other parts of your worksheet. This means that the cursor is always showing on your screen. You can move one column, one row, or you can move to any section of your table that you need to view simply by using the cursor keys to position your display.

Use your cursor keys to switch from the row mode to the column mode and vice versa. The right or left cursor keys put you in the column mode, and the up or down keys switch you back to the row mode. In short, with the use of your cursor keys, you can move to any part of your worksheet with the push of a button.

You can also use the SELECT ROW (33) or SELECT COL (34) commands to quickly move to any part of the screen. The SELECT ROW command allows you to position your cursor on a specific row; SELECT COL lets you go to a specific column.

The GOTO (36) command can be used to position the screen at a specific portion of the table. For example, to see the results at row 40, column 10 of your table, use the GOTO command and specify row 40, column 10. MicroPlan will position row 40, column 10 in the upper left corner of the screen.

## The MicroPlan HELP Command

If at any time you want on-screen help for one of the MicroPlan commands, simply enter the HELP (7) command. The HELP command will prompt you for the number of the command for which you need help. Simply enter the command number or the corresponding mnemonic command and press <Return>.

For example, if you need help for the ROW TITLE (20) command, you would enter command 7, press <Return>, then enter 20, and <Return>. A brief explanation of command 20 will appear at the bottom of your screen as shown below.

```

-----
- - - - -
MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 1 <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1      0.0      0.0      0.0      0.0      0.0
2      0.0      0.0      0.0      0.0      0.0
3      0.0      0.0      0.0      0.0      0.0
4      0.0      0.0      0.0      0.0      0.0
5      0.0      0.0      0.0      0.0      0.0
6      0.0      0.0      0.0      0.0      0.0
7      0.0      0.0      0.0      0.0      0.0
8      0.0      0.0      0.0      0.0      0.0
9      0.0      0.0      0.0      0.0      0.0
10     0.0      0.0      0.0      0.0      0.0
11     0.0      0.0      0.0      0.0      0.0
12     0.0      0.0      0.0      0.0      0.0
13     0.0      0.0      0.0      0.0      0.0

20 ROW TITLE  title ... CANCEL      (DOWN, UP, CANCEL)
Enter or change row titles. Each title entered is placed in
the current row. The cursor keys move the current row pointer.

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Press any of your cursor keys to recover your screen display.

Of course, the HELP command only gives you a 3-line description of the commands. For a more comprehensive description, consult the Command Reference Section of this manual.

## The Care & Feeding Of Your Diskettes

Floppy diskettes are not indestructable and should be handled with care. In most cases diskettes prove to be surprisingly sturdy and will give you dependable service if you treat them properly.

\*PROTECT your diskettes by keeping them in their protective envelope when not in use.

\*DO NOT BEND diskettes.

\*INSERT DISKETTES CAREFULLY into your disk drives. Never force a diskette into the disk drive.

\*NEVER TOUCH THE DISKETTE SURFACE. Fingerprints and dust can destroy data. Always handle diskettes by their protective covering.

**\*DO NOT STORE DISKETTES NEAR A HEAT SOURCE.** Like phonograph records, diskettes will warp or crack if exposed to extreme temperatures. For best results, store diskettes in a moderate temperature range.

**\*DO NOT EXPOSE DISKETTES TO MAGNETS.** Magnetic fields will damage data stored on your diskettes. Be aware of possible magnetic fields from sources such as X-rays and other electronic equipment.

### **The Importance Of Back-Up Copies**

Accidents do happen. Just when you least expect it, a power failure or a defective diskette can cause you to lose your data. Unfortunately no one is immune to this aspect of working with computers, but you can soften the blow by making back-up copies of your diskettes.

Back-up copies are as important as your data. If the data is not essential, you might feel that making back-up copies is a waste of time. If, however, you have data on your diskettes that is critical to your work, we strongly recommend that you make frequent back-up copies of your data and store them separately in a safe place. Consult your operating system manual for instructions on making back-up copies of your data diskettes. **THE RESPONSIBILITY FOR MAKING BACK-UP COPIES IS YOURS.**

### **Exiting MicroPlan**

Whenever you are through using MicroPlan and want to exit to the operating system, do the following:

1. Make sure you have saved any work you wish to keep.
2. ENTER COMMAND: **9** <Return>

VERIFY (Y OR N): **Y** <Return>

Exit MicroPlan using the **STOP** command.



## Chapter 2

# Doing A Sample Report

In this chapter you will learn the basic steps associated with building a table. You will produce a Five-Year Sales Forecast, make a change in your data and do a "what-if" analysis, and print a report.

### Five Year Sales Forecast

Let's assume you have a business and want to do a sales and gross profit forecast for the next five years. We will base the forecast on the following assumptions:

SALES:	Start with a base of \$1,000 and grow 10% per period.
COST OF GOODS:	A constant 45% of sales figures.
SALES AND ADMINISTRATION:	A constant 20% of sales figures.
RESEARCH AND DEVELOPMENT:	A flat \$300 per year.
TOTAL COSTS:	The sum of all costs (Cost of Goods, Sales and Administration, and Research and Development).
GROSS PROFIT:	Sales less total costs.

On your screen, the cursor on the command line will be prompting you to enter a command. Follow along on your computer by typing in all information in **BOLD TYPE**.

The first step in building the sample table is to enter titles for each row.

ENTER COMMAND: **20** <Return>

The ROW TITLE command (20) allows you to enter titles for each row.

ROW TITLE: **SALES** <Return>

Follow the prompts on your screen and type the description for row 1, SALES. Notice that after you press <Return>, the title goes into row 1 and the prompts continue asking for the next row title.

ROW TITLE: **COST OF GOODS** <Return>

The prompt on the command line is now asking for the description for row 3.

ROW TITLE: **SALES AND ADMINISTRATION** <Return>

The prompts continue to ask for row descriptions. Notice that this description is clipped in the middle of the word ADMINISTRATION. Don't worry. The screen is currently set to display only 15 characters for each title. The full description will be remembered for later use, as in printing. Later you will learn how you can adjust the screen to correspond to your individualized needs.

ROW TITLE: **RESEARCH AND DEVELOPMENT** <Return>

ROW TITLE: **TOTAL COSTS** <Return>

ROW TITLE: **GROSS PROFIT** <Return>

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command. The screen should show the following:

-----  
-----

```

                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 1 (SALES) <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1 SALES          0.0      0.0      0.0      0.0      0.0
2 COST OF GOODS  0.0      0.0      0.0      0.0      0.0
3 SALES AND ADM  0.0      0.0      0.0      0.0      0.0
4 RESEARCH AND   0.0      0.0      0.0      0.0      0.0
5 TOTAL COSTS    0.0      0.0      0.0      0.0      0.0
6 GROSS PROFIT   0.0      0.0      0.0      0.0      0.0
7                0.0      0.0      0.0      0.0      0.0
8                0.0      0.0      0.0      0.0      0.0
9                0.0      0.0      0.0      0.0      0.0
10               0.0      0.0      0.0      0.0      0.0
11               0.0      0.0      0.0      0.0      0.0
12               0.0      0.0      0.0      0.0      0.0
13               0.0      0.0      0.0      0.0      0.0
14               0.0      0.0      0.0      0.0      0.0
15               0.0      0.0      0.0      0.0      0.0
16               0.0      0.0      0.0      0.0      0.0
17               0.0      0.0      0.0      0.0      0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

-----  
-----

The data pointer and cursor are now back on row 1. The command line is prompting you for the next command. According to our assumptions, SALES will start at \$1,000 and grow at 10% per year. Let's enter data to reflect this assumption.

ENTER COMMAND: **31** <Return>

Enter data

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **2** <Return>

The ENTER command allows you to choose the method of data entry. You can enter data individually, value by value, by choosing "0". Choose "1" to enter a constant value for the entire line. The "2" option lets you enter a base value and have it grow by a certain percentage, and option "3" lets you enter a base value and have it increase by a constant amount. For our example, choose the GROW option (2).

BASE VALUE: **1000** <Return>

The command line prompts for the base value. Type in 1000. Notice that dollar signs and commas are not entered.

RATE: **10** <Return>

The prompt is now asking for the percentage rate. Type in 10. Notice that the percent signs are not entered. After you press <Return>, notice that row 1 contains the computed sales. The values start with 1,000 and grow by 10% per year.

The cursor and data pointer are now on row 2. According to our assumptions, the cost of goods is a constant 45% of sales, so we use the MULT K (53) command to multiply by a constant amount.

ENTER COMMAND: **53** <Return>

The MULT K (53) command allows you to compute the COST OF GOODS by multiplying a constant amount by row 1, SALES.

VALUE: **.45** <Return>

The command line is prompting for a value. Type in .45 to indicate 45%.

ROW (1-50): **1** <Return>

The prompt now asks for a row number. Type in 1 to indicate that the sales figures in row 1 should be used in the calculation. Again notice that the cursor and data pointer have automatically moved to row 3, SALES AND ADMINISTRATION.

We are assuming that sales and administrative costs are a constant 20% of our sales. Again use the MULT K command.

ENTER COMMAND: 53 <Return>

Multiply by a constant.

VALUE: .20 <Return>

ROW (1-50): 1 <Return>

For row 4, we assume that RESEARCH AND DEVELOPMENT is a constant cost of \$300 each year.

ENTER COMMAND: 31 <Return>

To enter costs for RESEARCH AND DEVELOPMENT, use the ENTER command. This time, however, select the constant value option.

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1 <Return>

BASE VALUE: 300 <Return>

The command line now prompts you for the constant base value. Type in 300. Notice that row 4 shows the value of 300 in all columns.

The data pointer and cursor are now pointing to row 5. To calculate the TOTAL COSTS in row 5, sum rows 2 through 4.

ENTER COMMAND: 55 <Return>

Use the SUM (55) command to sum several rows.

ROW BEGIN (1-50): 2 <Return>

Start summing with row 2, COST OF GOODS.

END (2-50): 4 <Return>

Finish summing with row 4, RESEARCH AND DEVELOPMENT. Notice that the sum for each column of the table is computed and the result is stored in row 5.

Finally, calculate the GROSS PROFIT in row 6 as SALES, row 1, minus TOTAL COSTS, row 5.



ENTER COMMAND: 42 <Return>

Subtract

ROW (1-50): 1 <Return>

The command line prompts for the first row number. Type in 1, for row 1, SALES.

ROW (1-50): 5 <Return>

The prompt is now asking for the row number to subtract. Type in 5 for row 5, TOTAL COSTS. After you press <Return>, MicroPlan will calculate the GROSS PROFITS and put the results in row 6.

You have now completed your first Five-Year Forecast. The screen should look like the following:

```

-----
- - - - -
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
                                ROW 7  <--
                                ENTER COMMAND:

                                ROW
                                -----1-----2-----3-----4-----5-----
                                1 SALES          1,000.0  1,100.0  1,210.0  1,331.0  1,464.1
                                2 COST OF GOODS    450.0    495.0    544.5    599.0    658.8
                                3 SALES AND ADM     200.0    220.0    242.0    266.2    292.8
                                4 RESEARCH AND      300.0    300.0    300.0    300.0    300.0
                                5 TOTAL COSTS      950.0    1,015.0  1,086.5  1,165.2  1,251.7
                                6 GROSS PROFIT      50.0     85.0    123.5    165.9    212.4
                                7                   0.0     0.0     0.0     0.0     0.0
                                8                   0.0     0.0     0.0     0.0     0.0
                                9                   0.0     0.0     0.0     0.0     0.0
                                10                  0.0     0.0     0.0     0.0     0.0
                                11                  0.0     0.0     0.0     0.0     0.0
                                12                  0.0     0.0     0.0     0.0     0.0
                                13                  0.0     0.0     0.0     0.0     0.0
                                14                  0.0     0.0     0.0     0.0     0.0
                                15                  0.0     0.0     0.0     0.0     0.0
                                16                  0.0     0.0     0.0     0.0     0.0
                                17                  0.0     0.0     0.0     0.0     0.0

                                1 format:
                                2 data:
                                3 math:
                                4 finance:
                                5 print:
                                6 status:
                                7 HELP
                                8
                                9 STOP
                                10 utility:
                                11 program:
                                12 stats:
                                13
                                14
                                15
                                16 format:
                                17 INSERT
                                18 DELETE
                                19 rows:
                                20 ROW TITLE
  
```

As you prepared the Five-Year Forecast, not only were the figures computed, but the commands required to create the table were memorized. Let's take a look at the corresponding command logic:

ENTER COMMAND: 22 <Return>

Show rows

Your screen should show the following:

Press any cursor key to recover your display.

ROW 7 <--

ENTER COMMAND:

ROW	TYPE	UNDER	BLANK	DEC	FOR	COMMAND	PARAMETERS
LINE	LINES	SIZ	MAT				
1 SALES	data	-	-	-			
2 COST OF GOODS	data	-	-	-	MULT K	K=0.45 ROW=1	
3 SALES AND ADM	data	-	-	-	MULT K	K=0.2 ROW=1	
4 RESEARCH AND	data	-	-	-			
5 TOTAL COSTS	data	-	-	-	SUM	ROWS 2 - 4	
6 GROSS PROFIT	data	-	-	-	SUB	ROW=1 ROW=5	
7	data	-	-	-			
8	data	-	-	-			
9	data	-	-	-			
10	data	-	-	-			
11	data	-	-	-			
12	data	-	-	-			
13	data	-	-	-			
14	data	-	-	-			
15	data	-	-	-			
16	data	-	-	-			
17	data	-	-	-			

To recover your display, press any cursor key.

## What-If Analysis

Let's make changes to our data and watch the entire Five-Year Forecast recalculate based on the new assumptions.

Do a "what-if" analysis with the assumption that the first year of RESEARCH AND DEVELOPMENT expenses row 4, column 1 will be \$500 instead of \$300.

ENTER COMMAND: 32 <Return>

Change

ROW (1-50): 4 <Return>

COL (1-20): 1 <Return>

VALUE: 500 <Return>

Now that the change has been made, compute the entire report to see the effect of the new assumption.

ENTER COMMAND: **98** <Return>

Compute

In just a second, the new Five-Year Forecast will show the following:

DONE.

ROW 7 <--  
ENTER COMMAND:

ROW	1	2	3	4	5	
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	1,464.1	1 format:
2 COST OF GOODS	450.0	495.0	544.5	599.0	658.8	2 data:
3 SALES AND ADM	200.0	220.0	242.0	266.2	292.8	3 math:
4 RESEARCH AND	500.0	300.0	300.0	300.0	300.0	4 finance:
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	1,251.7	5 print:
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	212.4	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

## Generating A Report

Now that you have built your table, let's print the report. Be sure your printer is connected and turned on, and your paper adjusted.

ENTER COMMAND: **82** <Return>

Titles

PAGE NUMBER (0-999): **1** <Return>

DATE (YEAR AS YY): **83** <Return>

MONTH (1-12): **1** <Return>

DAY (1-31): 1 <Return>  
 ROW-RANGE BEGIN (1-50): 1 <Return>  
 END (1-50): 6 <Return>  
 COL-RANGE BEGIN (1-20): 1 <Return>  
 END (1-20): 5 <Return>  
 TITLE 1: SAMPLE FIVE-YEAR FORECAST <Return>  
 TITLE 2: <Return>  
 TITLE 3: <Return>

Pressing the <Return> key by itself indicates that there are no titles for the second and third lines.

SET PAPER; HIT RETURN <Return>

The TITLES (82) command sends your Five-Year Forecast table to the printer to generate the following report:

-----  
 -----

dir 1/1/83

SAMPLE 5-YEAR FORECAST

PAGE 1

	-----1-----	-----2-----	-----3-----	-----4-----	-----5-----
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	1,464.1
2 COST OF GOODS	450.0	495.0	544.5	599.0	658.8
3 SALES AND ADMINIS	200.0	220.0	242.0	266.2	292.8
4 RESEARCH AND DEVE	500.0	300.0	300.0	300.0	300.0
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	1,251.7
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	212.4

-----  
 -----

You should now save your table on disk for future use with the SAVE TBL (112) command.

ENTER COMMAND: 112 <Return>

Save table

TABLE NAME: FORECAST <Return>

Congratulations, you have just completed your first report. If you want to stop now and return to the operating system:

ENTER COMMAND: 9 <Return> Stop

VERIFY (Y OR N): Y <Return>



## Chapter 3

# Building & Saving Tables

Chapter 3 shows you how to format a table to your own specifications. You will learn how to enter row and column descriptions and the different options available for data entry.

You can view the format commands on your screen by entering command 1 and a <Return>. To see the data entry commands, enter command 2 and then <Return>.

### ENTERING A ROW OR COLUMN OF DATA

In Chapter 2, you used the ENTER [31] command to enter values for several rows in the Five-Year Forecast. The ENTER command can be used to enter a column of data as well.

When entering data with the ENTER command, you can choose the method of data entry from among four options. Choose the "0" option (VALUES) and you can enter data, value by value, one cell at a time. Choosing the "1" option (CONSTANT) will allow you to enter a constant value for the entire row or column. With the GROW option, "2", you can enter a value and have it grow by a certain percentage. Choose option "3" (INCR) and your base value will be increased or decreased by an amount specified by you.

For example, suppose you want to enter the values, 10, 20, 30, 40, etc. into column 3 of your table. To do this, you would use the following commands. If you need to clear your screen of existing data use the RESET [114] command as shown below:

ENTER COMMAND: 114 <Return>

VERIFY (Y OR N): Y <Return>

ENTER COMMAND: 34 <Return>

Select column 3

COL (1-20): 3 <Return>

Use the SELECT COL [34] command to choose column 3. Notice that instead of using SELECT COL to position your cursor on column 3, you can also use either the right or left cursor arrow keys (→, ←). The data pointer now shows COL 3 ←.

ENTER COMMAND: **31** <Return>

Use the ENTER command to enter values for column 3.

CHOOSE (VALUE=0,CONSTANT=1,GROW=2,INCR=3): **3** <Return>

Choose the increasing option.

BASE VALUE: **10** <Return>

RATE: **10** <Return>

Your display will show the following in column 3. Notice that the data pointer has automatically changed to **COL 4** <-- and is ready for your next entry.

```

-----
- - - - -
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
                                COL 4 <--
                                ENTER COMMAND:
                                1 format:
                                2 data:
                                3 math:
                                4 finance:
                                5 print:
                                6 status:
                                7 HELP
                                8
                                9 STOP
                                10 utility:
                                11 program:
                                12 stats:
                                13
                                14
                                15
                                16 format:
                                17 INSERT
                                18 DELETE
                                19 rows:
                                20 ROW TITLE
ROW -----3-----4-----5-----6-----7-----
1          10.0      0.0      0.0      0.0      0.0
2          20.0      0.0      0.0      0.0      0.0
3          30.0      0.0      0.0      0.0      0.0
4          40.0      0.0      0.0      0.0      0.0
5          50.0      0.0      0.0      0.0      0.0
6          60.0      0.0      0.0      0.0      0.0
7          70.0      0.0      0.0      0.0      0.0
8          80.0      0.0      0.0      0.0      0.0
9          90.0      0.0      0.0      0.0      0.0
10         100.0     0.0      0.0      0.0      0.0
11         110.0     0.0      0.0      0.0      0.0
12         120.0     0.0      0.0      0.0      0.0
13         130.0     0.0      0.0      0.0      0.0
14         140.0     0.0      0.0      0.0      0.0
15         150.0     0.0      0.0      0.0      0.0
16         160.0     0.0      0.0      0.0      0.0
17         170.0     0.0      0.0      0.0      0.0
-----
- - - - -

```

## Entering Individual Values

If you prefer, you can enter values one at a time by using the ENTRY (30) command. With this command, you can go directly to a data entry position without having to go through the options offered in the ENTER (31) command.



With the ENTRY command you can use the cursor keys to move to the cell position of the value you wish to enter. This position is highlighted on your display. For example, suppose you want to enter the following data into column 4.

-----  
 - - - - -

	-1-	-2-	-3-	-4-	-5-	-6-	-7-
COLUMN 4:	100	100	100	0	100	300	300

- - - - -  
 -----

The following commands will do this:

ENTER COMMAND: 30 <Return>

Entry command

VALUE: 100 <Return>

Value for col 4, row 1.

VALUE: <Return>

Value for col 4, row 2. Notice that by pressing <Return>, the previous value is repeated.

VALUE: <Return>

Value for col 4, row 3.

VALUE: 0 <Return>

Value for col 4, row 4.

VALUE: 100 <Return>

Value for col 4, row 5.

VALUE: 300 <Return>

Value for col 4, row 6.

VALUE: <Return>

Value for col 4, row 7. The prior value, 300, is automatically used by pressing <Return>. This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

Notice that while in the ENTRY mode, each <Return> causes the data pointer and the cursor to automatically move to the next row or column.

Because of the different methods available for entering data, you should determine the best way based on your particular application. In order to save time, you should also decide whether to use the row mode or the column mode before you begin entering your data.

### Doing A Sample Inventory Table

To illustrate the formatting and data entry commands used in this chapter, let's prepare a sample Inventory table based on the chart below.

-----			
- - - - -			
ITEM	UNIT COST	QUANTITY	TOTAL COST
-----			
DESKS	300	10	
CHAIRS	150	20	
SHELVES	200	5	
TOTAL			
-----			
- - - - -			

Assume that you need an Inventory report to include three items: desks, chairs, and shelves. For each of these items, you want to show a unit cost, quantity, and total cost. You also want to show a grand total for all three items' cost. Let's start by setting up the table size for your Inventory example.

### Setting Table Size

Your table sizes can be changed to accommodate a variety of applications. For example, by choosing a 5-column format, you can have up to about 200 available rows. This format could handle a full income statement, cash flow statement, and balance sheet in a single table. With 60 columns in your table, you can do a five-year, monthly projection of cash flows for a real estate development project.

The potential size of each table is determined by the RAM (Random Access Memory) capacity of your computer. Based on a system with 64K (kilobytes) of RAM, your table can be up to 99 columns, **OR** up to 250 rows, with a total of approximately 1000 data cells. The SET UP command will automatically calculate the maximum number of columns and rows to let you know how large your table can be.

The SET UP (109) command allows you to select table sizes. When you bring your program up on your terminal, the table that you see on the screen is 50 rows by 20 columns. The initial table size will always default to 50 rows by 20 columns unless you use the SET UP command to specify another size. Let's use the SET UP command to build a sample Inventory table that is 5 columns by 15 rows. Use the RESET (114) command to clear your screen, then use the following commands.

ENTER COMMAND: **109** <Return>                      Set up table size

VERIFY (Y OR N): **Y** <Return>

Notice that answering "yes" (Y) to the SET UP verification query will clear the data from your screen. If you do not want the data cleared, respond with an "N" for no.

NUMBER OF COLUMNS (1-99): **5** <Return>

We want to have 5 columns in our table. Notice that you have the option for up to 99 columns.

ROWS (1-136): **15** <Return>

Our table will have 15 rows. Notice that you could have up to about 136 rows depending on the computer system you are using. The number of rows is considerably larger if you have more than 64K of RAM.

VERIFY (Y OR N): **Y** <Return>

The size of the table on the screen, the **CURRENT** table size, is shown in the upper left corner of your screen (15 ROWS BY 5 COLUMNS). The screen will now be reset to show a table that is 5 columns by 15 rows.

### Entering Row & Column Descriptions

Row and column titles are easy to enter. Using the ROW TITLE (20) command, you can enter titles of up to 40 alpha or numeric characters for each row. Each title entered is placed in the

current row as indicated by the data pointer and the highlighted block. You can use the cursor keys to position the data pointer to the row in which you want to enter a title. Let's enter row titles for the Inventory table.

ENTER COMMAND: **20** <Return>

Row titles

ROW TITLE: **ITEM** <Return>

Notice that after you press <Return>, the entry is moved to row 1 of your table. The command line will now prompt you for the description for row 2.

ROW TITLE: **DESKS** <Return>

ROW TITLE: **CHAIRS** <Return>

ROW TITLE: **SHELVES** <Return>

ROW TITLE: **TOTAL** <Return>

This is the last row title to be entered, so use the <CANCEL> command to cancel the ROW TITLE command.

Now enter the column descriptions for your Inventory table. Columns are allowed 2-line descriptions of up to 20 characters. Each line of the title is automatically right justified in the column. If only one line of description is needed, simply press <Return> to indicate that a second line is not necessary.

ENTER COMMAND: **25** <Return>

Column titles

COL TITLE 1: **UNIT** <Return>

Column 1 first title

COL TITLE 2: **COST** <Return>

Column 1 second title

COL TITLE 1: **QUANTITY** <Return>

COL TITLE 2: <Return>

Pressing the <Return> key by itself, indicates that there is no second line column description.

COL TITLE 1: **TOTAL** <Return>

Column 3 first title

COL TITLE 2: **COSTS** <Return>

Column 3 second title

This is the last column title to be entered, so press the <CANCEL> key to cancel the COL TITLE command.

Your screen should show the following:

```

-----
MODE=NORMAL  ORDER=R/C  ROW=1-15  COL=1-5

ROW 1 (ITEM) <--
ENTER COMMAND:

UNIT  QUANTITY  TOTAL  1 format:
COST   COSTS    COSTS  2 data:
ROW    1      2      3      4      5      3 math:
-----
1 ITEM  0.0    0.0    0.0    0.0    0.0  4 finance:
2 DESKS 0.0    0.0    0.0    0.0    0.0  5 print:
3 CHAIRS 0.0    0.0    0.0    0.0    0.0  6 status:
4 SHELVES 0.0    0.0    0.0    0.0    0.0  7 HELP
5 TOTAL  0.0    0.0    0.0    0.0    0.0  8
6        0.0    0.0    0.0    0.0    0.0  9 STOP
7        0.0    0.0    0.0    0.0    0.0 10 utility:
8        0.0    0.0    0.0    0.0    0.0 11 program:
9        0.0    0.0    0.0    0.0    0.0 12 stats:
10       0.0    0.0    0.0    0.0    0.0 13
11       0.0    0.0    0.0    0.0    0.0 14
12       0.0    0.0    0.0    0.0    0.0 15
13       0.0    0.0    0.0    0.0    0.0 16 format:
14       0.0    0.0    0.0    0.0    0.0 17 INSERT
15       0.0    0.0    0.0    0.0    0.0 18 DELETE
                                           19 rows:
                                           20 ROW TITLE
-----

```

The ROW TITLE and COL TITLE commands can also be used to change row and column descriptions. They can be used to correct typing errors or to supply new titles. The new descriptions you supply simply replace the old descriptions in the table.

### Entering Data

Using the data entry commands discussed earlier in this section, we will now enter data into the Inventory table. Use your cursor keys to position your cursor on column 1.

ENTER COMMAND: 30 <Return>

Data entry

VALUE: 0 <Return>

Row 1 is a heading and should have not values. The cursor will automatically go to column 1, row 2 ready for your next entry.

VALUE: 300 <Return>

Unit cost for desks (row 2) is \$300.00.

VALUE: 150 <Return>

Unit cost for chairs (row 3) is \$150.00.

VALUE: 200 <Return>

Unit cost for shelves (row 4) is \$200.00. This is the last value to be entered here, so press the <CANCEL> key to cancel the ENTRY command.

The data pointer and the cursor automatically move to the next column ready for your next command. Let's use the ENTRY command again to enter data in column 2.

ENTER COMMAND: 30 <Return>

Data entry

VALUE: 0 <Return>

Row 1 is a heading and has no value.

VALUE: 10 <Return>

The quantity of desks, row 2, is 10.

VALUE: 20 <Return>

The quantity of chairs, row 3, is 20.

VALUE: 5 <Return>

The quantity of shelves, row 4, is 5. This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

To get the TOTAL costs of the Inventory table, use the MULT (43) command to multiply column 1 by column 2.

ENTER COMMAND: 43 <Return>

COL (1-5): 1 <Return>

COL (1-5): 2 <Return>

Your results will appear in column 3. Your screen should now show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-15  COL=1-5
COL 4 <--
ENTER COMMAND:

```

ROW	UNIT COST	QUANTITY	TOTAL COSTS			
1	2	3	4	5		
1 ITEM	0.0	0.0	0.0	0.0	0.0	1 format:
2 DESKS	300.0	10.0	3,000.0	0.0	0.0	2 data:
3 CHAIRS	150.0	20.0	3,000.0	0.0	0.0	3 math:
4 SHELVES	200.0	5.0	1,000.0	0.0	0.0	4 finance:
5 TOTAL	0.0	0.0	0.0	0.0	0.0	5 print:
6	0.0	0.0	0.0	0.0	0.0	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
						16 format:
						17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

```

-----
-----

```

## Saving & Loading Tables

After you have created a table, you will probably want to save the table for future use. You will also need to know how to reload tables from your diskette into your computer so that you can change or update data. To see the commands associated with saving and loading tables, enter command 10 (utility) and press <Return>.

You can save tables on diskettes and load the tables again using the SAVE TBL (112) and LOAD TBL (111) commands. Each table is identified by an 8-character name. You can direct the tables to be saved or loaded from any of the disk drives of your computer. More information about file names, maintaining tables, and changing disk drives can be found in Chapter 6.

To illustrate the save and load commands, let's save the table on our screen as an Inventory table example named INVENT, reset the table, and then load the saved Inventory table back from the disk.

ENTER COMMAND: 112 <Return>

Save table

TABLE NAME: INVENT <Return>

When your table has been saved, you will see a message, "SAVED" in the upper left corner of your screen.

Now clear your screen using the RESET (114) command and then reload the table using the LOAD TBL (111) command.

ENTER COMMAND: 114 <Return>

Reset

VERIFY (Y OR N): Y <Return>

ENTER COMMAND: 111 <Return>

Load table

A directory is kept of all the tables that you save. After entering a load or save command, a message at the top of the screen will direct you to "Hit RETURN to see available tables or programs." If you wish to see the names of the tables in the directory, simply press <Return>. Continue pressing <Return> to view additional tables.

TABLE NAME: INVENT <Return>

Each table will save the following information:

1. Report options and titles.
2. Range settings and compute order
3. Row descriptions, options, and commands.
4. Column descriptions, options, and commands.
5. Table values.

In general, all relevant parameters are saved so that you can continue from one session to another without worrying about losing table information.



## Enlarging Tables

The SET UP command can also be used to enlarge a table--as long as you remain within the size limitations of your RAM. To enlarge a table, first set the current table to the new dimension. Then load the table to be enlarged, into the CURRENT table.

Let's enlarge our current table from 5 columns by 15 rows to 20 columns by 50 rows.

ENTER COMMAND: **109** <Return>                      Set up command

VERIFY (Y OR NO): **Y** <Return>

NUMBER OF COLUMNS (1-99): **20** <Return>

ROWS (1-50): **50** <Return>

VERIFY (Y OR N): **Y** <Return>

The current table will be set up to the new dimensions. The CURRENT table size is displayed in the upper left corner of your screen.

ENTER COMMAND: **111** <Return>                      Load table

TABLE NAME: **INVENT** <Return>

MicroPlan will give you a message on the screen as follows:

**New table is smaller than current table dimensions. Enlarge?**

**NEW 15x5    CURRENT 50x20**

CHOOSE (NEW=0, CURRENT=1): **1** <Return>

Your Inventory table will be loaded into the enlarged matrix. If for some reason you decide not to enlarge the table, simply choose "0" in the above prompt, signifying that you wish your new table to remain the same size. Let's save the enlarged Inventory table using the SAVE TBL (112) command.

ENTER COMMAND **112** <Return>

TABLE NAME: **INVENT** <Return>

You will receive a message from saying:

**Your file already exists. Continue with save?**

VERIFY (Y OR N): **Y** <Return>

By answering "yes" to the verification, you have indicated that you want to write over the existing file called INVENT. Because you now have an updated version of INVENT, you will want to save the new version instead of the old.

### Inserting & Deleting Lines

You can insert a new row or column using the INSERT (17) command. For example, let's insert a new row into the Inventory table. Put your cursor on row 5, then:

ENTER COMMAND: **17** <Return>

Insert

An empty row or column will automatically be inserted on the line indicated by your cursor. In reality, the row being inserted is the last row or column of your current table. Data in that row or column will be carried to the new location.

To delete a row or column, simply put your cursor on the row or column you wish to delete and use the DELETE (18) command. The command line will issue a prompt asking you to verify the deletion. A "Y" response to the prompt will clear the data from the deleted line and insert the line at the outer limits of your matrix. Any commands that referenced the deleted command will now reference the last row or column of your table.

For example, delete the line we just inserted into the Inventory table above. Use your cursor keys to move the cursor to row 5 and then follow the steps below.

ENTER COMMAND: **18** <Return>

Delete

VERIFY (Y OR N): **Y** <Return>

Row 5 has been deleted and your table adjusted.

## Reordering Rows And Columns

You can change the order of your rows using the REORDER (23) command. In the same way, the REORDER (28) command will let you reorder columns. Using these commands, you can change the order of rows and columns in already existing tables. For example, let's switch the order of columns 2 and 3 in our Inventory table.

ENTER COMMAND: 28 <Return> Reorder columns

OLD NUMBER (1-20): 3 <Return>

NEW NUMBER (1-20): 2 <Return>

Your screen should show the following.

```

-----
-----
INVENT                      MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
  ROW 5 (TOTAL) <--
ENTER COMMAND:

```

ROW	UNIT COST	TOTAL COSTS	QUANTITY				
	1	2	3	4	5		
1 ITEM	0.0	0.0	0.0	0.0	0.0	1 format:	
2 DESKS	300.0	3,000.0	10.0	0.0	0.0	2 data:	
3 CHAIRS	150.0	3,000.0	20.0	0.0	0.0	3 math:	
4 SHELVES	200.0	1,000.0	5.0	0.0	0.0	4 finance:	
5 TOTAL	0.0	0.0	0.0	0.0	0.0	5 print:	
6	0.0	0.0	0.0	0.0	0.0	6 status:	
7	0.0	0.0	0.0	0.0	0.0	7 HELP	
8	0.0	0.0	0.0	0.0	0.0	8	
9	0.0	0.0	0.0	0.0	0.0	9 STOP	
10	0.0	0.0	0.0	0.0	0.0	10 utility:	
11	0.0	0.0	0.0	0.0	0.0	11 program:	
12	0.0	0.0	0.0	0.0	0.0	12 stats:	
13	0.0	0.0	0.0	0.0	0.0	13	
14	0.0	0.0	0.0	0.0	0.0	14	
15	0.0	0.0	0.0	0.0	0.0	15	
16	0.0	0.0	0.0	0.0	0.0	16 format:	
17	0.0	0.0	0.0	0.0	0.0	17 INSERT	
						18 DELETE	
						19 rows:	
						20 ROW TITLE	

```

-----
-----

```

By using the REORDER command you can make adjustments to your table without having to re-enter data. Of course, when you insert or reorder a line, command references for existing rows and columns are automatically retained.



## Chapter 4

# Math & Formulas

Chapter 4 explains how to use the built-in mathematical commands. In addition, you will learn how to write and use formulas, how to use the handy PLUG command, and how to calculate and recalculate your results with surprising speed. To see the mathematical commands on your screen, enter command **3** and then <Return>.

### Simple Math Functions

Mathematical computations are performed on entire rows and columns of your table. Let's go through some of the more common commands. Make sure your screen is cleared. If not:

ENTER COMMAND: **114** <Return>

VERIFY (Y OR N): **Y** <Return>

The RESET command clears the entire screen and redisplay the table.

For our purposes here we will be doing the commands from a row mode. If you prefer, you can also enter the mathematical commands in columns. Let's enter some sample data into row 1 and row 2 for working purposes.

ENTER COMMAND: **31** <Return>

Enter data

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **1** <Return>

BASE VALUE: **20** <Return>

ENTER COMMAND: **31** <Return>

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **1** <Return>

BASE VALUE: **10** <Return>

Now you are ready to use the math commands. The cursor and data pointer are on row 3 and the command line is ready to receive a command to enter data or put results on that row. Let's start with the ADD (41) command and add rows 1 and 2. Make sure your data pointer is pointing to row 3, then:

ENTER COMMAND: **41** <Return> Add

ROW (1-50): **1** <Return>

ROW (1-50): **2** <Return>

The ADD command will add any two rows or columns in a table and put the results in the row or column indicated by the cursor and data pointer. For example:

$$\text{Row 1} + \text{Row 2} = \text{Row 3}$$

Now let's subtract row 2 from row 1 and put the difference in row 4 using the SUB (42) command. Make sure your cursor is on row 4, then:

ENTER COMMAND: **42** <Return> Subtract

ROW (1-50): **1** <Return>

ROW (1-50): **2** <Return>

The SUB command will subtract any two rows or columns of values and put the results in the row or column indicated by the cursor and data pointer. The first prompt asks for the row or column to subtract from; the second prompt asks for the row or column to subtract. For example:

$$\text{Row 1} - \text{Row 2} = \text{Row 4}$$

Using the MULT (43) command, multiply row 1 by row 2 and put the results in row 5.

ENTER COMMAND: **43** <Return> Multiply

ROW (1-50): **1** <Return>

ROW (1-50): **2** <Return>

The MULT command will multiply any two rows or columns of values in a table and put the results in the row or column indicated by the cursor and data pointer. For example:

$$\text{Row 1} \times \text{Row 2} = \text{Row 5}$$

Use the DIV (44) command to divide row 1 by row 2 and put the results in row 6.

ENTER COMMAND: 44 <Return> Divide

ROW (1-50): 1 <Return>

ROW (1-50): 2 <Return>

The DIV command will divide any two row or columns of values and put the quotient in the row or column indicated by the cursor and data pointer. For example:

$$\text{Row 1} / \text{Row 2} = \text{Row 6}$$

The ADD K (51), SUB K (52), MULT K (53), and DIV K (54) commands perform similar computations. Instead of working with two rows or columns, these commands work with one row or column and a constant. The constant that you supply for these commands will be added to, subtracted from, multiplied by, and divided into each value of the row or column that you indicate.

The other mathematical commands are used in the same manner as the commands described above. Some of the more frequently used commands are explained in the section below. Try experimenting with some of the commands on your own. For more information about a specific command, consult the Command Reference Section of this manual.

## Special Math Functions

The CUMULATE (49) command is helpful in situations where you need a cumulative total over a period of time. Let's use the CUMULATE command to calculate the cumulative total for the data in row 5 and put the results in row 7. Make sure your cursor is on row 7.

ENTER COMMAND: 49 <Return> Cumulate

VALUE: 100 <Return>

ROW (1-50): 5 <Return>

The CUMULATE command computes cumulative totals for a row or column of a table. After entering the command, the first prompt will ask for an initial or base value. This is especially useful for balance-forward types of calculations that have an ending balance to be carried forward. There must always be a base value entered when using the CUMULATE command. If you have no previous balance value, a "0" must be entered.

The SUM (55) command is one of the most frequently used of the mathematical commands. Use the SUM command to total the data from row 1 through row 7 and put the results in row 8. Make sure your cursor is on row 8, then:

ENTER COMMAND: 55 <Return> Sum

ROW BEGIN (1-50): 1 <Return>

Number of row to begin summing.

END (1-50): 7 <Return>

Last row to be included in the sum.

The SUM command lets you add any number of consecutive rows or columns. Like the other mathematical commands, you can position your results wherever you need to have them appear. The results will appear in the row or column indicated by your data pointer and cursor.

The GET (56) command will copy data from one row or column to another. Use the GET command to put the values from row 5 into row 9. Make sure your cursor is on row 9, then:

ENTER COMMAND: 56 <Return> Get command

ROW (1-50): 5 <Return>

The GET command allows you to retrieve data from any row and put it anywhere in your current table. Of course, the same thing can be done with columns in the column mode. You should note, however, that you cannot put data from a row into a column or data from a column into a row.



## Floor & Ceiling

The FLOOR (57) and CEILING (58) commands can be used to answer basic "if-then" questions about an existing row or column of values. Let's use the FLOOR command to analyze the data in row 7 and put the results in row 10. Your data pointer should be pointing to row 10.

```
ENTER COMMAND:  57  <Return>           Floor
VALUE:  800  <Return>           Minimum value
ROW (1-50):  7  <Return>
Row to compare to the minimum value.
```

When using the FLOOR command, you set a minimum value, or floor and then compare each value in your row or column. If a value in that line is greater than the minimum value you have specified, then that value will remain unchanged. If a value is less than or equal to the minimum value, then the minimum value will be entered. In our example, every value in row 7 that was less than 800 became 800. Values greater than 800 remained unchanged.

Now use the CEILING command to compare row 7 with a maximum value of 575. Put the results in row 11.

```
ENTER COMMAND:  58  <Return>           Ceiling
VALUE:  575  <Return>           Maximum value
ROW (1-50):  7  <Return>
Row to compare to maximum value.
```

The CEILING command works the same way as the FLOOR command, only in reverse. With the CEILING command, you set a maximum value or ceiling. When you compare a line with your maximum value, anything greater than or equal to the ceiling value will become that value; anything less than that maximum value will stay the same. In our example, all values in row 7 that were greater than 575 were changed to 575; other values were not changed.

Your screen showing the examples used above should look like the following:

```

-----
- - - - -
MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 12 ( ) <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1 SAMPLE DATA      20.0      20.0      20.0      20.0      20.0
2 SAMPLE DATA      10.0      10.0      10.0      10.0      10.0
3 ADD                30.0      30.0      30.0      30.0      30.0
4 SUB                10.0      10.0      10.0      10.0      10.0
5 MULT              200.0     200.0     200.0     200.0     200.0
6 DIV                 2.0        2.0        2.0        2.0        2.0
7 CUMULATE           300.0     500.0     700.0     900.0     1,100.0
8 SUM                572.0     772.0     972.0     1,172.0   1,372.0
9 GET                200.0     200.0     200.0     200.0     200.0
10 FLOOR             800.0     800.0     800.0     900.0     1,100.0
11 CEILING           300.0     500.0     575.0     575.0     575.0
12                   0.0        0.0        0.0        0.0        0.0
13                   0.0        0.0        0.0        0.0        0.0
14                   0.0        0.0        0.0        0.0        0.0
15                   0.0        0.0        0.0        0.0        0.0
16                   0.0        0.0        0.0        0.0        0.0
17                   0.0        0.0        0.0        0.0        0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

## Displaying Command Logic

The SHOW ROWS (22) command provides you with excellent documentation for every part of your worksheet. The SHOW ROWS command displays the commands that have been memorized for each row. All formulas, base values, parameters, and print options for each command will be shown on the display on your screen. The SHOW COLS (27) command will display corresponding information about columns.

If you want to change the command for a particular row or column, you can overwrite the original command by entering a new command. The new logic will be reflected when you use the SHOW ROWS or SHOW COLS commands. Use the SHOW ROWS command to see the table logic for each of the mathematical commands that you have just used.

ENTER COMMAND: 22 <Return>

Show row logic

Your screen will show the following:

Press any cursor key to recover your display.

ROW 12 ( ) <--

ENTER COMMAND:

ROW	TYPE	UNDER LINE	BLANK LINES	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
1	SAMPLE DATA	data	-	-	-		
2	SAMPLE DATA	data	-	-	-		
3	ADD	data	-	-	-	ADD	ROW=1 ROW=2
4	SUB	data	-	-	-	SUB	ROW=1 ROW=2
5	MULT	data	-	-	-	MULT	ROW=1 ROW=2
6	DIV	data	-	-	-	DIV	ROW=1 ROW=2
7	CUMULATE	data	-	-	-	CUMULATE	K=100 ROW=5
8	SUM	data	-	-	-	SUM	ROWS 1 - 7
9	GET	data	-	-	-	GET	ROW=5
10	FLOOR	data	-	-	-	FLOOR	K=800 ROW=7
11	CEILING	data	-	-	-	CEILING	K=575 ROW=7
12		data	-	-	-		
13		data	-	-	-		
14		data	-	-	-		
15		data	-	-	-		
16		data	-	-	-		
17		data	-	-	-		

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE

## The NULLIFY Command

If you want to delete a command from your table entirely, you must use the NULLIFY (39) command to nullify the command logic. NULLIFY will issue a prompt to verify that the current row or column should be nullified. The NULLIFY command will not affect the data currently in your table.

## Using Formulas

Although all commands have built-in formulas, it may be necessary for you to enter your own formulas for specialized computations. There are two commands that let you enter formulas into your tables. The FORMULA (35) command applies your formula to an entire row or column. The PLUG (37) command lets you put a formula in a single location, or cell. With these two commands you can do calculations on an entire row or column OR cell-by-cell calculations, as needed.

With the PLUG and FORMULA commands you can combine table references and constants with mathematical operators to make formulas. The valid operations consist of addition (+), subtraction (-), multiplication (\*), and division (/). You can use up to 40 characters in each formula.

When using the PLUG and FORMULA commands, you will also probably want to reference data already in your table. You can reference any row or column by preceding the row or column number with the letter "L". For example, you would reference row 7 as L7 or column 19 as L19. Row and column references are automatically distinguished according to the data pointer. If the data pointer is pointing to a row, then all line references are to rows. If the data pointer points to a column, then all line references are to columns.

Your formula can also reference single values in your table. Single value references are formed by preceding the row and column number with the letter "V". For example, to reference the value in row 1, column 1, enter V1,1 as part of your formula. To reference row 8, column 19, you would enter V8,19 as your reference. Notice that in a single value reference, the row number must precede the column number. Also, you must use a comma to separate the two values.

Of course, you can always use constants in your formulas. Constants are numbers such as .45 and 300. Notice that negative numbers such as -1.0 cannot be used. To use negative numbers, enter them as an expression such as (0-1).

---

---

L	reference a row or column	L7
V	reference a single value	V1,2
+	add two values	L1+L3
-	subtract two values	V3,4-V5,6
*	multiply two values	L4*L16
/	divide two values	V4,4/10

---

---

In a complex formula, multiplication and division are performed before addition and subtraction. For example, in the formula  $L3 + 2 * L1$ , line 1 will be multiplied by 2 before adding the values from line 3.

If your intent is to add 2 to every value of L3 before multiplying by the values in line 1, you can use parentheses. The following example would clearly specify your intent:

$$(L3 + 2) * L1$$

The easiest way to learn is by doing. Clear your screen using the RESET (114) command, enter some sample data, and enter the sample formulas below using the FORMULA (35) command.

---

---

L1	equivalent to the GET command
L1-L2-L3	subtract lines 2 and 3 from line 1
L3/L2*100	equivalent to the RATIO command
V1,1	set current row or column to the value in row 1, column 1
L3/V3,1*100	calculate line 3 as a percent of the value in the first column of row 3-- same as the % OF TOT command

---

---

### Using The FORMULA Command

Let's experiment using the FORMULA command in the following example. Suppose that your cost of goods has a fixed and variable component. Cost of goods is 45% of sales plus a \$300 constant expense. Assume that row 1 of your sample data contains sales data. You can then enter the formula  $.45 * L1 + 300$  to calculate the desired results. To produce the above example, put your cursor on an empty row, then

ENTER COMMAND: 35 &lt;Return&gt;

Formula

FORMULA: .45\*L1+300 &lt;Return&gt;

Check your results against the following:

```

MODE=NORMAL ORDER=R/C ROW=1-50 COL=1-20
ROW 9 (.45*L1+300) <--
ENTER COMMAND:

```

ROW	1	2	3	4	5
1 SAMPLE DATA	1,000.0	1,250.0	1,562.5	1,953.1	2,441.4
2 SAMPLE DATA	575.0	575.0	575.0	575.0	575.0
3 L1	1,000.0	1,250.0	1,562.5	1,953.1	2,441.4
4 L1-L2-L3	-575.0	-575.0	-575.0	-575.0	-575.0
5 L3/L2*100	173.9	217.4	271.7	339.7	424.6
6 V1,1	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
7 L3/V3,1*100	100.0	125.0	156.3	195.3	244.1
8	0.0	0.0	0.0	0.0	0.0
9 .45*L1+300	750.0	862.5	1,003.1	1,178.9	1,398.6
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

```

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Now use the SHOW ROWS (22) command to display your table logic as shown on the screen below.

Press any cursor key to recover your display.

ROW 9 (.45\*L1+300) <--

ENTER COMMAND:

ROW	TYPE	UNDER	BLANK	DEC	FOR	COMMAND	PARAMETERS
		LINE	LINES	SIZ	MAT		
1	SAMPLE DATA	data	-	-	-		1 format:
2	SAMPLE DATA	data	-	-	-		2 data:
3	L1	data	-	-	-	L1	3 math:
4	L1-L2-L3	data	-	-	-	L1-L2-L3	4 finance:
5	L3/L2*100	data	-	-	-	L3/L2*100	5 print:
6	V1,1	data	-	-	-	V1,1	6 status:
7	L3/V3,1*100	data	-	-	-	L3/V3,1*100	7 HELP
8		data	-	-	-		8
9	.45*L1+300	data	-	-	-	.45*L1+300	9 STOP
10		data	-	-	-		10 utility:
11		data	-	-	-		11 program:
12		data	-	-	-		12 stats:
13		data	-	-	-		13
14		data	-	-	-		14
15		data	-	-	-		15
16		data	-	-	-		16 format:
17		data	-	-	-		17 INSERT
							18 DELETE
							19 rows:
							20 ROW TITLE

Press any of your cursor keys to recover your display.

## Using The PLUG Command

Sometimes it is useful to relate various entries of your table in a formula and store the single value result in a specific cell location on your table.

PLUG formulas are similar to the regular formulas described above, however, these formulas cannot have references to an entire row or column. In other words, you cannot use line references (L1 or L19) in the PLUG formulas. The PLUG formulas can only reference individual table values (V1,1 or V2,19) or constants.

The results from the PLUG command can be placed anywhere on your table. It is not necessary to enter the PLUG command on the same row or column that you want your results to go. The PLUG command formula will be stored in the row or column indicated by your cursor and data pointer. The results from that formula will be placed in the location specified with the PLUG command prompts.

For example, you can enter the PLUG command on an unused row or column, say row 50, and have it place its calculated results in any cell, for example row 2, column 1.

To illustrate the use of PLUG, suppose you want to do a special weighted profit margin on your Five-Year Forecast table. The formula is the sum of profits for the first three years divided by the sales for the first three years. The following commands show how to do this calculation.

ENTER COMMAND: 111 <Return> Load table

TABLE NAME: FORECAST <Return>

ENTER COMMAND: 33 <Return>

Select an unused row to store the PLUG command logic.

Row (1-50): 50 <Return>

ENTER COMMAND: 37 <Return> Plug

Row (1-50): 8 <Return>

Column (1-20): 1 <Return>

Plug result in row 8, column 1.

FORMULA:  $(V6,1+V6,2+V6,3)/(V1,1+V1,2+v1,3)*100$  <Return>

The calculated results will be displayed in row 8, column 1.

Notice that you can put only one command per row or column. If you enter one command over another, the second command will override the initial command. For example, if you enter your PLUG command on the same row as a SUM command, the PLUG command will override the SUM command. You can use the SHOW ROWS (22) command to check the logic for your table.

## Using The COMPUTE Command

As you enter data in your table, all the commands you used to calculate the values for a row or column are memorized. When all your commands have been entered, issue the COMPUTE (98) command. In seconds, the table will be updated to reflect your results.



In Chapter 2, you used the CHANGE (32) command to ask a "what-if" question. In fact, you can do many types of "what-if" analysis including:

1. Change entire rows or columns of the table using the ENTER (31) command.
2. Change the command used to compute a row or column.
3. Change the values associated with commands.
4. Extend the model with more rows or columns.

Each command you enter replaces any command that was previously entered in that row or column. The new commands are used to compute new values, replacing the previous command.

Doing a "what-if" analysis is simple. The following steps outline the procedures you need to perform a "what-if" analysis on any of your tables.

1. Select the row or column you want to change by moving the data pointer.
2. Issue the commands to perform the desired calculation or to enter the new data values.
3. When all changes have been completed, issue the COMPUTE command to instantly update your table.

To illustrate some uses of the "what-if" capabilities, load the Five-Year Forecast example that you did in Chapter 2 by using the following steps:

ENTER COMMAND: 111 <Return>

Load table

TABLE NAME: FORECAST <Return>

Suppose your COST OF GOODS in line 2 should be 42.5% of SALES instead of 45%. To ask this "what-if" question, use the MULT K (53) command again--but this time, use the new percentage. Position your cursor on row 2, then:

ENTER COMMAND: **53** <Return>

Multiply by a constant.

VALUE: **.425** <Return>

Enter new value of 42.5%.

ROW (1-50): **1** <Return>

ENTER COMMAND: **98** <Return>

Use the COMPUTE command to update your table. Your results will be rounded to one decimal place unless you specify otherwise.

In a few seconds, you would get the following on your screen:

DONE.

ROW 3 (SALES AND ADMINISTRATION) <--  
ENTER COMMAND:

ROW	1	2	3	4	5
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	1,464.1
2 COST OF GOODS	425.0	467.5	514.3	565.7	622.2
3 SALES AND ADM	200.0	220.0	242.0	266.2	292.8
4 RESEARCH AND	500.0	300.0	300.0	300.0	300.0
5 TOTAL COSTS	1,125.0	987.5	1,056.3	1,131.9	1,215.1
6 GROSS PROFIT	-125.0	112.5	153.8	199.1	249.0
7	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE

As a second example of "what-if" analysis, suppose RESEARCH AND DEVELOPMENT costs start at \$700 and drop to \$300 by year five. To make this change, enter the new figures using the ENTER command.

ENTER COMMAND: 31 <Return>

Enter the new RESEARCH AND DEVELOPMENT figures.

CHOOSE (VALUES=0,CONSTANT=1,GROW=2,INCR=3): 3 <Return>

BASE VALUE: 700 <Return>

RATE: -100 <Return>

ENTER COMMAND: 98 <Return>

Now compute your new results.

The screen will show the following:

DONE.

ROW 5 (TOTAL COSTS) <--

ENTER COMMAND:

ROW

ROW	1	2	3	4	5
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	1,464.1
2 COST OF GOODS	425.0	467.5	514.3	565.7	622.2
3 SALES AND ADM	200.0	220.0	242.0	266.2	292.8
4 RESEARCH AND	700.0	600.0	500.0	400.0	300.0
5 TOTAL COSTS	1,325.0	1,287.5	1,256.3	1,231.9	1,215.1
6 GROSS PROFIT	-325.0	-187.5	-46.3	99.1	249.0
7	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE



## Chapter 5

# Formatting & Printing Reports

Chapter 5 explains how to design presentation-quality reports. You will learn how to set printing options for individual rows and columns as well as how to set global options for your entire report.

### Setting Print Options

There are three different commands that let you set options for a printed report: the `OPTIONS (81)` command, the `SET TYPE (21)` command for rows, and the `SET TYPE (26)` command for columns. These commands set options only for printed reports. They will not show up on your screen.

The `OPTIONS (81)` command sets global or overall print options that apply to your entire report. Some of the options you can set with this command include overall row title widths, column widths, number of columns per page, and page controls. The `OPTIONS` command also provides top and left margin options to support printers with automatic paper feeds. The global print options are the lowest level of print options in the options hierarchy, and will be overridden by both the row and column `SET TYPE` commands.

The row `SET TYPE` command (21) sets print options for individual rows. Options include setting row types, underlining, and the number of decimal places for each row. The row `SET TYPE` options will override the global options, but will be overridden by the column `SET TYPE` command.

The column `SET TYPE` command (26) sets print options for individual columns. Options under this command include columns widths and number of decimal places for each column. The column `SET TYPE` options are the highest in the options hierarchy, and will override both the global and row `SET TYPE` option settings. Once set, the column options cannot be changed.

To illustrate the formatting and printing capabilities, let's use the Inventory table that we created in Chapter 3.

ENTER COMMAND: **111** <Return>

Load table

TABLE: **INVENT** <Return>

## Setting Row Options

You can specify a row as a heading, subtitle, footnote, or as a normal data row. You can also underline a row, insert trailing blank lines, specify the number of decimal places for row values, and specify if you want "\$" or "%" signs with your values. For the Inventory report, let's assume that we want to designate rows 1, 4, and 5 as follows:

Row 1 ITEM:	Heading only; no data assigned to row.
Row 4 SHELVES:	Last item before TOTAL; need single underline.
Row 5 TOTAL:	Total figures; need double underline.

To specify these row print options, use the SET TYPE (21) command.

ENTER COMMAND: 21 <Return>

The SET TYPE command allows you to set options on each row. For each option, if you press <Return> without a response, the previous setting for an option will remain unchanged.

ROW: 1 <Return>

Specify options for row 1.

TYPE (DATA=0, SUBT=1, HEADING=2, NOTE=3, OMIT=4): 2 <Return>

Each row can be identified as a row of numeric data; a subtitle that centers the corresponding row title in your report; a heading that leaves the area to the right of the row title blank; or a footnote that puts the row title at the the bottom of the page. If you prefer, the entire row can be omitted on the printed report.

Select option "2" to designate row 1 as a heading for the Inventory report. If you had pressed the <Return> key by itself, the option would have defaulted to the current setting of "0", meaning a data row. When you designate a row as a heading, subtitle, or footnote, the entire row title text--up to 40 characters--will be displayed on your screen. Once options have been selected, they will be remembered and will be saved as part of your table until they are changed.

UNDERLINE (NO=0, [-]=1, [=]=2, [\_]=3): <Return>

Each row can be underlined with dashes, double underlined using equal signs, or underlined with a true single underline. By pressing the <Return> key by itself, the option setting defaults to the current setting of "0", no underline. If you had selected option "3" at an earlier date, then the current setting in the upper right corner would say CURRENT=3. A single <Return> would leave the "3" setting intact.

TRAILING BLANK LINES (NEW PAGE=9): <Return>

Each row can have up to 8 blank lines trailing a particular row. A value of "9" indicates that a new page will be started following this row. This option must be set to indicate the position of page breaks in multi-page reports. By pressing the <Return> key by itself, the option defaults to "0" trailing blank lines.

DECIMAL PLACES (0-3 OFF=4): <Return>

Each row can have from 0 to 3 decimal places. By pressing the <Return> key by itself, the option defaults to 1 decimal place.

FORMAT (NO=0, [%]=1, [\$]=2, NO,=3): <Return>

Each row can have "%" or "\$" signs with each value. You can also choose to have no commas in a particular row by choosing option 3 (NO,). By pressing the <Return> key by itself, the option setting defaults to "0" where no signs are placed with the values.

The sign format option is the last prompt for row 1. The SET TYPE command automatically prompts you to set the options for another row if you desire. Let's continue to set the print options for row 4 and 5 with the following commands.

ROW (1-50): 4 <Return>

Specify options for row 4.

TYPE (DATA=0, SUBT=1, HEAD=2, NOTE=3, OMIT=4): <Return>

Leave option at current setting.

UNDERLINE (NO=0, [-]=1, [=]=2, [\_]=3): 1 <Return>

Underline row 4 with dashes.

TRAILING BLANK LINES (New Page=9): <Return>

Leave option at current setting.

DECIMAL PLACES (0-3 OFF=4): <Return>

Leave option at current setting.

FORMAT (NO=0, [%]=1, [\$]=2, NO,=3): <Return>

Leave option at current setting.

ROW (1-50): 5 <Return>

Specify options for row 5.

TYPE (DATA=0, SUBT=1, HEAD=2, NOTE=3, OMIT=4): <Return>

UNDERLINE (NO=0, [-]=1, [=]=2, [\_]=3): 2 <Return>

Specify a double underline.

TRAILING BLANK LINES (NEW PAGE=9): <Return>

DECIMAL PLACES (0-3 OFF=4): <Return>

FORMAT (NO=0, [%]=1, [\$]=2, NO,=3): <Return>

Press the <CANCEL> key to cancel the SET TYPE command. You can display a summary of the row options that you have just set with the SHOW ROWS (22) command.

ENTER COMMAND: 22 <Return>

Show row options

The SHOW ROWS command displays the option settings as well as the commands that have been specified for each row. Notice that if you want to see options for rows that are not currently visible on your screen, you must first show the other portion of the table on screen and then use the SHOW ROWS command. Your screen will show the following:



Press any cursor key to recover your display.

COL 1 (UNIT COST) <--

ENTER COMMAND:

ROW	TYPE	UNDER	BLANK	DEC	FOR	COMMAND	PARAMETERS
1	ITEM	head		-	-		1 format:
2	DESKS	data		-	-		2 data:
3	CHAIRS	data		-	-		3 math:
4	SHELVES	data	----	-	-		4 finance:
5	TOTAL	data	====	-	-		5 print:
6		data		-	-		6 status:
7		data		-	-		7 HELP
8		data		-	-		8
9		data		-	-		9 STOP
10		data		-	-		10 utility:
11		data		-	-		11 program:
12		data		-	-		12 stats:
13		data		-	-		13
14		data		-	-		14
15		data		-	-		15
16		data		-	-		16 format:
17		data		-	-		17 INSERT
							18 DELETE
							19 rows:
							20 ROW TITLE

To recover your display, press any of the cursor keys.

## Setting Column Options

You can format each column by using the column SET TYPE (26) command. With this command you can control individual column widths, specify the number of decimal places, and indicate whether or not you want "\$" or "%" signs with your values. Note that column options will always override previously set row options.

Let's format column 2 (QUANTITY) of the Inventory table so that it has no decimal places.

ENTER COMMAND: 26 <Return>

Set type options for columns.

COLUMN (1-20): 2 <Return>

Specify options for column 2.

COLUMN WIDTH (4-20): <Return>

Each column can have a different width, ranging from 4 to 20 characters (including commas and decimals). By pressing the <Return> key by itself, the column width defaults to the current setting of 10 spaces.

DECIMAL PLACES (0-3 OFF=4): 0 <Return>

Each column can have from 0 to 3 decimal places. By pressing the <Return> key by itself, the number of decimal places defaults to the current setting of 1 decimal place. For the Inventory report, set the number of decimal places in column 2 to "0".

FORMAT (NO=0, [%]=1, [\$]=2, NO.=3): <Return>

Each column can have "%" or "\$" signs with each value. By pressing the <Return> by itself, the option defaults to the current setting of "0", and no signs are placed with the values.

Press the <CANCEL> key to cancel the SET TYPE command. You can see a summary of the column options that you have just set with the SHOW COLS (27) command.

ENTER COMMAND: 27 <Return>

The SHOW COLS command displays the option settings as well as the commands that have been specified for each column. Notice that if you want to see options for columns that are not currently visible on your screen, you must first show the other portion of the table on screen and then use the SHOW COLS command. Your screen will display the following.

Press any cursor key to recover your display.

COL 1 (UNIT COST) <--

ENTER COMMAND:

COL	COLUMN WIDTH	DEC SIZ	FOR MAT	COMMAND	PARAMETERS	
1 UNIT COST	10	1	-			1 format:
2 QUANTITY	10	0	-			2 data:
3 TOTAL COSTS	10	1	-			3 math:
4	10	1	-	MULT	COL=1 COL=2	4 finance:
5	10	1	-			5 print:
6	10	1	-			6 status:
7	10	1	-			7 HELP
8	10	1	-			8
9	10	1	-			9 STOP
10	10	1	-			10 utility:
11	10	1	-			11 program:
12	10	1	-			12 stats:
13	10	1	-			13
14	10	1	-			14
15	10	1	-			15
16	10	1	-			16 format:
17	10	1	-			17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

To recover your display, press any of the cursor keys.

## Printing Reports

After setting print options for individual row and column formats, you will want to finish your report design by setting options for the overall report. These global report options include row description width, column width settings, number of columns per page, number of decimal places, and other features that affect the overall report. These options will not show on screen--only on the printed report. Let's set the global print options for the Inventory report using the OPTIONS (81) command.

ENTER COMMAND: **81** <Return>

Printing options

TOP MARGIN (0-50): <Return>

LEFT MARGIN (0-50): <Return>

The two options above support printers with automatic paper feeds. If your printer does not have an automatic paper feeder simply press <Return>. The options will default to the current settings.

ENHANCEMENT (0-3): <Return>

This option gives you the ability to take advantage of special printer features such as bold print, expanded print, and compressed print. Your dealer can assist you in accessing these options with your printer.

ROW TITLE WIDTH (4-40): 10 <Return>

Row descriptions can have from 4 to 40 alpha-numeric characters. By pressing the <Return> key by itself, the row title width option will default to the current setting of 20 characters. For the Inventory report, set the row title width to 10 characters.

COLUMN WIDTH (4-20): <Return>

Columns can have from 4 to 20 numeric characters. By pressing the <Return> key by itself, the column width will default to the current setting of 10 characters.

COLUMNS PER PAGE (1-20): <Return>

The maximum number of columns that you can print on a page will vary, depending on your table size and your printer. Because current table is 20 columns wide, you have the option to print up to 20 columns. By pressing the <Return> key by itself, the number of columns per page will default to the current setting of 10 columns per page. If you have more than 10 columns in your table to print, the first 10 columns will be printed on page 1 and the second 10 columns on page 2. Row titles, column titles, and report titles will automatically be repeated on each page.

DECIMAL PLACES (0-3): <Return>

Each value in your table can have from 0-3 decimal places in the printed report. By pressing the <Return> key by itself, the number of decimal places will default to the current setting of 1 decimal place.

OMIT ZERO ROWS (NO=0, YES=1): <Return>

Any rows that have all zero values can be eliminated from the printed report. By pressing the <Return> key by itself, the omit zero rows option will default to the current setting of "0" which will print zero rows.

SUPPRESS ZERO VALUES (NO=0, DASH=1, BLANK=2): 2 <Return>

Zero values in rows and columns can be printed with zeros, identified with a dash, or left blank. By pressing the <Return> key by itself, the suppress zero values option will default to the current setting of printing zero values as zeros.

PRINT ROW TITLE AFTER WHICH COLUMN (0-9): <Return>

Row titles can be printed between any two columns up through the middle of the table. By pressing the <Return> key by itself, the option will default to "0", printing the row titles on the left side of the report, in front of column 1.

NEGATIVE NUMBERS (-N=0, N-=1, (N)=2): <Return>

Negative numbers can be displayed with a negative sign preceding the number, or, for accounting purposes, they may be shown with a trailing negative sign, or in parenthesis. By pressing the <Return> key by itself, the option will default to the current option of "0", printing negative signs in front of the numbers.

PAGE CONTROL (OFF=0, FEED=1, PAUSE=2): <Return>

For reports longer than a page, the printer can be set to the desired page control. The form feed option issues a page break command so that each page appears on a new sheet of paper. The pause option will instruct the printer to break between pages to allow a new sheet of paper to be inserted into the printer. By pressing the <Return> key by itself, the page control option defaults to a continuous print without intervention. Three blank lines will automatically be skipped between pages.

Before using the feed and pause page control options, you must use the trailing blank line option in the SET TYPE (21) for rows command to identify page breaks.

OMIT COMMAS (NO=0, YES=1): <Return>

To accommodate wide reports, the comma option can be turned off to save space. By pressing the <Return> key by itself, the omit commas option defaults to printing all numbers with commas separating every three digits of large numbers.

DOUBLE SPACE (NO=0, YES=1): <Return>

Data rows can be single or double spaced. By pressing the <Return> key by itself, the double space option defaults to the current setting of "0" indicating single spacing.

OMIT LINE NUMBERS (NO=0, YES=1): <Return>

Row and column numbers can be printed or eliminated on your final report. By pressing the <Return> key by itself, the omit line numbers option defaults to "0", printing the row and column numbers.

After completing the global options for your report, you will want to set the title information, report ranges, and print a final report using the TITLES (82) command. Each TITLE option will identify the default settings. However, if the TITLE option has been set before, the CURRENT setting will reflect the previous setting. The TITLES command will send your report to the printer, so make sure your printer is on and connected, and your paper adjusted.

ENTER COMMAND: **82** <Return>

Report titles

PAGE NUMBER (0-999): <Return>

A page number can be printed in the upper right corner of the report if you desire. By pressing the <Return> key by itself, the page number defaults to the "OFF" position and the report pages will not be numbered.

DATE (YEAR AS YY): **83** <Return>

Date information can be printed in the upper left corner of the report. By pressing the <Return> key by itself, the date defaults to the "OFF" position, and no date will be printed. If you enter a value for the year option and <Return>, the command line will prompt you for the month and day as follows. If no year number is entered, then the month and day options will be skipped.

MONTH (1-12): **1** <Return>

Months January through December are identified by corresponding numbers 1 through 12. By pressing the <Return> key by itself, the month option will default to the "OFF" position, and no month will be printed.

DAY (1-31): **1** <Return>

Days of the month are identified by the numbers 1-31. By pressing the <Return> key by itself, the day option will default to the "OFF" position and no day will be printed.

ROW-RANGE BEGIN (1-50): 1 <Return>

END (1-50): 5 <Return>

You can decide to print only a few rows of your table by using the row ranges print option. By pressing the <Return> key by itself, the row range defaults to printing all of the rows in the table.

COL-RANGE BEGIN (1-20): 1 <Return>

END (1-20): 3 <Return>

Indicate the columns to print in your report by using the column range option. By pressing the <Return> key by itself, the column range defaults to printing all of the columns in the table.

Setting row and column ranges with the TITLES command will set the row and column ranges for the entire table. To change the row and column ranges back to their original settings after printing, use the ROW RANGE (92) and COL RANGE (93) commands.

TITLE 1: TAKING INVENTORY <Return>

TITLE 2: SAMPLE PROBLEM <Return>

TITLE 3: <Return>

Reports are allowed up to three title lines, with a maximum of 40 alpha-numeric characters each. The quote (") character is an illegal character and should not be used in report titles. Report titles are centered at the top of each page of the report. Pressing the <Return> key by itself, indicates that there is no title for that line.

If you do not want to print your report at this time, hit the <CANCEL> key to cancel the report. If you do want to print your report, check to see that the printer is connected and turned on, and your paper adjusted.

SET PAPER; HIT RETURN: <Return>

Your printed Inventory report will look like the following:

1/1/83

TAKING INVENTORY  
SAMPLE PROBLEM

	UNIT COST	QUANTITY	TOTAL COSTS
	1	2	3
1 ITEM			
2 DESKS	300.0	10	3,000.0
3 CHAIRS	175.0	20	3,500.0
4 SHELVES	200.0	5	1,000.0
5 TOTAL			

To show the overall report options for your Inventory report on screen, use the SHOW OPTIONS (84) command.

ENTER COMMAND: 84 <Return>

Show global print options and title information for Inventory report. Your screen should show the following:



Press any cursor key to recover your display.

ENTER COMMAND:

ROW	UNIT COST	QUANTITY	TOTAL COSTS			
-----1-----	-----2-----	-----3-----	-----4-----	-----5-----		
REPORT OPTIONS				PAGE NUMBER: 0		
DATE: 83/1/1						
TITLE 1: TAKING INVENTORY						
TITLE 2: SAMPLE PROBLEM						
TITLE 3:						
TOP MARGIN: 0 LEFT MARGIN: 0						
ROW TITLE WIDTH: 10						
COLUMN WIDTH: 10				OMIT COMMAS: NO		
COLUMNS PER PAGE: 10				DOUBLE SPACE: NO		
DECIMAL PLACES: 1				OMIT LINE NUMBERS: NO		
OMIT ZERO ROWS (NO=0,YES=1): 0						
SUPPRESS ZERO VALUES (NO=0,[-]=1,[ ]=2): 2						
PRINT ROW TITLE AFTER WHICH COLUMN: 0						
NEGATIVE NUMBERS (-N=0,N=-1,(N)=2): 0						
PAGE CONTROL (OFF=0,FEED=1,PAUSE=2): 0						

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE

Press any of the cursor keys to recover the table.

## Printing Tables & Reports

To get a printed copy of your table, complete with row settings, row commands, column settings, column commands, report options, and title information use the PRINT TBL (118) command.

Reports can be printed without going through the TITLES (82) command. After you have set the report OPTIONS with command 81, you can send the report straight to the printer with the REPORT (83) command. You can also use the REPORT command to print tables that have already been saved on disk.

## Cancelling Reports

Reports that have started printing can be stopped by pressing the <CANCEL> key. Printing will stop and a message on the screen will indicate that the report has been cancelled.



## Chapter 6

# Additional MicroPlan Commands

Chapter 6 covers the different modes available in MicroPlan. It also discusses other commands that will be helpful in using MicroPlan's more advanced functions.

### MicroPlan Modes

In Chapter 1, we discussed the mode indicator on MicroPlan's status line. In the course of using MicroPlan, you will be using several different modes, or states of operation. For example, when you use the COMPUTE (98) command, MicroPlan goes in and out of the Compute Mode automatically. When you start a program by using the PROGRAM (97) command, MicroPlan is then in the Program Mode. You can see the change in mode reflected on the status line at the top of your screen.

When you are through with your programming, you return MicroPlan to the Normal Mode by using the NORMAL (99) command. The five modes in MicroPlan are explained below.

**NORMAL**--The Normal Mode is the MicroPlan default mode. It is the mode used when formatting tables, doing data entry and printing reports. When the Run Program, Compute, and Protect Modes are used, MicroPlan will automatically return to the Normal Mode. When you use the Program Mode command, however, you must use the NORMAL (99) command to return MicroPlan to the Normal Mode.

**COMPUTE**--The COMPUTE (98) command starts computing rows and columns using the math and formula commands you have entered into your table. The Compute Mode reverts back to the Normal Mode automatically after computations are completed.

**PROGRAM**--The PROGRAM (97) command turns on the MicroPlan Program Mode and instructs MicroPlan to begin remembering command steps to be saved in a program. You can put up to 100 steps in any one program. The LOAD PGM (121) command can itself be a program step so that you can chain several programs. MicroPlan's programming feature is thoroughly discussed in Chapter 9.

**RUN PROGRAM**--The RUN PGM (96) command instructs MicroPlan to start running the current program in memory. MicroPlan will execute the program steps and return automatically to the Normal Mode.

PROTECT--The PROTECT (101) command turns the Protect Mode on and off. When the Protect Mode is on, a "P" is displayed in the top right corner of your screen. When the Protect Mode is on, all formulas and row and column relationship you have established in your table are protected from tampering. With MicroPlan in the Protect Mode, you can make changes to data in your table without the fear of disturbing the underlying logic. This is useful in keeping unsophisticated users from disrupting your table.

### Setting Row & Column Ranges

You can limit your data entry and your computations to a particular section of your table by using the ROW RANGE (92) and COL RANGE (93) commands. The right top corner of the screen shows the current row and column ranges. Unless otherwise specified, the range settings will default to the size of your current table. The default table size and range settings are 50 rows by 20 columns.

In Chapter 3, you saw how the SET UP (109) command is used to enlarge a table. This command should not be confused with the ROW RANGE and COLUMN RANGE commands. The SET UP command affects the physical size of the entire table. The ROW and COLUMN RANGE commands are temporary "working" range limitations that give you flexibility in your data entry, computations, and printing.

There are many ways to use the row and column range settings. For example, consider a table with budget columns and actual columns. In the budget columns you may have set up COST OF SALES as a percentage of SALES, or FRINGE BENEFITS as a percentage of SALARY EXPENSES. When the actual numbers are inserted in place of budget numbers to do rolling forecasts, you do not want to tamper with the actual COST OF SALES and FRINGE BENEFITS because of their mathematical relationship to SALES and SALARY EXPENSES respectively.

By setting the row and column ranges, you can limit your calculations to affect only the budget columns, leaving the actual columns intact. For a more complete example using the ROW and COL RANGE commands, see the ROLLING FORECAST section of Chapter 7.



ENTER COMMAND: 102 <Return>

(ROW/ONLY=1, COL/ONLY=2, ROW/COL=3, COL/ROW=4): 4 <Return>

After choosing option "4" above, MicroPlan will perform computations for all columns and then for all rows. Notice that the computing order on the status line at the top of your screen is now set to "ORDER=C/R".

Now make a change in your data, and compute your table according to the new computing order.

ENTER COMMAND: 32 <Return>

ROW (1-50): 3 <Return>

COL (1-20): 1 <Return>

VALUE: 175 <Return>

ENTER COMMAND: 98 <Return>

Your screen should show the following:

```

-----
- - - - -
INVENT                                MODE=NORMAL  ORDER=C/R  ROW=1-50  COL=1-20
  ROW 6 <--
ENTER COMMAND:

```

ROW	UNIT COST	QUANTITY	TOTAL COSTS	1 format:	2 data:	3 math:	4 finance:	5 print:	6 status:	7 HELP	8	9 STOP	10 utility:	11 program:	12 stats:	13	14	15	16 format:	17 INSERT	18 DELETE	19 rows:	20 ROW TITLE
1 ITEM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DESKS	300.0	10.0	3,000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 CHAIRS	175.0	20.0	3,500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 SHELVES	200.0	5.0	1,000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 TOTAL	675.0	35.0	7,500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

```

-----
- - - - -

```

Save your new Inventory table using the SAVE TBL (112) command.

ENTER COMMAND: 112 <Return>

TABLE NAME: INVENT <Return>

An message will appear telling you that the table INVENT already exists and asking if you want to continue with the save. Enter a "Y" to indicate that you do want to overwrite the existing INVENT table with the new INVENT table.

### Using The FIX Command

The FIX (38) command will recalculate only the current row or column without computing other rows or columns. It allows you to manually recalculate a single row or column. Sometimes, the calculation order required to correctly update values is more complex than the simple row/column order that is permitted by the ORDER command. FIX can be used to manually supplement these calculations.

For example, if you also add a PERCENTAGE PROFIT row to the Five-Year Forecast example, then none of the compute ORDER options correctly calculate the percentage profit for the total column. Let's try it.

ENTER COMMAND: 111 <Return>

Load table

TABLE NAME: FORECAST <Return>

ENTER COMMAND: 20 <Return>

Row title

Use the cursor keys to position your cursor on row 7.

ROW TITLE: PROFIT RATIO <Return>

Press <CANCEL> to cancel the ROW TITLE command. Make sure your cursor is back on row 7.

ENTER COMMAND: **67** <Return>

Take ratio of GROSS PROFIT to SALES.

ROW (1-50): **6** <Return>

Row 6 is GROSS PROFITS.

ROW (1-50): **1** <Return>

Row 1 is SALES.

Row 7 now contains the ratio of the five years' GROSS PROFITS to SALES.

Now let's put a TOTAL column in column 5 to get the total for each of the four quarters. Enter the new column title and then recompute your results using the following commands:

ENTER COMMAND: **25** <Return>

Add new column title. Position your cursor on column 5.

COL TITLE 1: **TOTAL** <Return>

COL TITLE 2: <Return>

The second <Return> indicates that there is no second title for this column. Since this is the only column title we want to enter, press the <CANCEL> key to cancel the COL TITLE command.

ENTER COMMAND: **55** <Return> Sum

BEGIN COL (1-20): **1** <Return>

END (1-20): **4** <Return>

ENTER COMMAND: **98** <Return> Compute

Your screen should show the following. Unfortunately, it is not what we wanted to do.



```

FORECAST
ROW 1 (SALES) <--
ENTER COMMAND:

```

ROW	1	2	3	4	TOTAL
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0
2 COST OF GOODS	450.0	495.0	544.5	599.0	2,088.5
3 SALES AND ADM	200.0	220.0	242.0	266.2	928.2
4 RESEARCH AND	500.0	300.0	300.0	300.0	1,400.0
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	4,416.7
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	224.4
7 PROFIT RATIO	-15.0	7.7	10.2	12.5	15.4
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

What we want to do is to calculate the combined ratio of the four quarters and the total, not the total of ratios for the four quarters. The correct order is to do rows first, then columns--including the TOTAL column--and finally, the row of profit margins. To do this, use the steps outlined below.

1. Position the data pointer to the PROFIT RATIO row.
2. Use the FIX (38) command to recalculate the profit margins.

Your new screen should show:

```

FORECAST          MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
  ROW 7 (PROFIT RATIO) <--
ENTER COMMAND:

```

ROW	1	2	3	4	5	TOTAL
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	4,641.0
2 COST OF GOODS	450.0	495.0	544.5	599.0	2,088.5	2,088.5
3 SALES AND ADM	200.0	220.0	242.0	266.2	928.2	928.2
4 RESEARCH AND	500.0	300.0	300.0	300.0	1,400.0	1,400.0
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	4,416.7	4,416.7
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	224.4	224.4
7 PROFIT RATIO	-15.0	7.7	10.2	12.5	4.8	4.8
8	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0

The FIX command can also be automated as part of a MicroPlan program. See Chapter 9 for more information about MicroPlan programs. Save your new Inventory table using the SAVE TBL (112) command.

ENTER COMMAND: 112 <Return>

TABLE NAME: FORECAST <Return>

An message will appear telling you that the table FORECAST already exists and asking if you want to continue with the save. Enter a "Y" to indicate that you do want to overwrite the existing FORECAST table with the new FORECAST table.

## Maintaining Tables

As you have seen, all tables you save are automatically put into a MicroPlan directory. Whenever you use a load or save command, you have the option to examine the contents of a diskette by pressing the <Return> key in response to the request for a filename.

By issuing a series of <Return> keys, you can see the names of the tables on disk, one table at a time. The MicroPlan directory will display the names of available tables, the report title information, and the table size information on line two of your screen. This helps you keep track of your tables.

You can use the LIST TBLs (116) command to print a list of all the tables on a particular disk. If you want to erase a table from your diskette, simply use the ERASE TBL (117) command. A prompt on the command line will ask you for the filename of the table to be erased. The table will then be deleted from your disk and the MicroPlan directory.

MicroPlan table names can be up to eight alpha-numeric characters. All table names must start with an alpha character and may not include the following characters: . ? " / or a space. Lower case characters are automatically converted to upper case.

All CP/M file names are constructed from three parts:

#### **D:FILENAME.TYP**

1. An optional disk drive identification character, followed by a colon.
2. A file name of up to 8 characters.
3. An optional type identification of up to 3 characters preceded by a period.

CP/M disk drives are assigned names such as disk drive A:, B:, C: and so on. If you supply a drive name, then you need to enter the colon character as well. In most cases, CP/M files should be saved on your B drive. You can change drives in MicroPlan using the SET DRIVE (108) command.

### **Changing Disk Drives**

To save tables on a specific disk drive, use the SET DRIVE (108) command to specify the drive name. That drive will be used as the data drive for all subsequent load and save operations until you change the drive with the SET DRIVE command or until you exit MicroPlan.

The SET DRIVE command will also allow you to change diskettes during a working session. Whenever you change diskettes, you should always issue a SET DRIVE command to initialize your new diskette.

### Interfacing With Word Processors

You can save MicroPlan reports in a file for combining with text produced on your word processing software. The SAVE REP (85) command allows you to print reports into a file instead of to a printer.

The SAVE REP command is similar to the REPORT (83) command in that all options and titles will be included in the report. By saving the report in a file, you can include MicroPlan reports in the body of text from a word processor, enhance reports using a word processor editor, or spool reports to printers.

The SAVE REP command will not save your table in MicroPlan. To save a table for future use in MicroPlan, use the SAVE TBL (112) command.

### Designing On-Screen Formats

Your screen will normally show 5 columns and 17 rows. Each cell has one decimal place, each column is 10 spaces wide, and each row title uses 15 spaces. Zero values are displayed on the screen.

The SET CRT (86) command allows you to change the display parameters for on-screen viewing. These changes are not reflected on the printed copy. For example, let's change the screen to show columns, each 20 spaces wide, with 3 decimal places, and with 15 spaces for row titles.

ENTER COMMAND: 86 <Return> Set CRT

DECIMAL PLACES (0-3): 3 <Return>

ROW TITLE WIDTH (5-30): 15 <Return>

COLUMN WIDTH (4-20): 20 <Return>

DISPLAY ZERO VALUES (NO=0, YES=1): <Return>

Pressing <Return> after an option will cause it to default to the current setting.

Your screen should show the following:

```

-----
FORECAST                      MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 7 (PROFIT RATIO) <--
ENTER COMMAND:

ROW
-----1-----2-----
1 SALES                      1,000.000      1,100.000
2 COST OF GOODS              450.000      495.000
3 SALES AND ADMINISTRATIO    200.000      220.000
4 RESEARCH AND DEVELOPMEN    500.000      300.000
5 TOTAL COSTS                1,150.000    1,015.000
6 GROSS PROFIT              -150.000      85.000
7 PROFIT RATIO              -15.000       7.727
8                          0.000      0.000
9                          0.000      0.000
10                         0.000      0.000
11                         0.000      0.000
12                         0.000      0.000
13                         0.000      0.000
14                         0.000      0.000
15                         0.000      0.000
16                         0.000      0.000
17                         0.000      0.000

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

You can change the on-screen parameters to allow financial reports that show up to trillion dollar figures with penny accuracy. Computations are accurate to 14 precision digits.

You can also design your screen display to show columns that are only 4 characters wide. This displays more columns, but numbers in each column will have to be less than four digits wide. Numbers that require more space than that allowed by your current column width will be displayed as three asterisks (\*\*).

For an 80 column screen, 65 spaces are available for the table area. After subtracting the space required for the row title, the number of columns shown on-screen is calculated depending on the size of the columns. Note that although all columns will be the same size on the screen, your printed report can have different widths for each column.

The SET CRT command does not change any of the values in the table. Therefore, feel free to experiment with this command to design screens to suit your needs.

## **Your Screen Display**

MicroPlan has several commands that allow you to clear your screen. These commands are explained below.

The CLR DATA [113] command allows you to clear the data from your current table within the current row or column ranges. It does not disturb the table logic, row or column titles, or print options. This command lets you use master tables, complete with logic and print options to make duplicate tables.

The RESET [114] command clears all data, logic, and options information from memory.

The REDISPLAY [115] command will redisplay your screen should it be distorted for any reason. No changes are made to your data.

## Chapter 7

# Financial Commands

MicroPlan's built-in financial commands make sophisticated business analysis easy. Whether you are doing capital budgeting, tax or merger planning, or return on investment analysis, financial planning applications require financial functions such as doing depreciation schedules, loan amortization, internal rates of return, present value analysis, and tax computations.

This section describes the built-in financial commands available in MicroPlan. To see these commands on your screen, enter command 4, and then press <Return>.

### Using The PERCENT Command

The PCT (70) and K PCT (71) commands allow you to calculate different kinds of percentages. The K PCT command does percentages using a constant (K) rate and the PCT command calculates percentages using percentage rates that you have stored in a row or column of the table.

For example, let's assume that row 1 contains the outstanding balances on an overdraft facility. At an interest rate of 15%, we can calculate the interest charges using the K PCT (71) command using the following commands.

ENTER COMMAND: 30 <Return>

Enter outstanding balances on row 1.

VALUE: 2000 <Return>

VALUE: 3000 <Return>

VALUE: 2500 <Return>

VALUE: 4000 <Return>

VALUE: 3750 <Return>

Enter <CANCEL> to cancel the ENTRY command after five values. Position your cursor on row 2, column 1.

ENTER COMMAND: 71 <Return>

Constant percentage

% RATE: 15 <Return>

ROW (1-50): 1 <Return>

If you expect interest rates to vary period by period, you can enter individual interest rates and use the PCT (70) command to forecast the interest rate changes. Position your cursor on row 3 and then enter the variable interest rates as follows:

ENTER COMMAND: 30 <Return>

Enter individual data as varying interest rates.

VALUE: 15 <Return>

VALUE: 18 <Return>

VALUE: 17 <Return>

VALUE: 16 <Return>

VALUE: 15 <Return>

This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command. Now position your cursor on row 4.

ENTER COMMAND: 70 <Return>

Calculate interest changes using the PCT command.

ROW (1-50): 3 <Return>

Row containing variable percentage rates.

ROW (1-50): 1 <Return>

Row containing outstanding balance figures.

Your screen will show the following:



```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
COL 1 <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1 BALANCES      2,000.0  3,000.0  25,000.0  4,000.0  3,750.0
2 K PCT         300.0   450.0   3,750.0   600.0   562.5
3 INTEREST RATE  15.0    18.0    17.0     16.0    15.0
4 PCT           300.0   540.0   4,250.0   640.0   562.5
5              0.0     0.0     0.0      0.0     0.0
6              0.0     0.0     0.0      0.0     0.0
7              0.0     0.0     0.0      0.0     0.0
8              0.0     0.0     0.0      0.0     0.0
9              0.0     0.0     0.0      0.0     0.0
10             0.0     0.0     0.0      0.0     0.0
11             0.0     0.0     0.0      0.0     0.0
12             0.0     0.0     0.0      0.0     0.0
13             0.0     0.0     0.0      0.0     0.0
14             0.0     0.0     0.0      0.0     0.0
15             0.0     0.0     0.0      0.0     0.0
16             0.0     0.0     0.0      0.0     0.0
17             0.0     0.0     0.0      0.0     0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

## Computing Ratios & Percent Of Totals

You can do percent ratios and percent of total calculations in MicroPlan. The **RATIO** (67) command calculates the percentage ratio of one row or column to another row or column.

For example, in the Five-Year Forecast example from Chapter 6, we used the **RATIO** (67) command to calculate the percentage profit margin using the profit figures in row 6 and the sales figures in row 1.

The **RATIO** command divides values from a first row by values in a second row. The results are expressed in percentage terms by multiplying by 100. Of course, for simple ratios of two values, you can always use the **DIVIDE** (44) command.

The **% OF TOT** (68) command calculates a row or column as a percentage of a total figure that you supply. To illustrate the **% OF TOT** command, let's index sales growth for our Five-Year Forecast example. Sales were growing from \$1,000 in year one to \$1,331 in year four. We want to see the growth rate year after year in relation to year 1, the base year. The **% OF TOT** command expresses this growth rate index.

ENTER COMMAND: **111** <Return>

Load table

TABLE NAME: **FORECAST** <Return>

Position your cursor on row 8 and then use the following steps to calculate the growth rate index.

ENTER COMMAND: **68** <Return>

Calculate percentage of total.

VALUE: **1000** <Return>ROW (1-50): **1** <Return>

The results shown in row 8 show the index of sales figures in relation to the base value of 1000. Your screen will show the following.

```

-----
FORECAST                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
  ROW 9 <--
ENTER COMMAND:

```

ROW	1	2	3	4	5	TOTAL
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	4,641.0
2 COST OF GOODS	450.0	495.0	544.5	599.0	2,088.5	2,088.5
3 SALES AND ADM	200.0	220.0	242.0	266.2	928.2	928.2
4 RESEARCH AND	500.0	300.0	300.0	300.0	1,400.0	1,400.0
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	4,416.7	4,416.7
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	224.4	224.4
7 PROFIT RATIO	-15.0	7.7	10.2	12.5	4.8	4.8
8 % OF TOTAL	100.0	110.0	121.0	133.1	464.1	464.1
9	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0

```

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

## The SAVINGS Command

Given the liberalized 1981 tax law governing Individual Retirement Accounts, you may want to put away \$2,000 for yourself and \$2,000 for your spouse into an IRA. You can compute your tax savings and retirement benefits using the following commands. First clear your screen by using the RESET (114) command.

ENTER COMMAND: 20 <Return> Row titles

ROW TITLE: IRA CONTRIBUTION <Return>

Title for row 1.

ROW TITLE: CUMULATIVE IRA CONTRIBUTION <Return>

ROW TITLE: TAX SAVINGS <Return>

ROW TITLE: CUMULATIVE TAX SAVINGS <Return>

ROW TITLE: RETIREMENT FUND <Return>

ROW TITLE: IRA EARNINGS <Return>

ROW TITLE: TAX SAVINGS ON IRA EARNINGS <Return>

ROW TITLE: TOTAL TAX SAVINGS <Return>

This is the last row title to enter, so use the <CANCEL> key to cancel the ROW TITLE command.

Assuming you are 40 years old and intend to contribute to your IRA for the next 20 years, we will enter column titles for 1983 through 2002.

ENTER COMMAND: 25 <Return>

COL TITLE 1: 1983 <Return>

First title for column 1.

COL TITLE 2: <Return>

The COL TITLE command will allow you to put two titles in each column. By pressing <Return>, MicroPlan will skip the second title.

COL TITLE 1: 1984 <Return> <Return>

COL TITLE 1: **1985** <Return> <Return>

COL TITLE 1: **1986** <Return> <Return>

COL TITLE 1: **1987** <Return> <Return>

Continue entering column titles through the year 2002. Then use the <CANCEL> key to cancel the COL TITLE command.

Your cursor should now be back on row 1. You can enter your yearly contribution of, say, \$4,000.

ENTER COMMAND: **31** <Return>

CHOOSE (VALUES=0, CONSTANT=1, GROW=2, INCR=3): **1** <Return>

BASE VALUE: **4000** <Return>

Your cursor is now on row 2. Calculate your cumulative contribution using the CUMULATE (49) command.

ENTER COMMAND: **49** <Return>

Cumulate your yearly IRA contribution.

VALUE: **0** <Return>

Enter 0 to indicate no initial value.

ROW (1-50): **1** <Return>

Calculate the cumulative contribution with the values on row 1.

Assume that you are in the 40% tax bracket. To compute your yearly tax savings use the following:

ENTER COMMAND: **71** <Return>

Constant percentage

% RATE: **40** <Return>

ROW (1-50): **1** <Return>

To arrive at the cumulative tax savings, use the CUMULATE command.

ENTER COMMAND: 49 <Return> Cumulate  
VALUE : 0 <Return> No initial value  
ROW (1-50): 3 <Return>

Your IRA contribution is growing at a constant 12% per year for the next twenty years. Calculate your savings balance using a 12% compounding rate.

ENTER COMMAND: 75 <Return> Savings command  
RATE: 12 <Return> Compounding rate  
ROW (1-50): 1 <Return>

Your cursor is now on row 6. Your growing RETIREMENT FUND, row 5, less your CUMULATIVE IRA CONTRIBUTION, row 2, will give you your IRA EARNINGS.

ENTER COMMAND: 42 <Return> Subtract  
ROW (1-50): 5 <Return>  
ROW (1-50): 2 <Return>

Since your IRA earnings are not taxed until you withdraw your money, you can figure your tax savings as follows:

ENTER COMMAND: 71 <Return> Constant percentage  
RATE: 40 <Return>  
ROW (1-50): 6 <Return>

Total tax savings are figured from TAX SAVINGS (row 3) on contributions not taxed and from tax savings on IRA EARNINGS.

ENTER COMMAND: 41 &lt;Return&gt;

Add

ROW (1-50): 3 &lt;Return&gt;

ROW (1-50): 7 &lt;Return&gt;

Your screen should appear as follows:

```

-----
- - - - -
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 9 <--
ENTER COMMAND:
      1983      1984      1985      1986      1987
ROW
-----1-----2-----3-----4-----5-----
1 IRA CONTRIBUT  4,000.0  4,000.0  4,000.0  4,000.0  4,000.0
2 CUMULATIVE IR  4,000.0  8,000.0 12,000.0 16,000.0 20,000.0
3 TAX SAVINGS   1,600.0  1,600.0  1,600.0  1,600.0  1,600.0
4 CUMULATIVE TA  1,600.0  3,200.0  4,800.0  6,400.0  8,000.0
5 RETIREMENT FU  4,000.0  8,480.0 13,497.6 19,117.3 25,411.4
6 IRA EARNINGS   0.0      480.0  1,497.6  3,117.3  5,411.4
7 TAX SAVINGS O   0.0      192.0   599.0  1,246.9  2,164.6
8 TOTAL TAX SAV  1,600.0  1,792.0  2,199.0  2,846.9  3,764.6
9                0.0      0.0      0.0      0.0
10               0.0      0.0      0.0      0.0
11               0.0      0.0      0.0      0.0
12               0.0      0.0      0.0      0.0
13               0.0      0.0      0.0      0.0
14               0.0      0.0      0.0      0.0
15               0.0      0.0      0.0      0.0
16               0.0      0.0      0.0      0.0
17               0.0      0.0      0.0      0.0
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE
21 SET TYPE
22 SHOW ROWS
23 REORDER
24 cols:
25 COL TITLE
26 SET TYPE
27 SHOW COLS
28 REORDER
29
30 ENTRY
31 ENTER
32 CHANGE
33 SELECT ROW
34 SELECT COL
35 FORMULA
-----
- - - - -

```

Your retirement fund by the year 2002 is \$288,209.80 (row 5, column 20). The total tax savings for each of the twenty years are shown on row 8.

## Doing Depreciations

MicroPlan has built-in formulas for computing different depreciation schedules. You can choose straight-line, sum of years digits, double declining balance, and double declining balance with an automatic switchover to straight-line schedules.

To do a depreciation schedule, use the SET DEPR (61) command to enter the assumptions for the depreciation problem. Then, use the DEPR (62) command to calculate the depreciation schedule based on your assumptions.

The SET DEPR command prompts for the method of depreciation to be used, the book value, the salvage value, and life (in years) for the schedule. These assumptions are stored in columns 1 through 4 of the current row.

The DEPR command will always prompt for a row number. You should respond with the number of the row that contains the depreciation schedule assumptions. You must be in the row mode to use the SET DEPR command. If you are in the column mode, MicroPlan will issue a warning message. However, the depreciation schedule can be stored as either a row or column in your table.

Follow this example to do a simple depreciation schedule. Suppose you have appliances valued at \$6,000. Tax authorities allow the use of the double declining balance method for tax deduction purposes. The appliances have a useful life of 10 years with an estimated salvage value of \$800. Calculate the depreciation schedule for these appliances using the following commands. Clear your screen if necessary with the RESET (114) command, then position your cursor on row 1.

ENTER COMMAND: 61 <Return>

Enter depreciation assumptions.

CHOOSE (SL=1,SYD=2,DDB=3,DDB-SW=4): 3 <Return>

BOOK VALUE: 6000 <Return>

SALVAGE VALUE: 800 <Return>

LIFE (YEARS): 10 <Return>

You have just established your depreciation assumptions on row 1. (Notice that you might have column headings that do not correspond with the assumptions you just entered. To avoid confusion, you may want to put the assumptions in row 50.) Let us now move the cursor to row 2 to do your depreciation schedule.

ENTER COMMAND: 62 <Return>

ROW (1-50): 1 <Return>

Do depreciation schedule using the assumptions in row 1.

The first 5 years of the depreciation schedule would look like the following screen:

```

-----
- - - - -
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 1 (SET DEPR) <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1 SET DEPR           3.0   6,000.0   800.0   10.0   0.0
2 DEPRECIATE       1,200.0   960.0   768.0   614.4   491.5
3                   0.0     0.0     0.0     0.0     0.0
4                   0.0     0.0     0.0     0.0     0.0
5                   0.0     0.0     0.0     0.0     0.0
6                   0.0     0.0     0.0     0.0     0.0
7                   0.0     0.0     0.0     0.0     0.0
8                   0.0     0.0     0.0     0.0     0.0
9                   0.0     0.0     0.0     0.0     0.0
10                  0.0     0.0     0.0     0.0     0.0
11                  0.0     0.0     0.0     0.0     0.0
12                  0.0     0.0     0.0     0.0     0.0
13                  0.0     0.0     0.0     0.0     0.0
14                  0.0     0.0     0.0     0.0     0.0
15                  0.0     0.0     0.0     0.0     0.0
16                  0.0     0.0     0.0     0.0     0.0
17                  0.0     0.0     0.0     0.0     0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Let's continue the example to do the accumulated depreciation and remaining book value schedules as well. Make sure your cursor is on row 3, then use the following commands.

ENTER COMMAND: **49** <Return>

Use the CUMULATE command to calculate the accumulated depreciation.

BASE VALUE: **0** <Return>

ROW (1-50): **2** <Return>

ENTER COMMAND: **35** <Return>

Use the FORMULA command to calculate the remaining book value.

FORMULA: **V1,2 - L3** <Return>

The schedule will look similar to the following.



ROW 5 <--  
ENTER COMMAND:

MODE=NORMAL ORDER=R/C ROW=1-50 COL=1-20

ROW	1	2	3	4	5	
1 SET DEPR	3.0	6,000.0	800.0	10.0	0.0	1 format:
2 DEPRECIATE	1,200.0	960.0	768.0	614.4	491.5	2 data:
3 CUMULATE DEPR	1,200.0	2,160.0	2,928.0	3,542.4	4,033.9	3 math:
4 BOOK VALUE	4,800.0	3,840.0	3,072.0	2,457.6	1,966.1	4 finance:
5	0.0	0.0	0.0	0.0	0.0	5 print:
6	0.0	0.0	0.0	0.0	0.0	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

It is easy to ask "what-if" questions with the DEPR command. For example, what if you used the sum of years digits depreciation method instead of the double declining balance method. You can use the CHANGE (32) command to change the value in row 1, column 1 to a 2, indicating the sum of years method, and then ask MicroPlan to recalculate your schedule using the COMPUTE (98) command. Try it on your own.

If you want to do your depreciation schedules in columns, here is a usage hint that may make life easier. Store the depreciation assumptions in row 50 of your table and set the ROW RANGE (92) to a range that does not include row 50. This way, the depreciation schedule will not overlap the depreciation assumptions.

## Doing Loan Amortizations

MicroPlan has built-in formulas for fixed payment mortgages with balloon payments. To do loan schedules, use the SET LOAN (63) command to enter the data necessary to solve your loan problem. Then use the LOAN (64) command to calculate the monthly, quarterly, or annual payment and the interest payment schedules.

With these results, you can develop a full amortization schedule

including balance outstanding, principal payment, and total payment.

The SET LOAN command is similar to the SET DEPR command. It will prompt you for the desired time period (annually, quarterly or monthly), and then for the loan amount, terminal balloon payment, term of loan, interest rate, and the payment. This data is stored in columns 1 through 6 of the current row.

Entering any four of the five variables given below will prompt MicroPlan to calculate the fifth.

```
Loan Amount(pv)      = 100,000
Balloon Payment (fv) = 0
Term (n)             = 30 years
Interest rate (i)    = 10%
Payment (pmt)        = ?
```

MicroPlan will compute the payment (pmt) and show the results in the top left corner of your screen. On the other hand, if you supplied the loan amount (pv), and left the term of loan blank, MicroPlan will compute the number of years needed to repay the loan.

The SET LOAN command prompts for loan assumptions to be put in rows. If you are in the column mode, MicroPlan will issue a warning message. The LOAN command stores the calculated interest payment schedule in the row or column indicated by the date pointer. When you calculate the loan schedule with the LOAN (64) command, MicroPlan will also store the calculated period payment amount in column 6 of the row that holds the loan assumptions.

MicroPlan loan calculations assume a monthly compounding period. This means payments are assumed to be made against the outstanding balance on a monthly basis. If you want yearly rate computations, the results are automatically summed and displayed as an annualized total.

Let's do an example. Suppose you have a mortgage for \$100,000 at an 18% interest rate for 30 years. You can generate a full amortization schedule using the steps below. Clear your screen if necessary using the RESET (114) command.

ENTER COMMAND: 33 <Return>

Select row 50

ROW (1-50): 50 <Return>

ENTER COMMAND: 63 <Return>

Set loan assumptions

CHOOSE (ANNUAL=1, QUARTERLY=2, MONTHLY=12): 1 <Return>

LOAN AMOUNT: 100000 <Return>

TERMINAL BALLOON PAYMENT AMOUNT: <Return>

Pressing <Return> indicates no balloon payment.

TERM OF LOAN: 30 <Return>

ANNUAL INTEREST RATE (%): 18 <Return>

ANNUAL PAYMENT: <Return>

Enter no value and press <Return>. MicroPlan will compute the annual interest payments. Notice that the top left corner of your screen will show the following information: PV=100,000, FV=0, R=18%, N=30, PMT=18085.02. This information reflects the assumptions that you entered on row 50 and the computed result of the ANNUAL PAYMENT.

Now set your row ranges to include only 30 rows for the 30 years of the loan.

ENTER COMMAND: 92 <Return> Set row range

ROW RANGE BEGIN (1-50): 1 <Return>

END (1-50): 30 <Return>

Position your cursor on row 1, column 1 with the GOTO (36) command.

ENTER COMMAND: 36 <Return>

ROW (1-50): 1 <Return>

COL (1-20): 1 <Return>

Now calculate the mortgage interest payments according to the schedule in row 50, using the LOAN (64) command. Payments will appear in column 1.

ENTER COMMAND: 64 <Return>

ROW (1-50): 50 <Return>

Position your cursor on column 2 and use the FORMULA (35) command to get the annual payments. Notice that if you are doing monthly or quarterly amortization, the formula V50,6 needs to be divided by 12 for monthly amortizations and by 4 for quarterly amortizations.

ENTER COMMAND: 35 <Return>

Use FORMULA to get the annual payments.

FORMULA: V50,6 <Return>

ENTER COMMAND: 42 <Return>

Subtract to calculate the principal payments.

COL (1-5): 2 <Return>

COL (1-5): 1 <Return>

ENTER COMMAND: 49 <Return>

Use CUMULATE to calculate the cumulative principal.

BASE VALUE: 0 <Return>

No initial value payment.

COL (1-5): 3 <Return>

ENTER COMMAND: 35 <Return>

Use FORMULA to calculate the outstanding mortgage balances.

FORMULA: V50,2-L4

The following table illustrates the type of amortization schedule that can be generated with MicroPlan.

```

-----
-----
MODE=NORMAL  ORDER=R/C  ROW=1-30  COL=1-20

ROW 1 <--
ENTER COMMAND:

```

ROW	INTEREST PAYMENTS	ANNUAL PAYMENTS	PRINCIPAL PAYMENTS	CUMULATIVE PRINCIPAL	OUTSTANDING BALANCE	1 format: 2 data: 3 math: 4 finance: 5 print: 6 status: 7 HELP 8 9 STOP 10 utility: 11 program: 12 stats: 13 14 15 16 format: 17 INSERT 18 DELETE 19 rows: 20 ROW TITLE
1	2	3	4	5	6	
1	17,992.6	18,085.0	92.4	92.4	99,907.6	
2	17,974.5	18,085.0	110.5	202.9	99,797.1	
3	17,952.9	18,085.0	132.1	335.0	99,665.0	
4	17,927.1	18,085.0	157.9	492.9	99,507.1	
5	17,896.2	18,085.0	188.8	681.7	99,318.3	
6	17,859.3	18,085.0	225.8	907.5	99,092.5	
7	17,815.1	18,085.0	269.9	1,177.4	98,822.6	
8	17,762.3	18,085.0	322.7	1,500.1	98,499.9	
9	17,699.2	18,085.0	385.9	1,886.0	98,114.0	
10	17,623.7	18,085.0	461.3	2,347.3	97,652.7	
11	17,533.4	18,085.0	551.6	2,898.9	97,101.1	
12	17,425.5	18,085.0	659.5	3,558.4	96,441.6	
13	17,296.5	18,085.0	788.5	4,346.8	95,653.2	
14	17,142.3	18,085.0	942.7	5,289.6	94,710.4	
15	16,957.9	18,085.0	1,127.1	6,416.7	93,583.3	
16	16,737.4	18,085.0	1,347.6	7,764.3	92,235.7	
17	16,473.8	18,085.0	1,611.2	9,375.6	90,624.4	

```

-----
-----

```

**CAUTION:** If your computer comes with 64K memory, you may not be able to do full schedules for, say, monthly payments for a 30-year loan amortization.

## Discounting Cash Flows

Doing discount cash flows in MicroPlan is easy. The DCF (65) command allows you to discount a row or column of cash flows using any discount rate you choose.

For example, suppose a project requires an initial investment of \$5,000. For the next 4 years, the project will generate cash as shown below. What is the discounted value of cash flows using discount rates of 20%, 25% and 30%? If necessary, clear your screen using the RESET (114) command and position your cursor on row 1.

ENTER COMMAND: 31 <Return>

Enter cash flow values.

CHOOSE (VALUES=0,CONSTANT=1,GROW=2,INCR=3): <Return>

Pressing <Return> automatically defaults to the value (0) data entry option.

VALUE: -5000 <Return>

Value for row 1, column 1. Invested amounts are entered as negative numbers. Therefore to enter an initial investment of \$5,000, enter -5000 for the first cash flow value.

VALUE: 1000 <Return>

VALUE: 2000 <Return>

VALUE: 2000 <Return>

VALUE: 7000 <Return>

Press the <CANCEL> key to cancel the ENTER command.

ENTER COMMAND: 65 <Return>

Discount cash flows at 20%.

% RATE: 20 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 49 <Return>

Compute cumulative discounted cash flow.

BASE VALUE: 0 <Return>

No initial value

ROW (1-50): 2 <Return>

ENTER COMMAND: 65 <Return>

Discount cash flows at 25%.

% RATE: 25 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 49 <Return>

Compute cumulative discounted cash flow.

BASE VALUE: 0 <Return>

No initial value

ROW (1-50): 4 <Return>

ENTER COMMAND: 65 <Return>

Discount cash flows at 30%.

% RATE: 30 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 49 <Return>

Compute cumulative discounted cash flow.

BASE VALUE: 0 <Return>

No initial value

ROW (1-50): 6 <Return>

The screen will show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
COL 1 <--
ENTER COMMAND:

ROW
-----1-----2-----3-----4-----5-----
1 CASH FLOW VAL -5,000.0  1,000.0  2,000.0  2,000.0  7,000.0
2 DCF AT 20%    -5,000.0    833.3  1,388.9  1,157.4  3,375.8
3 CUMULATE      -5,000.0 -4,166.7 -2,777.8 -1,620.4  1,755.4
4 DCF AT 25%    -5,000.0    800.0  1,280.0  1,024.0  2,867.2
5 CUMULATE      -5,000.0 -4,200.0 -2,920.0 -1,896.0  971.2
6 DCF AT 30%    -5,000.0    769.2  1,183.4    910.3  2,450.9
7 CUMULATE      -5,000.0 -4,230.8 -3,047.3 -2,137.0  313.9
8              0.0        0.0        0.0        0.0        0.0
9              0.0        0.0        0.0        0.0        0.0
10             0.0        0.0        0.0        0.0        0.0
11             0.0        0.0        0.0        0.0        0.0
12             0.0        0.0        0.0        0.0        0.0
13             0.0        0.0        0.0        0.0        0.0
14             0.0        0.0        0.0        0.0        0.0
15             0.0        0.0        0.0        0.0        0.0
16             0.0        0.0        0.0        0.0        0.0
17             0.0        0.0        0.0        0.0        0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Rows 3, 5, and 7 above contain the cumulative discounted cash flows. To find out if your investment returns more than 25% per year, you can look for the value in row 5, column 5. If this value is greater than 0, then the investment return is more than 25%, as is the case for this example.

Now, suppose cost overruns push the project investment to \$6,000. Cash returns are unlikely to change. What is the effect of the cost overrun on the discounted cash flows?

ENTER COMMAND: **32** <Return>

Change initial investment.

ROW (1-50): **1** <Return>

COL (1-20): **1** <Return>

VALUE: **-6000** <Return>

ENTER COMMAND: **98** <Return>

Compute the impact of the change in the initial investment. The screen will show the following:

DONE.

COL 1 <--  
ENTER COMMAND:

ROW

ROW	1	2	3	4	5
1 CASH FLOW VAL	-6,000.0	1,000.0	2,000.0	2,000.0	7,000.0
2 DCF AT 20%	-6,000.0	833.3	1,388.9	1,157.4	3,375.8
3 CUMULATE	-6,000.0	-5,166.7	-3,777.8	-2,620.4	755.4
4 DCF AT 25%	-6,000.0	800.0	1,280.0	1,024.0	2,867.2
5 CUMULATE	-6,000.0	-5,200.0	-3,920.0	-2,896.0	-28.8
6 DCF AT 30%	-6,000.0	769.2	1,183.4	910.3	2,450.9
7 CUMULATE	-6,000.0	-5,230.8	-4,047.3	-3,137.0	-686.1
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE



## Calculating Internal Rates of Return

You can ask MicroPlan to calculate the internal rate of return for cash flows. The internal rate of return is the discount rate which sets the sum of discounted cash flows equal to zero.

For example, to calculate the internal rate of return for the cash flows from the discounted cash flow example, use the IRR (66) command as follows. Put your cursor on row 9, then:

```
ENTER COMMAND:  93  <Return>                Set column range
COL RANGE BEGIN (1-20):  1  <Return>
END (1-20):  5  <Return>
ENTER COMMAND:  66  <Return>                Do IRR calculation
ROW (1-50):  1  <Return>
```

The IRR command gives an answer of 24.8% (32.7% for the discounted cash flow with the initial investment of \$5000). Notice that MicroPlan has also stored the results of the internal rate of return in column 1 of the current row.

The IRR command may take some time to calculate. This is because MicroPlan uses a trial-and-error method to search for an answer. After each trial, MicroPlan gets closer and closer to the correct answer. You should always set the column or row ranges before using the IRR command because the more cash flows you have, the longer it takes MicroPlan to find the answer.

It is possible that MicroPlan cannot find the answer for a specific cash flow stream. For example, if the total of all cash flows is negative, if there is more than one change in signs, or if the rate of return is in excess of 200% per year, MicroPlan will not be able to compute the internal rate of return. In such cases, MicroPlan will display an error message and will not change the previous rate on screen.

## Forecasting Cash Flows & Balances

This next section illustrates the use of MicroPlan in preparing income statements, cash flow statements, and balance sheets. It emphasizes key aspects of preparing these forecasts including:

1. Variable growth rates.
2. Tax computations.
3. Interest costs and loan drawdowns.
4. Lead/lag relationships in cash flows.
5. Beginning and ending balance computations.
6. Rolling forecasts.

### Variable Growth Rates

The GROW [74] command allows you to forecast sales using varying growth rates. The GROW command is different from the grow option in the ENTER command. The GROW command uses growth rates that are stored in a row or column of your table, and will update the forecast whenever you use the COMPUTE command. The grow option of the ENTER command uses a constant growth rate that you supply with the command prompts to enter values.

To use the GROW command, start by entering a row or column of growth rates into your table. Then, use the GROW command to forecast. Let's use the Five-Year Forecast table from Chapter 6 for illustration. Let's assume that sales will grow at 50% per year for the first 2 years and slow down to 30% per year for the next 2 years. You can modify the table as follows:

```
ENTER COMMAND: 111 <Return>           Load table
TABLE NAME:  FORECAST <Return>
ENTER COMMAND: 33 <Return>           Select row 9
ROW (1-50):  9 <Return>
ENTER COMMAND: 31 <Return>           Enter growth rates
CHOOSE (VALUES=0,CONSTANT=1,GROW=2,INCR=3):  <Return>
VALUE:  50 <Return>
Value for row 9, column 1.
VALUE:  <Return>
Entering <Return> tells MicroPlan to repeat the previous value.
```

VALUE: 30 <Return>

VALUE: <Return>

Use the <CANCEL> key to cancel the ENTER command.

ENTER COMMAND: 33 <Return>

Select row 1

ROW (1-50): 1 <Return>

ENTER COMMAND: 74 <Return>

Forecast using the GROW command.

BASE VALUE: 1000 <Return>

Enter year 0 value.

ROW (1-50): 9 <Return>

Reference growth rates from row 9.

ENTER COMMAND: 98 <Return>

Update forecast

The screen will show the following:

```

-----
FORECAST          MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
  ROW 2 (COST OF GOODS) <--
ENTER COMMAND:

ROW      1      2      3      4      5      TOTAL
-----
1 SALES      1,500.0    2,250.0    2,925.0    3,802.5    10,477.5
2 COST OF GOODS      675.0    1,012.5    1,316.3    1,711.1    4,714.9
3 SALES AND ADM      300.0    450.0    585.0    760.5    2,095.5
4 RESEARCH AND      500.0    300.0    300.0    300.0    1,400.0
5 TOTAL COSTS      1,475.0    1,762.5    2,201.3    2,771.6    8,210.4
6 GROSS PROFIT      25.0    487.5    723.8    1,030.9    2,267.1
7 PROFIT RATIO      1.7    21.7    24.7    27.1    75.2
8              0.0    0.0    0.0    0.0    0.0
9 GROWTH RATES      50.0    50.0    30.0    30.0    160.0
10             0.0    0.0    0.0    0.0    0.0
11             0.0    0.0    0.0    0.0    0.0
12             0.0    0.0    0.0    0.0    0.0
13             0.0    0.0    0.0    0.0    0.0
14             0.0    0.0    0.0    0.0    0.0
15             0.0    0.0    0.0    0.0    0.0
16             0.0    0.0    0.0    0.0    0.0
17             0.0    0.0    0.0    0.0    0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

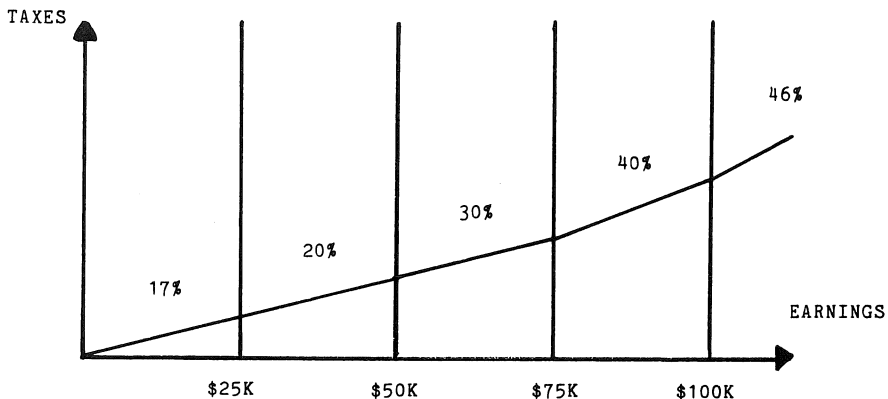
```

Note that the base value of the GROW command is different from the base value in the grow option of ENTER. The ENTER option uses the base value as the value for year 1, whereas the GROW command uses the base value as the value for year 0. If your business is a startup, you can set the growth rate for year 1 at 0%. This way, the year 0 value will be the result for year 1 as well. Of course, an on-going business would use the prior year's actual results for the base value.

## Doing Taxes

MicroPlan has commands to let you enter tax schedules and calculate the taxes due, based on these schedules. You can use MicroPlan to do personal taxes, corporate taxes, or any calculations that have progressive rates applied against earnings.

Typically, tax schedules show progressive increases in tax rates. A tax to earnings schedule may have the following relationship.



The SET SCHED (76) command prompts for a schedule. You can enter up to ten brackets and the marginal tax rate for each bracket. This schedule is stored in the current row of your table. Schedules cannot be stored as a column.

The DO TAX (77) command calculates taxes due based on a specific schedule for a row of earnings. DO TAX will first ask for the row number of the schedule you want to use, then the earnings data. The results are the taxes due. Note that negative earnings will always result in taxes due of 0.

Let's enter the 1981 tax schedule for corporations and calculate the taxes due. Clear your screen using the RESET (114) command.

ENTER COMMAND: 31 <Return> Enter sample earnings

CHOOSE (VALUES=0,CONSTANT=1,GROW=2,INCR=3): 3 <Return>

BASE VALUE: 25 <Return>

RATE: 25 <Return>

ENTER COMMAND: 76 <Return> Enter tax schedule

NUMBER OF BRACKETS (1-10): 4 <Return>

UPPER LIMIT FOR BRACKET 1: 25 <Return>

MARGINAL RATE: 17.0 <Return>

UPPER LIMIT FOR BRACKET 2: 50 <Return>

MARGINAL RATE: 20.0 <Return>

UPPER LIMIT FOR BRACKET 3: 75 <Return>

MARGINAL RATE: 30.0 <Return>

UPPER LIMIT FOR BRACKET 4: 100 <Return>

MARGINAL RATE: 40.0 <Return>

MARGINAL RATE FOR REMAINING INCOME: 46.0 <Return>

Move your cursor to row 3, then do your tax calculations using the DO TAX (77) command.

ENTER COMMAND: 77 <Return>

SCHEDULE (1-50): 2 <Return>

EARNINGS (1-50): 1 <Return>

Your screen will show the following:

```

-----
-----
                                MODE=NORMAL   ORDER=R/C   ROW=1-50   COL=1-20
      ROW 1 (SAMPLE EARNINGS) <--
ENTER COMMAND:

ROW                                1 format:
-----1-----2-----3-----4-----5-----2 data:
1 SAMPLE EARNIN          25.0      50.0      75.0      100.0      125.0 3 math:
2 TAX SCHEDULE           4.0      25.0      17.0      50.0      20.0 4 finance:
3 DO TAX                 4.3       9.3      16.8      26.8      38.3 5 print:
4                       0.0       0.0       0.0       0.0       0.0 6 status:
5                       0.0       0.0       0.0       0.0       0.0 7 HELP
6                       0.0       0.0       0.0       0.0       0.0 8
7                       0.0       0.0       0.0       0.0       0.0 9 STOP
8                       0.0       0.0       0.0       0.0       0.0 10 utility:
9                       0.0       0.0       0.0       0.0       0.0 11 program:
10                      0.0       0.0       0.0       0.0       0.0 12 stats:
11                      0.0       0.0       0.0       0.0       0.0 13
12                      0.0       0.0       0.0       0.0       0.0 14
13                      0.0       0.0       0.0       0.0       0.0 15
14                      0.0       0.0       0.0       0.0       0.0 16 format:
15                      0.0       0.0       0.0       0.0       0.0 17 INSERT
16                      0.0       0.0       0.0       0.0       0.0 18 DELETE
17                      0.0       0.0       0.0       0.0       0.0 19 rows:
                                20 ROW TITLE
-----
-----

```

## Handling Tax Losses

The tax laws permit losses to be carried back against prior year earnings or forward against future earnings. For existing businesses, a reasonable approximation of tax loss carryback is to calculate a negative tax due (i.e. a refund) for the year that the loss is incurred. This refund would be a cash inflow for the corporation. As long as tax losses do not exceed the earnings from prior years, multiplying pre-tax losses by a simple 46% would approximate both the timing and size of the tax impact.

For on-going, healthy businesses, you can use the K PCT (71) command to calculate tax refunds or tax due on profits.

For new companies or companies electing to carry losses forward against future earnings, losses reduce tax liabilities on future years when earnings are positive.

You can use the following sequence of commands to calculate a tax loss carry forward. But first enter the following pre-tax figures as dummy data. Clear your screen using the RESET (114) command.

ENTER COMMAND: **30** <Return>

Enter pre-tax figures as dummy data.

VALUE: **-150** <Return>

VALUE: **100** <Return>

VALUE: **200** <Return>

VALUE: **-200** <Return>

VALUE: **400** <Return>

Use the <CANCEL> key to cancel the ENTRY command.

ENTER COMMAND: **49** <Return>

Cumulate pre-tax profits.

BASE VALUE: **0** <Return>

ROW (1-50): **1** <Return>

ENTER COMMAND: **57** <Return>

Set loss years to 0

VALUE: **0** <Return>

ROW (1-50): **2** <Return>

ENTER COMMAND: **131** <Return>

Calculate year to year change.

PERIODS (1-12): **1** <Return>

ROW (1-50): **3** <Return>

ENTER COMMAND: **57** <Return>

Profits after carry forward.

VALUE: **0** <Return>

ROW (1-50): **4** <Return>

ENTER COMMAND: **71** <Return>

Calculate tax due

% RATE: **46.0** <Return>

ROW (1-50): **5** <Return>

Your display will show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
COL 1 <--
ENTER COMMAND:

ROW                                1 format:
-----1-----2-----3-----4-----5-----2 data:
1 SAMPLE DATA      -150.0    100.0    200.0    -200.0    400.0 3 math:
2 PRETAX PROFIT     -150.0    -50.0    150.0     -50.0    350.0 4 finance:
3 LOSS YEARS         0.0       0.0     150.0       0.0    350.0 5 print:
4 CHANGE            0.0       0.0     150.0    -150.0    350.0 6 status:
5 PROFITS           0.0       0.0     150.0       0.0    350.0 7 HELP
6 TAX DUE           0.0       0.0      69.0       0.0    161.0 8
7                  0.0       0.0       0.0       0.0       0.0 9 STOP
8                  0.0       0.0       0.0       0.0       0.0 10 utility:
9                  0.0       0.0       0.0       0.0       0.0 11 program:
10                 0.0       0.0       0.0       0.0       0.0 12 stats:
11                 0.0       0.0       0.0       0.0       0.0 13
12                 0.0       0.0       0.0       0.0       0.0 14
13                 0.0       0.0       0.0       0.0       0.0 15
14                 0.0       0.0       0.0       0.0       0.0 16 format:
15                 0.0       0.0       0.0       0.0       0.0 17 INSERT
16                 0.0       0.0       0.0       0.0       0.0 18 DELETE
17                 0.0       0.0       0.0       0.0       0.0 19 rows:
                                20 ROW TITLE

```

In the last step, you may choose to use the tax schedule commands from the previous example if profits would be affected by the graduated income tax schedules.

## Interest & Loan Drawdown

Interest calculations are simple in MicroPlan. Interest expenses are normally expressed as a percentage of the outstanding loan balances. Ideally, the computer should calculate interest expense, cash required and loan drawdown schedules automatically. However, these calculations are difficult to forecast because the results are interrelated. The drawdown depends on cash required. As you borrow more money, your interest expenses change, increasing the need for more cash. This relationship is called a simultaneous system of equations. Unfortunately, only very complex mathematical systems can correctly handle these kinds of models.



A simple solution to forecasting interest expenses and cash requirements is to make the loan drawdown schedule an entered value to your model--as opposed to calculated. This solution has two advantages: 1) It more closely models the actual operation of the corporate borrowing decision and 2) it breaks the loop of simultaneous equations.

Let's look at the logic behind an abbreviated model.

```

-----
DATA ENTRY SECTION

1  Loan Drawdown (Repayment)  <-- ENTER
2  Loan Balance               <-- Cumulate row 1
   :
   :
   :
INCOME STATEMENT

17 Expenses
   :
   :
22 Interest Expenses          <-- % of row 2
23 Total Expenses
   :
   :
CASH FLOW

37 Profit After Tax
38 Additional Short Term Debt <-- GET row 1
   :
   :
42 Total Inflow
   :
   :
57 Total Outflow
58 Net Cash Flow              <-- Row 42 minus row 57
   :
   :
BALANCE SHEET

72 Cash & Equivalent          <-- Cumulate row 58
-----

```

As you develop your initial forecasts, you might find that cash balances in row 72 have negative values. This means that you need to borrow funds to cover the negative balances. You can use the ENTER (31) or CHANGE (32) commands to change row 1, the loan drawdown and repayment schedule. Then, after using the COMPUTE command, you can check to see if sufficient cash is available to run your business. By trial and error, you can develop a better understanding of the borrowing requirements and payback abilities of your business.

## Leads & Lags In Cash Flow Projections

In planning, cash flow requirements are critical. The timing of cash inflow and outflow can determine the success or failure of a business. The LEAD (73) and LAG (72) commands shift data to reflect timing differences between bookings and actual receipt or payment of cash.

For example, one business determines that 40% of sales is cash on delivery, 35% is on net 30 day terms, and the remaining 25% averages 60 days on payment. Let's pretend that the Five-Year Forecasting table from Chapter 2 is a monthly model and extend it to calculate the cash inflow schedule as follows. Load the FORECAST table with the LOAD TBL (111) command, and then position your cursor on row 10.

ENTER COMMAND: 72 <Return>

Use the LAG command to shift sales by 30 days.

PERIODS (1-12): 1 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 72 <Return>

Shift sales by 60 days.

PERIODS (1-12): 2 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 71 <Return>

Calculate C.O.D. portion.

% RATE: 40 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 71 <Return>

Calculate Net 30 portion.

% RATE: 35 <Return>

ROW (1-50): 10 <Return>

ENTER COMMAND: 71 <Return>

Calculate Net 60 portion.

% RATE: 25 <Return>

ROW (1-50): 11 <Return>

ENTER COMMAND: 55 <Return>

Calculate total cash inflow.

BEGIN ROW (1-50): 12 <Return>

END (1-50): 14 <Return>

Your screen should show the following:

```

-----
- - - - -
FORECAST                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
  ROW 1 (SALES) <--
ENTER COMMAND:

ROW                                     TOTAL
-----1-----2-----3-----4-----5-----
1 SALES                               1,000.0  1,100.0  1,210.0  1,331.0  4,641.0
2 COST OF GOODS                       450.0   495.0   544.5   599.0   2,088.5
3 SALES AND ADM                       200.0   220.0   242.0   266.2   928.2
4 RESEARCH AND                        500.0   300.0   300.0   300.0   1,400.0
5 TOTAL COSTS                         1,150.0  1,015.0  1,086.5  1,165.2  4,416.7
6 GROSS PROFIT                       -150.0    85.0   123.5   165.9   224.4
7 PROFIT RATIO                        -15.0    7.7   10.2   12.5    4.8
8                                     0.0    0.0    0.0    0.0    0.0
9                                     0.0    0.0    0.0    0.0    0.0
10 LAG BY 30                          0.0   1,000.0  1,100.0  1,210.0  1,331.0
11 LAG BY 60                          0.0    0.0   1,000.0  1,100.0  1,210.0
12 C.O.D.                            400.0   440.0   484.0   532.4  1,856.4
13 NET 30                            0.0   350.0   385.0   423.5   465.9
14 NET 60                            0.0    0.0   250.0   275.0   302.5
15 TOTAL INFLOW                       400.0   790.0  1,119.0  1,230.9  2,624.8
16                                     0.0    0.0    0.0    0.0    0.0
17                                     0.0    0.0    0.0    0.0    0.0

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

## Beginning & Ending Balances

As you have seen, MicroPlan commands compute for a row or a column at a time. Sometimes, you may want to calculate the results for one period, then carry the results into the next period. Typically, this occurs when you need to forecast balance sheet account items.

The CUMULATE command allows you to do these balance forward type calculations. However, you should note that you may need to create some intermediate steps. When you print reports, you always have the option not to print these intermediate steps by using the SET TYPE (21) command and selecting the OMIT (4) option under the TYPE prompt.

You can use the CUMULATE command to forecast almost all balance sheet items including accounts receivables, inventories, gross assets, accounts payables, and retained earnings. For each balance item, there should be a corresponding cash flow item that forecasts the net changes for that account. In other words, profits less dividends paid would flow into retained earnings.

To further illustrate balance forecasting, let's do an inventory analysis as follows:

Beginning Inventory:	1,000 (Lag ending inventory.)
Units Received:	Entered values
Shipments:	Entered values
Returned:	5% of units received
Ending Inventory:	Beginning+Received-Shipments-Returned

You can produce a table for the above analysis with the steps outlined below:

-----  
 -----  
 Inventory Analysis Table

1	Units Received	Entered values (30)
2	Shipments	Entered values (30)
3	Returned	5% of row 1 (71)
4	Net Inventory Change	L1-L2-L3 (35)
5	Ending Balance	Cumulate row 4 with initial value of 1,000 (49)
6	Beginning Balance	Lag row 5 by 1 period (72)
7	Units Received	Get row 1 (56)
8	Shipments	Get row 2 (56)
9	Returned	Get row 3 (56)
10	Ending Balance	Get row 5 (56)

-----  
 -----

By printing only rows 6 through 10, you will get the report you need. Of course, you can also do the analysis in columns instead of rows if appropriate.

Another way to solve the inventory projection problem is to use a MicroPlan program to update one column at a time. For example, set the column range to columns 1 through 1 only, using the COL RANGE [93] command, then use the ENTRY [30] command to enter the year 0 values into column 1. The following program could be used to automatically update the remaining columns.

-----  
 -----

STEP	DATA PTR	COMMAND	ARGUMENTS
1		COL RANGE	2 TO 2
2		COMPUTE	
3		COL RANGE	3 TO 3
4		COMPUTE	
5		COL RANGE	4 TO 4
6		COMPUTE	
7		.	
8		:	

-----  
 -----

The above program would update your inventory projection, one column at a time. For more information about writing and using MicroPlan programs, see Chapter 9.

### Rolling Forecasts

MicroPlan is designed to support rolling forecasts. Once you have established a monthly budget, you can enter the actual results for each month and update your forecasts on a monthly basis.

Each month, select the column for the current month and enter the actual results for that month. For January, for example, select column 1 and enter the January results over the budgeted figures. Then set the column range to cover the remaining budget months and use the COMPUTE command.

In this case, January results mean setting the column range to columns 2 through 12. Note that MicroPlan will only recalculate the remaining months. Any total columns will show combined actual and budget figures to reflect the latest available information.

Let's go through a simple quarterly rolling forecast for selected departmental expenses. Use the RESET (114) command to clear your screen if necessary.

ENTER COMMAND: 20 <Return>

ROW TITLE: WAGES <Return>

Title for row 1.

ROW TITLE: FRINGE BENEFITS <Return>

ROW TITLE: TRAVEL EXPENSE <Return>

ROW TITLE: POSTAGE <Return>

ROW TITLE: TOTAL EXPENSES <Return>

Press the <CANCEL> key to cancel the ROW TITLE command.

ENTER COMMAND: 25 <Return>

COL TITLE: 1Q <Return>

COL TITLE: 2Q <Return>

COL TITLE: **3Q** <Return>

COL TITLE: **4Q** <Return>

COL TITLE: **YEAR** <Return>

Use the <CANCEL> key to cancel the COL TITLE command.

Position your cursor on row 1. Let's enter some budget numbers to work with. Suppose your wage expense is \$20,000 and is expected to grow 2% per quarter for the next four quarters.

ENTER COMMAND: **31** <Return>

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **2** <Return>

BASE VALUE: **20000** <Return>

RATE: **8** <Return>

The year column (5) also picks up the wage numbers. Let's leave them for now; we'll adjust the column later.

Fringe benefits is 15% of wages, so:

ENTER COMMAND: **71** <Return>

% RATE: **15** <Return>

ROW (1-50): **1** <Return>

Travel expenses are, say, \$5,000 per quarter and postage is \$200.

ENTER COMMAND: **31** <Return>

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **1** <Return>

BASE VALUE: **5000** <Return>

ENTER COMMAND: **31** <Return>

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): **1** <Return>

BASE VALUE: **200** <Return>

To sum the total expense for each quarter:

ENTER COMMAND: **55** <Return>

BEGIN ROW (1-50): 1 <Return>

END (1-50): 4 <Return>

To sum the total expenses for the year, use your cursor keys to move the cursor to column 5.

ENTER COMMAND: 55 <Return>

BEGIN COL (1-20): 1 <Return>

END (1-20): 4 <Return>

The quarterly budget is now complete. Three months into the current year, the first quarter actual numbers are now available. You would like to do a rolling forecast by combining the first quarter actual with the next three quarters of budget to come up with an up-to-date budget. Move your cursor to the 1Q column, column 1.

ENTER COMMAND: 30 <Return>

VALUE: 21000 <Return>

VALUE: 3600 <Return>

VALUE: 3500 <Return>

VALUE: 120 <Return>

VALUE: 28220 <Return>

Use the <CANCEL> key to cancel the ENTRY command.

Entering the COMPUTE command at this time will disrupt the actual numbers. Fringe benefits, for example, are assumed to be 15% of wages; the actual number is \$3,600 rather than the assumed 15%. Therefore, we need to limit the range of column operation as follows:

ENTER COMMAND: 93 <Return>

BEGIN (1-20): 2 <Return>

END (1-20): 5 <Return>



ENTER COMMAND: 98 <Return>

Your rolling forecast will appear on the screen as follows:

```

-----
-----
DONE.
  COL 2 (2Q ) <--
ENTER COMMAND:

```

ROW	1Q	2Q	3Q	4Q	YEAR	1 format:
1 WAGES	21,000.0	21,600.0	23,328.0	25,194.2	91,122.2	2 data:
2 FRINGE BENEFI	3,600.0	3,240.0	3,499.2	3,779.1	14,118.3	3 math:
3 TRAVEL EXPENS	3,500.0	5,000.0	5,000.0	5,000.0	18,500.0	4 finance:
4 POSTAGE	120.0	200.0	200.0	200.0	720.0	5 print:
5 TOTAL EXPENSE	28,220.0	30,040.0	32,027.2	34,173.4	124,460.6	6 status:
6	0.0	0.0	0.0	0.0	0.0	7 HELP
7	0.0	0.0	0.0	0.0	0.0	8
8	0.0	0.0	0.0	0.0	0.0	9 STOP
9	0.0	0.0	0.0	0.0	0.0	10 utility:
10	0.0	0.0	0.0	0.0	0.0	11 program:
11	0.0	0.0	0.0	0.0	0.0	12 stats:
12	0.0	0.0	0.0	0.0	0.0	13
13	0.0	0.0	0.0	0.0	0.0	14
14	0.0	0.0	0.0	0.0	0.0	15
15	0.0	0.0	0.0	0.0	0.0	16 format:
16	0.0	0.0	0.0	0.0	0.0	17 INSERT
17	0.0	0.0	0.0	0.0	0.0	18 DELETE
						19 rows:
						20 ROW TITLE

```

-----
-----

```

ALL MicroPlan commands that reference prior period figures are designed to accomodate rolling forecasts. For example, the CUMULATE command will use the actual results as the beginning balance in calculating new balances; the GROW command will use the actual results as the initial value in forecasting into future periods; and the LAG command will reference your actual data when appropriate.

### If-Then-Else With MicroPlan

By using the values of "0" or "1" in a data cell or in a row or column, you can create an if-then-else situation with MicroPlan. In other words, if the value is zero, do the operation. If the value is one, then do another operation. This kind of function is feasible because any value multiplied by 1 is equal to the same value, and any value multiplied by 0 is zero.

Let's go through an example to illustrate the if-then-else function in MicroPlan. The following example is taken from the MicroPlan Real Estate Solution Book written by Eric Von Berg and Rody Ishii.

Under the 1982 Tax Act, the method to calculate the depreciable basis of a property was changed. For historic structures, the depreciable basis is now reduced by half of the investment tax credit (ITC) taken. For ordinary property, the basis is reduced by 100% of the ITC taken. Therefore, before you can do the depreciation schedule, you need to determine:

IF property is historic,  
THEN take 50% of the ITC to calculate depreciable value,  
ELSE take 100% of the ITC.

Let's set up this example using the following commands. If necessary clear your screen using the RESET (114) command.

ENTER COMMAND: 20 <Return>                      Enter row titles

ROW TITLE: BUILDING VALUE <Return>

Title for row 1.

ROW TITLE: INVESTMENT TAX CREDIT <Return>

ROW TITLE: HISTORIC (NO=0, YES=1) <Return>

ROW TITLE: DEPRECIATION EXPENSE <Return>

This is the last row title to be entered, so press the <CANCEL> key to cancel the ROW TITLE command.

Enter column titles using the COL TITLE command (25).

ENTER COMMAND: 25 <Return>

COL TITLE 1: BUILDING <Return>

COL TITLE 2: A <Return>

Titles for column 1.

COL TITLE 1: BUILDING <Return>

COL TITLE 2: B <Return>

COL TITLE 1: **BUILDING** <Return>

COL TITLE 2: **C** <Return>

COL TITLE 1: **BUILDING** <Return>

COL TITLE 2: **D** <Return>

This is the last column title to enter, so press the <CANCEL> key to cancel the COL TITLE command.

Your cursor is on row 1. Now enter data for each building value using the ENTRY [30] command.

ENTER COMMAND: **30** <Return>

VALUE: **50000** <Return>

VALUE: **80000** <Return>

VALUE: **75000** <Return>

VALUE: **60000** <Return>

This is the last value to enter for row 1, so use the <CANCEL> key to cancel the ENTRY command.

Row 2 is calculated as a constant 10% of each building value, row 1. Use the K PCT [71] command to calculate row 2.

ENTER COMMAND: **71** <Return>

% RATE: **10** <Return>

ROW (1-50): **1** <Return>

For row 3 enter a "0" or a "1" depending on whether or not that particular building is historic.

ENTER COMMAND: 30 <Return>

VALUE: 0 <Return>

Enter a "0" in column 1 to indicate that this building is not historic.

VALUE: 1 <Return>

Enter a "1" in column 2 to indicate that this building is historic.

VALUE: 1 <Return>

VALUE: 0 <Return>

This is the last value to be entered here, so use the <CANCEL> key to cancel the ENTRY command.

Assume that we need to calculate the annual depreciation expense over 15 years. The investment tax credit (ITC) is subtracted from the building value and in the case of historic structure, 50% of the ITC is added back. Use the FORMULA (35) command to enter the necessary formula.

ENTER COMMAND: 35 <Return>

$(L1-L2+(.5*L2*L3))/15$  <Return>

In other words, the building value (row 1) - the ITC (row 2) + (50% of row 2 (ITC) \* row 3) divided by 15 years. Notice that the values in row 3 will be "1" if the building is historic. If the building is not historic, the value in row 3 will be "0".

Your screen will show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

    ROW 5  <--
ENTER COMMAND:

```

ROW	BUILDING A	BUILDING B	BUILDING C	BUILDING D		
	1	2	3	4	5	
1 BUILDING VALU	50,000.0	80,000.0	75,000.0	60,000.0	0.0	1 format:
2 INVESTMENT TA	5,000.0	8,000.0	7,500.0	6,000.0	0.0	2 data:
3 (NO=0,YES=1)	0.0	1.0	1.0	0.0	0.0	3 math:
4 DEPRECIATION	3,000.0	5,066.7	4,750.0	3,600.0	0.0	4 finance:
5	0.0	0.0	0.0	0.0	0.0	5 print:
6	0.0	0.0	0.0	0.0	0.0	6 status:
7	0.0	0.0	0.0	0.0	0.0	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

```

-----
-----

```

This same approach can be applied to other problems that need the if-then-else function. The designations of "0" and "1" can be used to tell MicroPlan to execute different commands under certain conditions. Try experimenting on your own.



## Chapter 8

# Statistical Commands

MicroPlan has built-in commands for doing statistical analysis. You can use these commands to analyze trends in forecasts, product sales, or to calculate means, standard deviations, and variances. To see the statistical commands on your screen, enter command **12** and <Return>.

### Building A Product Analysis Table

Let's go through a product trend analysis based on sales data for the past five years to see how we can do a forecast for the next three years. First, set up a table reflecting the history of three products using the following data:

	1975	1976	1977	1978	1979	1980
PROD A	95	110	129	148	171	190
PROD B	120	110	115	125	115	120
PROD C	170	155	150	138	122	125
TOTAL	385	375	394	411	408	435

Use the following commands to enter row and column descriptions.

```
ENTER COMMAND:  20  <Return>                Enter row title
ROW TITLE:  PRODUCT A  <Return>
ROW TITLE:  PRODUCT B  <Return>
ROW TITLE:  PRODUCT C  <Return>
ROW TITLE:  TOTAL SALES  <Return>
```

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command.

ENTER COMMAND: 25 <Return>

Enter column title

COLTITLE 1: 1975 <Return>

COL TITLE 2: <Return>

The second <Return> indicates that there is no title for the second line and tells MicroPlan to skip the second column title line.

COL TITLE 1: 1976 <Return> <Return>

COL TITLE 1: 1977 <Return> <Return>

COL TITLE 1: 1978 <Return> <Return>

COL TITLE 1: 1979 <Return> <Return>

COL TITLE 1: 1980 <Return> <Return>

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command.

Now, enter data for each row of the table using the data from the chart above.

ENTER COMMAND: 30 <Return>

Data entry

VALUE: 95 <Return>

Value for row 1, column 1.

VALUE: 110 <Return>

Value for row 1, column 2.

VALUE: 129 <Return>

VALUE: 148 <Return>

VALUE: 171 <Return>

VALUE: 190 <Return>

This is the last value, so press the <CANCEL> key to cancel the ROW TITLE command.

Use the ENTRY (30) command to complete the rest of the table with the data for Product B and Product C below.



```

-----
-----
          1975    1976    1977    1978    1979    1980
          ----    ----    ----    ----    ----    ----
PROD B    120     110     115     125     115     120
PROD C    170     155     150     138     122     125
-----
-----

```

When your data entry is complete, press the <CANCEL> key to get out of the data entry mode. Next, use the SUM (55) command to sum the data for Products A, B, and C (rows 1 through 3). The results should go in row 4, TOTAL SALES.

ENTER COMMAND: 55 <Return> Sum

ROW BEGIN (1-50): 1 <Return>

END (1-50): 3 <Return>

Your screen will show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
ROW 5 <--
ENTER COMMAND:
ROW      1977    1978    1979    1980
-----3-----4-----5-----6-----7-----
1 PRODUCT A    129.0    148.0    171.0    190.0    0.0
2 PRODUCT B    115.0    125.0    115.0    120.0    0.0
3 PRODUCT C    150.0    138.0    122.0    125.0    0.0
4 TOTAL SALES  394.0    411.0    408.0    435.0    0.0
5              0.0      0.0      0.0      0.0      0.0
6              0.0      0.0      0.0      0.0      0.0
7              0.0      0.0      0.0      0.0      0.0
8              0.0      0.0      0.0      0.0      0.0
9              0.0      0.0      0.0      0.0      0.0
10             0.0      0.0      0.0      0.0      0.0
11             0.0      0.0      0.0      0.0      0.0
12             0.0      0.0      0.0      0.0      0.0
13             0.0      0.0      0.0      0.0      0.0
14             0.0      0.0      0.0      0.0      0.0
15             0.0      0.0      0.0      0.0      0.0
16             0.0      0.0      0.0      0.0      0.0
17             0.0      0.0      0.0      0.0      0.0
1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE
-----
-----

```

Some facts are evident immediately, just from looking at the table. For example, total sales have been improving with time. Sales of Product A are increasing, while sales of Product C are declining. Sales of Product B are wobbling up and down. Let's continue with some analysis.

## Looking At Trends

MicroPlan has various statistical commands that simplify trend analysis. For example, let's analyze the percentage growth and change from year to year for Products A, B, and C by adding the following lines. Move your cursor to row 5, then:

ENTER COMMAND: 20 <Return>

Enter row title

ROW TITLE: % GROWTH A <Return>

Row title for row 5.

ROW TITLE: % GROWTH B <Return>

Row title for row 6.

ROW TITLE: % GROWTH C <Return>

ROW TITLE: CHANGE A <Return>

ROW TITLE: CHANGE B <Return>

ROW TITLE: CHANGE C <Return>

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command

Now find the year-to-year percentage growth rates for Product A. Your cursor should be back at row 5.

ENTER COMMAND: 132 <Return>

Percentage growth

PERIODS (1-12): 1 <Return>

ROW (1-50): 1 <Return>

Do the percentage growth rates for Product B.

```
ENTER COMMAND: 132 <Return>           Percentage growth
PERIODS (1-12): 1 <Return>
ROW (1-50): 2 <Return>
```

Percentage growth rates for Product C.

```
ENTER COMMAND: 132 <Return>           Percentage growth
PERIOD (1-12): 1 <Return>
ROW (1-50): 3 <Return>
```

Looking at rows 5, 6, and 7, we can see how each year's sales compare to the year before. Product A seems to be growing at about 15% per year, but grew less than that in 1980. Product B seems to run steady at about 120. Product C seems to be showing an erratic pattern.

We can get yet another view of the trend by using the DELTA (131) command. The DELTA command calculates the difference between one period and another. Put your cursor on row 8, then use the following commands.

```
ENTER COMMAND: 131 <Return>
```

The DELTA command calculates the change in your values from period to period.

```
PERIODS (1-12): 1 <Return>
```

Calculate the change in values over one time period.

```
ROW (1-50): 1 <Return>
```

The DELTA calculation for Product A is shown in row 8. Do the same analysis for Products B and C as follows.

ENTER COMMAND: **131** <Return>

DELTA calculations for Product B.

PERIODS (1-12): **1** <Return>

ROW (1-50): **2** <Return>

ENTER COMMAND: **131** <Return>

DELTA calculations for Product C.

PERIODS (1-12): **1** <Return>

ROW (1-50): **3** <Return>

Your screen will show the following:

```

-----
-----
                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 11 <--
ENTER COMMAND:
1777      1778      1779      1780
ROW
-----3-----4-----5-----6-----7-----
1 PRODUCT A      129.0      148.0      171.0      190.0      0.0
2 PRODUCT B      115.0      125.0      115.0      120.0      0.0
3 PRODUCT C      150.0      138.0      122.0      125.0      0.0
4 TOTAL SALES    394.0      411.0      408.0      435.0      0.0
5 % GROWTH A      17.3      14.7      15.5      11.1     -100.0
6 % GROWTH B       4.5       8.7      -8.0       4.3     -100.0
7 % GROWTH C      -3.2      -8.0     -11.6       2.5     -100.0
8 CHANGE A        19.0      19.0      23.0      19.0     -190.0
9 CHANGE B         5.0      10.0     -10.0       5.0     -120.0
10 CHANGE C       -5.0     -12.0     -16.0       3.0     -125.0
11              0.0       0.0       0.0       0.0       0.0
12              0.0       0.0       0.0       0.0       0.0
13              0.0       0.0       0.0       0.0       0.0
14              0.0       0.0       0.0       0.0       0.0
15              0.0       0.0       0.0       0.0       0.0
16              0.0       0.0       0.0       0.0       0.0
17              0.0       0.0       0.0       0.0       0.0
1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

The actual increase, in real dollar terms, of Product A has been reasonably steady. You might expect an increase of another 15-20 units in 1981. Product B is again hard to predict, but Product C is worth studying. Perhaps there is a reason for the recent improvement in sales.

## Moving Averages

MicroPlan has additional commands that let you further analyze your sales trends. The MOV AVG (133) command produces an average for as many years as needed. You can apply the moving average command to each of the three products in the Product Analysis table. Use the ROW TITLE (20) command to add the following row titles. Your cursor should be on row 11.

ENTER COMMAND: 20 <Return> Row titles

ROW TITLE: 6-YR AVG % A <Return>

Title for row 11.

ROW TITLE: 3-YR AVG % A <Return>

ROW TITLE: 2-YR AVG % A <Return>

ROW TITLE: 2-YR AVG % B <Return>

ROW TITLE: 2-YR AVG % C <Return>

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command.

Now let's go back to row 11 and do moving averages for Product A using three different time periods. Make sure your cursor is on row 11, then use the following commands.

ENTER COMMAND: 133 <Return> Moving average

PERIODS (1-12): 6 <Return>

Calculate moving average over six time periods.

ROW (1-50): 5 <Return>

Calculate moving average using data from row 5.

ENTER COMMAND: 133 <Return> Moving average

PERIODS (1-12): 3 <Return>

ROW (1-50): 5 <Return>

ENTER COMMAND: **133** <Return>                      Moving average

PERIODS (1-12): **2** <Return>

ROW (1-50): **5** <Return>

Looking at the moving average in the table, you might decide that the two-year moving average is the most important. This is strictly a judgement call. Continue to do two-year moving averages for Products B and C, using the following commands.

ENTER COMMAND: **133** <Return>                      Moving average

PERIODS: **2** <Return>

ROW (1-50): **6** <Return>

Compute the moving average for row 6 (Product B) over 2 time periods.

ENTER COMMAND: **133** <Return>

PERIODS: **2** <Return>

ROW (1-50): **7** <Return>

Compute the moving average for row 7 (Product C) over 2 time periods.

Columns 2 through 6 of your table will show the following:

```

-----
- - - - -
MODE=NORMAL ORDER=R/C ROW=1-50 COL=1-20

COL 2 (1976 ) <--
ENTER COMMAND:

```

	1976	1977	1978	1979	1980	
ROW						
1 PRODUCT A	110.0	129.0	148.0	171.0	190.0	1 format:
2 PRODUCT B	110.0	115.0	125.0	115.0	120.0	2 data:
3 PRODUCT C	155.0	150.0	138.0	122.0	125.0	3 math:
4 TOTAL SALES	375.0	394.0	411.0	408.0	435.0	4 finance:
5 % GROWTH A	15.8	17.3	14.7	15.5	11.1	5 print:
6 % GROWTH B	-8.3	4.5	8.7	-8.0	4.3	6 status:
7 % GROWTH C	-8.8	-3.2	-8.0	-11.6	2.5	7 HELP
8 CHANGE A	15.0	19.0	19.0	23.0	19.0	8
9 CHANGE B	-10.0	5.0	10.0	-10.0	5.0	9 STOP
10 CHANGE C	-15.0	-5.0	-12.0	-16.0	3.0	10 utility:
11 6-YR AVG % A	0.0	0.0	0.0	0.0	12.4	11 program:
12 3-YR AVG % A	0.0	11.0	15.9	15.8	13.8	12 stats:
13 2-YR AVG % A	7.9	16.5	16.0	15.1	13.3	13
14 2-YR AVG % B	-4.2	-1.9	6.6	0.3	-1.8	14
15 2-YR AVG % C	-4.4	-6.0	-5.6	-9.8	-4.6	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

```

-----
- - - - -

```

Remember, there is no single way to look at the past results. These are only suggestions. In rows 11 through 15, you are fishing for insight--looking for ways to improve the future forecast by understanding past results.

## Additional Statistical Commands

If you are working with more massive data, for example 20 years of data rather than 5, you may want to use some other statistical attributes in your data.

The MEAN (135) command calculates the average values for a series of rows or columns. In our example, the MEAN command could give you the average sales for Products A, B, and C. The SIGMA (136) command calculates the standard deviation for a series of rows or columns. The MAX (141) and MIN (142) commands give you the largest and smallest values in a series of rows or columns. The TOTAL (144) command adds up all values in a series to give you a total. TOTAL is similar to the SUM (55) command. In essence, these commands can give you a quick feeling for your data.

Many of MicroPlan's statistical commands enable you to do basic mathematical functions such as exponentials, logarithms, and variances. These commands perform their particular function on

the rows or columns you specify through the command prompts. The results of each function will be placed in the row or column indicated by your cursor and data pointer. These commands are discussed further in the Command Reference Section.

## Exponential Smoothing

In time trend forecasting, each historical value is given equal weight. It is often advisable, however, to give additional weight to more recent data. Data from 1979-1982, for example, may be more relevant to 1983-1986 forecasting than, say, data from 1970 to 1973. The SMOOTH (134) command assigns more weight to the most recent data.

In exponential smoothing, you can vary the weighing factor by specifying a smoothing constant as a percentage, from 0% to 100%. A higher percentage value assigns more weight to recent data. A smoothing constant expressed as 25%, for example, assigns more weight to recent data than a constant percentage of, say, 5%. In most cases, the smoothing factor should be between 5% and 25%.

## Producing Forecasts

The analysis above is only a beginning. There are, of course, many other ways to analyze the sales figures in your table. You might, for example, use the GROW (74) command to project future sales. You can experiment with different rates to produce varying forecasts.

Let's use the GROW command to produce a sales forecast for Products A, B, and C from the Product Analysis table. First extend the time horizon to include 1981 through 1983. Use the COL TITLE (25) command to insert additional column titles. Position your cursor on column 7.

ENTER COMMAND: 25 <Return>                      Column titles

COL TITLE 1: 1981 <Return>

COL TITLE 2: <Return>

COL TITLE 1: 1982 <Return> <Return>

COL TITLE 1: 1983 <Return> <Return>

This is the last column title, so press the <CANCEL> key to cancel the COL TITLE command.



Next we want to restrict our analysis to columns 7 through 9, which represents the forecast range.

```
ENTER COMMAND: 93 <Return>          Set column ranges
    BEGIN (1-20): 7 <Return>
    END (7-20): 9 <Return>
```

Finally, enter three different percentage growth assumptions into rows 5 through 7, and use the GROW command to generate the desired forecasts.

```
ENTER COMMAND: 33 <Return>          Select row 5
    ROW (1-50): 5 <Return>
ENTER COMMAND: 31 <Return>
    CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1 <Return>
    BASE VALUE: 13 <Return>
    Enter percentage estimates for Product A.
ENTER COMMAND: 31 <Return>
    CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1 <Return>
    BASE VALUE: 0 <Return>
ENTER COMMAND 31 <Return>
    CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1 <Return>
    BASE VALUE: -10 <Return>
    Estimates for Product C.
ENTER COMMAND: 33 <Return>
    ROW (1-50): 1 <Return>          Select row 1
```

ENTER COMMAND: 74 <Return>

Use the GROW command to do the forecast for Product A

BASE VALUE: 0 <Return>

ROW (1-50): 5 <Return>

ENTER COMMAND: 74 <Return>

Forecast for Product B.

BASE VALUE: 0 <Return>

ROW (1-50): 6 <Return>

ENTER COMMAND: 74 <Return>

Forecast for Product B.

BASE VALUE: 0 <Return>

ROW (1-50): 7 <Return>

Your screen will show the following:

```

-----
- - - - -
MODE=NORMAL ORDER=R/C ROW=1-50 COL=7-9
ROW 4 (TOTAL SALES) <--
ENTER COMMAND:

```

ROW	1980	1981	1982	1983	
1 PRODUCT A	190.0	214.7	242.6	274.2	0.0
2 PRODUCT B	120.0	120.0	120.0	120.0	0.0
3 PRODUCT C	125.0	112.5	101.3	91.1	0.0
4 TOTAL SALES	435.0	0.0	0.0	0.0	0.0
5 % GROWTH A	11.1	13.0	13.0	13.0	0.0
6 % GROWTH B	4.3	0.0	0.0	0.0	0.0
7 % GROWTH C	2.5	-10.0	-10.0	-10.0	0.0
8 CHANGE A	19.0	-190.0	0.0	0.0	0.0
9 CHANGE B	5.0	-120.0	0.0	0.0	0.0
10 CHANGE C	3.0	-125.0	0.0	0.0	0.0
11 6-YR AVG % A	12.4	-4.3	-6.9	-9.8	-12.2
12 3-YR AVG % A	13.8	-24.4	-29.6	-33.3	0.0
13 2-YR AVG % A	13.3	-44.4	-50.0	0.0	0.0
14 2-YR AVG % B	-1.8	-47.8	-50.0	0.0	0.0
15 2-YR AVG % C	-4.6	-48.8	-50.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

```

1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Be careful. So far you have looked at past growth rates and projected them three years into the future. Remember that past growth rates DO NOT PREDICT future growth rates. Product C might have just opened a new market, and Product A might be destroyed by an extremely competitive new product introduction. MicroPlan is a tool, valuable to clarify your analysis. It does not replace a thorough understanding of the marketplace and the trends that determine it.

### **Quarterly Forecasts & Seasonality**

There is no reason that you have to put the years in columns and the forecast products in rows, unless it is convenient. Some models are better suited for running lengthwise. For example, you can do a quarterly interpretation of the Product Analysis table as shown in the table below.

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QUARTERLY FORECASTS  
WITH SEASONALITY

	PRODUCT A	PRODUCT B	PRODUCT C
	1	2	3
1 1ST QTR 1979	26.5	17.1	19.4
2 2ND QTR 1979	33.8	22.7	26.5
3 3RD QTR 1979	51.1	32.2	34.7
4 4TH QTR 1979	59.6	43.0	41.4
5 1979 TOTAL	171.0	115.0	122.0
6 1ST QTR %	15.5	14.9	15.9
7 2ND QTR %	19.8	19.7	21.7
8 3RD QTR %	29.9	28.0	28.4
9 4TH QTR %	34.9	37.4	33.9
10 1ST QTR 1980	29.1	18.5	19.2
11 2ND QTR 1980	39.1	25.2	25.7
12 3RD QTR 1980	52.4	31.5	34.0
13 4TH QTR 1980	69.4	44.8	46.1
14 1980 TOTAL	190.0	120.0	125.0
15 1ST QTR %	15.3	15.4	15.4
16 2ND QTR %	20.6	21.0	20.6
17 3RD QTR %	27.6	26.3	27.2
18 4TH QTR %	36.5	37.3	36.9
19	1981 FORECAST		
20 1981 TOTAL	214.7	120.0	112.5
21 1ST QTR (15%)	32.2	18.0	16.9
22 2ND QTR (21%)	45.1	25.2	23.6
23 3RD QTR (27%)	58.0	32.4	30.4
24 4TH QTR (37%)	79.4	44.4	41.6

Notice that the 1979 and 1980 year totals are equal to those year totals in the previous Product Analysis table, and that the 1981 forecast is equal to the 1981 forecast. The addition of quarterly data allows you to add seasonality components into your forecasts. To understand the seasonality pattern for Products A, B and C, build the Quarterly Forecast table using the commands outlined below.

First, label the row and column titles using the ROW TITLE (20) and COL TITLE (25) commands. Next enter data for each product for each quarter using the ENTRY command. Use the TOTAL (144) command to calculate the 1979 year totals for each product as follows.

```
ENTER COMMAND: 144 <Return>           Total command

ROW BEGIN (1-50): 1 <Return>

END (1-50): 4 <Return>
```

Use the RATIO (67) command to calculate each quarter's sales results as a percentage of the entire year's sales. Make sure your cursor is on row 6 then:

```
ENTER COMMAND: 67 <Return>           Calculate ratio

ROW (1-50): 1 <Return>

ROW (1-50): 5 <Return>

ENTER COMMAND: 67 <Return>           Calculate ratio

ROW (1-50): 2 <Return>

ROW (1-50): 5 <Return>

ENTER COMMAND: 67 <Return>

ROW (1-50): 3 <Return>

ROW (1-50): 5 <Return>

ENTER COMMAND: 67 <Return>

ROW (1-50): 4 <Return>

ROW (1-50): 5 <Return>
```

Use the same procedure to enter the data, calculate the totals, and figure the ratios for the 1980 sales figures.

At this point, you have identified seasonal sales patterns. Quarterly sales run about 15, 21, 27 and 37 percent, respectively, of annual totals. Unless there are reasons to assume a difference in 1981, you can now do a quarterly breakdown for your 1981 sales figures.

### The 1981 Quarterly Sales Forecast

To do the quarterly sales forecast for 1981, position your cursor on row 20 and enter the 1981 sales figures from the Product Analysis table with the following commands. Position your cursor on row 20.

ENTER COMMAND: **30** <Return>

Data entry

VALUE: **214.7** <Return>

1981 forecast for Product A.

VALUE: **120** <Return>

1981 forecast for Product B.

VALUE: **112.5** <Return>

1981 forecast for Product C.

This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

MicroPlan has several different ways to produce a percentage breakdown like the one in rows 21 through 24. One simple way is to use the MULT K (53) command to multiply each value by a constant number as follows:

ENTER COMMAND: **53** <Return>

VALUE: **.15** <Return>

ROW: **20** <Return>

Multiply row 20 by .15 and put the results in row 21.

## Correlation

Sometimes sales analysis unlocks some short cuts. Occasionally you may discover that your sales figures follow some easily estimated or readily available statistics. For example, in the table below, you might be having trouble understanding the up and down performance of Product 100.

```

-----
MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20

ROW 1 (PRODUCT 100) <--
ENTER COMMAND:
YEAR 1  YEAR 2  YEAR 3  YEAR 4  YEAR 5
ROW
-----1-----2-----3-----4-----5-----
1 PRODUCT 100      75.0    100.0    125.0    100.0    75.0
2                0.0      0.0      0.0      0.0      0.0
3 INDUSTRY SALE  50,000.0  60,000.0  75,000.0  65,000.0  55,000.0
4 HOUSING START   2,000.0   1,700.0   1,400.0   1,750.0   1,950.0
5 EXPERT FORECA  55,000.0  70,000.0  90,000.0  80,000.0  60,000.0
6                0.0      0.0      0.0      0.0      0.0
7 (L1/L3)*1000    1.5      1.7      1.7      1.5      1.4
8 (L1/L4)*1000    37.5     58.8     89.3     57.1     38.5
9 (L1/L5)*1000    1.4      1.4      1.4      1.3      1.3
10               0.0      0.0      0.0      0.0      0.0
11               0.0      0.0      0.0      0.0      0.0
12               0.0      0.0      0.0      0.0      0.0
13               0.0      0.0      0.0      0.0      0.0
14               0.0      0.0      0.0      0.0      0.0
15               0.0      0.0      0.0      0.0      0.0
16               0.0      0.0      0.0      0.0      0.0
17               0.0      0.0      0.0      0.0      0.0
1 format:
2 data:
3 math:
4 finance:
5 print:
6 status:
7 HELP
8
9 STOP
10 utility:
11 program:
12 stats:
13
14
15
16 format:
17 INSERT
18 DELETE
19 rows:
20 ROW TITLE

```

Looking for clues to Product 100, you might find a trade magazine that lists several sets of number. One set of numbers tracks the whole industry's sales, another tracks housing starts, and a third presents a well-known industry expert's forecast for the whole market. The three sets of numbers are shown above in rows 2 through 4.

With these numbers on the screen, you begin to see a relationship between the industry total sales and your Product 100 sales. Product 100 seems to go up and down with the industry.

This kind of relationship is called "correlation". Sophisticated econometric models are based upon observed correlations between different market factors. When the correlation between two different factors is good enough, statistical analysis can produce a numerical formula that relates one to the other. If the sales of your company are correlated to housing starts or

some other well-known indicator, you may be able to forecast your own sales by using a published forecast of that indicator, and multiplying it or dividing it by a single number.

Even without statistical analysis, some correlations become clear almost immediately. You might try, for example, laying out the data as shown in the table above. You can then look for possible indicators that move up and down with your sales.

In the example above, a simple formula was used to show how the industry sales and housing starts relate to Product 100. Past sales are divided by each factor and then multiplied by 1000 to make the relationship easier to read. The row title includes the formula used. There is no particular magic to this kind of formula. You can multiply or divide the rows, as necessary looking for an easy way to read the relationship.

Using this kind of information provides a good first step on the way to a sound forecast. For example, looking at the table above, let's assume that the industry expert's forecast went as follows:

-----				
-----				
	---6---	---7---	---8---	---9---
EXPERT FORECAST	70,000	90,000	100,000	90,000
-----				
-----				

In this case, knowing the above numbers would give you a clue to your own sales. Looking back at your formula, your sales, divided by industry sales and multiplied by 1000, are likely to land within some predictable range. This is true because of simple algebra:

$$(\text{your sales} / \text{industry sales}) * 1000 = (\text{roughly}) \quad 1.5$$

$$(\text{your sales}) = (\text{industry sales} * 1.5) / 1000$$

So that in the year 6 you would expect to sell approximately:

$$(\text{your sales}) = (70,000 * 1.5) / 1000 = 105$$



Using MicroPlan, you can enter the industry forecast into one row of your model. This is probably a trial row, used as a point of reference. It is seldom a forecast in itself.

You can use the FORMULA [35] command to make a row that is equal to the industry forecast times 1.5, divided by 1000 using the following steps:

ENTER COMMAND: 33 <Return>

Select row 10

ROW [1-50]: 10 <Return>

ENTER COMMAND: 35 <Return>

Formula

:(L4\*1.5)/1000 <Return>

This formula gives you the first indication of a possible forecast, which appears in line 10 of the report below.

1/1/83

# FUNDAMENTALS OF CORRELATION SAMPLE REPORT

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	-----1-----	-----2-----	-----3-----	-----4-----	-----5-----
1 PRODUCT 100	75.0	100.0	125.0	100.0	75.0
2 INDUSTRY SALES	50,000.0	60,000.0	75,000.0	65,000.0	55,000.0
3 HOUSING STARTS	2,000.0	1,700.0	1,400.0	1,750.0	1,950.0
4 EXPERT FORECAST	55,000.0	70,000.0	90,000.0	80,000.0	60,000.0
5 (L1/L2)*1000	1.5	1.7	1.7	1.5	1.4
6 (L1/L3)*1000	37.5	58.8	89.3	57.1	38.5
7 (L1/L4)*1000	1.4	1.4	1.4	1.3	1.3
	YEAR				
	-----6-----	-----7-----	-----8-----	-----9-----	-----10-----
9	FUTURE FORECAST FOR PRODUCT 100				
10 REFERENCE	105.0	135.0	150.0	135.0	0.0



# Chapter 9

## Programming

With MicroPlan you can write programs that automatically control a modeling process from start to finish. This chapter shows you how to combine MicroPlan's basic tables with the MicroPlan Program Mode to produce sophisticated models. To see the MicroPlan PROGRAMMING commands on your screen, enter command 11 and the <Return>.

### What Is A MicroPlan Program?

In previous chapters you have seen how MicroPlan remembers your steps when you are building a table. The relationship you establish among rows and columns is saved with each table so that you can do "what-if" analysis. MicroPlan has another device, the Program Mode that lets you do even more complex modeling with cookbook simplicity.

A MicroPlan program has nothing to do with Fortran, Cobol, or BASIC. Programming, in MicroPlan, can be thought of as stacking commands in a file as you execute them. The MicroPlan program is designed to remember your command steps so that if you need to do the whole sequence again, you can simply run a program rather than having to execute each step individually.

In your daily routine, you might work with a sequence of MicroPlan commands similar to the following:

1. Load a table--LOAD TBL (111)
2. Change a few numbers--ENTER (31) or CHANGE (32)
3. Review the impact of the changes--COMPUTE (98)
4. Print a report--REPORT (83)
5. Save the revised table--SAVE TBL (112)

It would be very helpful if you could execute this sequence automatically. This is exactly what a MicroPlan program does. By using the MicroPlan Program Mode, you can have MicroPlan automatically load a table, prompt you for changes in your data, compute the new results, print a report, and save the new table--simply by running your program.

The PROGRAM (97) command turns on the Program Mode which records each command that you enter, as a program step. The NORMAL (99) command turns off the Program Mode. To run a program, use the RUN PGM (96) command. While you are in the Program Mode,

MicroPlan allows you to include prompting messages such as "Enter from Sales Schedule Line #5" where appropriate, on data entry commands. With these prompts, you can build a model once, then let your assistant do the maintenance.

## MicroPlan Modes

MicroPlan can be in one of five modes or states of operation. They are:

NORMAL (99)--The default mode; also used to turn off the Program Mode.

COMPUTE (98)--Recomputes rows and columns according to the computing order.

PROGRAM (97)--Turns on the Program Mode.

RUN PROGRAM (96)--Instructs MicroPlan to run the current program.

PROTECT (101)--Turns the Protect Mode on and off.

In the following sections, you will be working with the MicroPlan Program Mode.

## The MicroPlan Income Model

On your MicroPlan diskette, there is a model that analyzes the income and cash flow of a real estate investment. This model, called INCOME, includes a table with pre-set titles and commands, and a program that prompts you for all necessary input. Let's use this model to illustrate the MicroPlan Program Mode.

Before running the INCOME model, make sure your printer is turned on and connected, and your paper adjusted. Load and run the model by typing **PLAN INCOME** followed by the <Return> key. MicroPlan automatically loads the INCOME table and the corresponding program and immediately starts executing the program steps.

## About The Income Model

Suppose your broker has brought an income property investment opportunity to your attention. A large house can be purchased and rented to tenants. The broker suggests that with the substantial tax shelter and accumulating equity growth, the investment returns are excellent.

The INCOME model produces a cash flow analysis of a real estate purchase. After you supply the net operating income data, depreciation, loan and cost of property information, the model analyzes the tax impact of the investment, generates a cash flow statement and tells you the equity impact of the investment. Respond to the INCOME model prompts step-by-step using the following information.

PROMPT: ENTER OPERATING INCOME (\$000):

Net operating income is the rent income less operating expenses like maintenance, utilities and vacancy allowance.

CHOOSE (VALUES=0,CONSTANT=1,GROW=2,INCR=3): 2 <Return>

For this example, enter a net operating income of \$12,000 per year with rent increasing at 10% per year.

BASE VALUE: 12.0 <Return>

RATE: 10 <Return>

PROMPT: PURCHASE PRICE (\$000):

VALUE: 150.0 <Return>

The property has a \$150,000 purchase price.

PROMPT: MORTGAGE AMOUNT (\$000):

VALUE: 120 <Return>

You can borrow \$120,000 to finance the purchase.

PROMPT: TERM OF MORTGAGE (YEARS):

VALUE: 30 <Return>

The term of the loan is 30 years.

PROMPT: INTEREST RATE (%):

VALUE: 15 <Return>

The mortgage has a fixed interest rate of 15%.

PROMPT: DEPRECIABLE VALUE:

VALUE: 110.0 <Return>

The depreciable value of the building is \$110,000.

PROMPT: SALVAGE VALUE:

VALUE: 10.0 <Return>

The salvage value is \$10,000.

PROMPT: DEPRECIABLE LIFE (YEARS):

VALUE: 25 <Return>

The property has a depreciable life of 25 years.

SET PAPER; HIT RETURN

After accepting all of your input, MicroPlan will automatically analyze the investment and produce the following report on your printer.

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PAGE 1

Real Estate Investment Analysis  
Income Property  
(\$000)

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Assumptions:</b>					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Mortgage Inputs	1.0	120.0	-	30.0	15.0
Depreciation Inputs	2.0	110.0	10.0	25.0	-
Purchase Price	150.0	40.0	-	-	-
<b>Tax Shelter Impact</b>					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Depreciation Allowance	7.7	7.4	7.1	6.8	6.5
Interest Expense	18.0	17.9	17.9	17.9	17.8
Taxable Income	-13.7	-12.1	-10.5	-8.7	-6.7
Income Tax (Shelter)	-5.5	-4.9	-4.2	-3.5	-2.7
After Tax Income (Loss)	-8.2	-7.3	-6.3	-5.2	-4.0
<b>Cashflow Impact</b>					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Mortgage Payments	18.2	18.2	18.2	18.2	18.2
Income Tax (Shelter)	-5.5	-4.9	-4.2	-3.5	-2.7
Cashflow (Outflow)	-0.7	-0.2	0.5	1.2	2.0
Cashflow Rate	-2.5%	-0.5%	1.7%	4.1%	6.8%
<b>Equity Impact</b>					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Interest Expense	18.0	17.9	17.9	17.9	17.8
Income Tax (Shelter)	-5.5	-4.9	-4.2	-3.5	-2.7
Equity Income	-0.5	0.1	0.8	1.6	2.4
Equity Rate	-1.7%	0.3%	2.7%	5.3%	8.1%

## Using Programs For "What-If" Analysis

By using MicroPlan programs with your tables, you can perform more sophisticated "what-if" analysis. You can produce analyses that require even hundreds of steps all with the push of a button. When you want to test a different set of assumptions, simply use the RUN PGM (96) command to start executing the program steps.

For example, what if interest rates in the example above were to rise from 15% to 18%? To ask MicroPlan this "what-if" question, enter the RUN PGM (96) command. Then respond to the prompts and enter responses exactly as in the previous example. When MicroPlan asks for the mortgage interest rate, enter 18.0 instead of 15.0. The answer to your "what-if" question would appear as the report on the following page.



11/18/81

PAGE 1

Real Estate Investment Analysis  
Income Property  
(\$000)

	Year 1	Year 2	Year 3	Year 4	Year 5
Assumptions:					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Mortgage Inputs	1.0	120.0	-	30.0	18.0
Depreciation Inputs	2.0	110.0	10.0	25.0	-
Purchase Price	150.0	40.0	-	-	-
Tax Shelter Impact					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Depreciation Allowance	7.7	7.4	7.1	6.8	6.5
Interest Expense	21.6	21.6	21.5	21.5	21.5
Taxable Income	-17.3	-15.8	-14.1	-12.3	-10.4
Income Tax (Shelter)	-6.9	-6.3	-5.6	-4.9	-4.1
After Tax Income (Loss)	-10.4	-9.5	-8.5	-7.4	-6.2
Cashflow Impact					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Mortgage Payments	21.7	21.7	21.7	21.7	21.7
Income Tax (Shelter)	-6.9	-6.3	-5.6	-4.9	-4.1
Cashflow (Outflow)	-2.8	-2.2	-1.5	-0.8	0.0
Cashflow Rate	-9.3%	-7.3%	-5.1%	-2.7%	0.0%
Equity Impact					
Net Operating Income	12.0	13.2	14.5	16.0	17.6
Interest Expense	21.6	21.6	21.5	21.5	21.5
Income Tax (Shelter)	-6.9	-6.3	-5.6	-4.9	-4.1
Equity Income	-2.7	-2.1	-1.4	-0.6	0.2
Equity Rate	-8.9%	-6.9%	-4.6%	-2.1%	0.8%

## Creating A Program

You can create your own program by using the PROGRAM (97) command. This command puts MicroPlan into the Program Mode. Commands that are entered while in the Program Mode are then automatically memorized as program steps by MicroPlan.

In the NORMAL mode, MicroPlan automatically stores computation commands in the rows and columns of the table. In the Program Mode, commands are stored in the special area of your computer's memory that has enough room for about 100 steps. If you need more than 100 steps in your program, you can use the LOAD PGM (121) command as a program step to call another program. MicroPlan programs can store not only computation commands, but also commands that load and store tables, print reports, set ranges, and even compute.

You can recognize the different kinds of MicroPlan files as they appear in the directory by looking at the three letter suffix at the end of each file. The suffix ".TBL" denotes a MicroPlan table containing the table data and format; the suffix ".LOG" denotes a MicroPlan Program containing the program steps.

Some MicroPlan utility commands cannot be used as program steps, that is, they cannot be saved when you are in the Program Mode. For example, in the Program Mode, MicroPlan will not memorize commands such as SHOW ROWS or SET TYPE. In general, MicroPlan has been instructed to memorize commands in a sensible way. The Command Reference Section has specific details on how MicroPlan handles each command while in the Program Mode.

Let's create a program that loads the INCOME table and prints the table as a report. Make sure your printer is connected and turned on, and your paper adjusted. Then follow the steps below.

ENTER COMMAND: 124 <Return>

Clear current program from the program memory area.

VERIFY (Y OR N): Y <Return>

ENTER COMMAND: 97 <Return>

Turn on Program Mode. Notice that the mode status on the top line has changed to PROGRAM.

ENTER COMMAND: 111 <Return>                      Load table

TABLE NAME: INCOME <Return>

After your table has been loaded, MicroPlan prints the message 'NEXT STEP=2' in the top left corner of the screen. This tells you that you are now putting step # 2 in your program.

ENTER COMMAND: **83** <Return> Print report

ENTER COMMAND: **99** <Return>

The NORMAL [99] command turns off the Program Mode. Notice that the mode status on the top line has changed back to NORMAL.

ENTER COMMAND: **125** <Return>

The SHOW PGM [125] command displays the stored program steps. The 2 steps of your program will appear on the screen as shown below.

Press any cursor key to recover your display.

ROW 1 (Assumptions:) <--

ENTER COMMAND:

ROW	Year 1	Year 2	Year 3	Year 4	Year 5	
1 Assumptions: STEP		COMMAND	PARAMETERS			1 format:
2 Net Operating						2 data:
3 Mortgage Inpu 1		LOAD TBL	INCOME			3 math:
4 Depreciation 2		REPORT				4 finance:
5 Purchase Pric						5 print:
6 Tax Shelter Impact						6 status:
7 Net Operating	12.0	13.8	15.9	18.3	21.0	7 HELP
8 Depreciation	12.5	11.7	10.8	10.0	9.2	8
9 Interest Exp	24.0	23.9	23.9	23.8	23.8	9 STOP
10 Taxable Inco	-24.5	-21.8	-18.9	-15.6	-12.0	10 utility:
11 Income Tax	-9.8	-8.7	-7.5	-6.2	-4.8	11 program:
12 After Tax In	-14.7	-13.1	-11.3	-9.4	-7.2	12 stats:
13 Cashflow Impact						13
14 Net Operatin	12.0	13.8	15.9	18.3	21.0	14
15 Mortgage Pa	24.2	24.2	24.2	24.2	24.2	15
16 Income Tax	-9.8	-8.7	-7.5	-6.2	-4.8	16 format:
17 Cashflow (Ou	-2.4	-1.7	-0.8	0.3	1.6	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

Press any cursor key to recover your display.

## Inserting Steps

You can add steps to already existing programs using the same PROGRAM (97) command that turns on the Program Mode. The PROGRAM command will prompt with the message **"FOLLOWING WHICH STEP:"** whenever a program is already in the program area. Additional program steps can be inserted in the beginning, added to the middle, or appended to the end of an existing program. Subsequent commands are inserted as program steps until a NORMAL (99), a RUN PGM (96), or another PROGRAM (97) command is issued.

For example, go back to the Program Mode using the PROGRAM (97) command, and set the row ranges to include only rows 5 through 17 using the ROW RANGE (92) command. By using this command, only the computed data will be printed. Insert the row range command after step 1 of the sample program as follows:

```
ENTER COMMAND:  97 <Return>           Program mode
    FOLLOWING WHICH STEP (0-2):  1  <Return>
ENTER COMMAND:  92  <Return>           Set row range
    ROW BEGIN (1-50):  5  <Return>
    END (5-50):  17  <Return>
ENTER COMMAND:  96 <Return>           Run new program
```

Notice that MicroPlan will load the INCOME model again, set the row range and print the abbreviated report. Use the SHOW PGM (125) command to look at the new program steps. Your screen should show the following:

Press any cursor key to recover your display.

ROW 1 (Assumptions:) <--  
ENTER COMMAND:

ROW	Year 1	Year 2	Year 3	Year 4	Year 5
1 Assumptions: STEP					
2 Net Operating					
3 Mortgage Inpu	1		LOAD TBL	INCOME	
4 Depreciation	2		ROW RANGE	ROWS 5 - 17	
5 Purchase Pric	3		REPORT		
6 Tax Shelter I					
7 Net Operating	12.0	13.8	15.9	18.3	21.0
8 Depreciation	12.5	11.7	10.8	10.0	9.2
9 Interest Exp	24.0	23.9	23.9	23.8	23.8
10 Taxable Inco	-24.5	-21.8	-18.9	-15.6	-12.0
11 Income Tax	-9.8	-8.7	-7.5	-6.2	-4.8
12 After Tax In	-14.7	-13.1	-11.3	-9.4	-7.2
13 Cashflow Impact					
14 Net Operatin	12.0	13.8	15.9	18.3	21.0
15 Mortgage Pa	24.2	24.2	24.2	24.2	24.2
16 Income Tax	-9.8	-8.7	-7.5	-6.2	-4.8
17 Cashflow (Ou	-2.4	-1.7	-0.8	0.3	1.6

Press any cursor key to recover your display.

## Deleting Or Replacing Steps

You can delete steps from your MicroPlan program using the DEL STEPS (100) command. The DEL STEPS command allows you to delete a series of steps from the program one at a time.

When deleting a series of non-consecutive steps from a program, take care not to inadvertently delete the wrong steps. For example, if you want to delete steps 5, 9 and 11 of a program, start with the step with the largest step number. If you delete starting with step 5, you will notice that after deleting step 5, steps 9 and 11 become new steps 8 and 10 of the program.

The DEL STEPS command is also used to replace program steps. First delete the series of steps to be replaced. Then use the PROGRAM command to insert the new steps in their proper position.

For practice, let's delete the first step of the current program.

ENTER COMMAND: **100** <Return> Delete program steps

BEGIN STEP (1-3): **1** <Return>

END (1-3): <Return>

A <Return> tells MicroPlan to use the same number to begin and end the delete command.

ENTER COMMAND: **125** <Return> Display new program

You will see that MicroPlan has deleted the step and re-numbered the remaining steps.

### Loading & Saving Programs

You can load and save programs on your diskettes using the LOAD PGM [121] and SAVE PGM [122] commands. Each program is identified by an 8-character program name.

To illustrate the SAVE and LOAD PGM commands, save the previous 2-step program and then load the saved program from disk.

ENTER COMMAND: **122** <Return> Save program

PROGRAM NAME: **NEWPGM** <Return>

DESCRIPTION: **CHANGE RANGES AND PRINT REPORT** <Return>

You can enter a program description of up to 30 characters after saving your program.

ENTER COMMAND: **124** <Return> Clear program area

VERIFY (Y OR N): **Y** <Return>

ENTER COMMAND: **121** <Return> Load program

PROGRAM NAME: **NEWPGM** <Return>

Notice that after loading and executing your program, MicroPlan will tell you how many steps you have in your program. To get a copy of the program from the printer, make sure your printer is connected and turned on, and your paper adjusted. Then use the PRINT PGM [123] command.

In Chapter 3, you learned how to load and save tables. In the Program Mode, you load programs and save programs using the LOAD PGM (121) and SAVE PGM (122) commands. Since a program is generally associated with a particular table, it is sometimes helpful to be able to save a table and a program at the same time. For this reason, MicroPlan has the commands LOAD ALL (106) and SAVE ALL (107). LOAD ALL will load both a table and the associated program from your disk into memory, and proceed to execute the program steps. SAVE ALL will save both table and program to disk at the same time.

As with tables, you can direct a program to be saved or loaded from any of the disk drives on your computer by using the SET DRIVE (108) command. Please note that you cannot enlarge your table while in the Program Mode. Also, whenever you change the dimensions of your table, the current program steps in memory will be erased. Make sure you have saved your program before enlarging your table.

As you save programs to your diskettes, MicroPlan automatically maintains a directory of your programs. Whenever you use the SAVE PGM command, MicroPlan requests a description that helps you to remember the contents of a program.

When you use the LOAD PGM command, you have the option to glance through the directory and examine the programs that you have on the diskette. The directory provides the program name as well as a brief description of each program.

The LIST PGMS (126) command sends a listing of all programs on a particular disk to the printer. To delete programs from your diskette use the ERASE PGM (127) command. The CLEAR PGM (124) command lets you clear the program currently in memory.

## **Stopping A Program**

After you have entered the RUN PGM (96) command, you can still cancel the command by using your <CANCEL> key. At the next convenient point, MicroPlan will cancel the RUN PGM command and stop printing.

## **Advanced Programming**

MicroPlan programs can be used to handle a variety of needs. In this section you will learn to create programs to solve the following problems:

1. Doing computations that require more than a simple row or column computing order.
2. Developing a customized model that prompts for data input.
3. Controlling models that work with more than one table using MicroPlan's Add-On Consolidation Module.

## Doing Computations

With some problems, the row and column orientation of the COMPUTE command will not correctly compute the values for your table. For example, if you add a total column and a percentage profit row to your Five-Year Forecast from Section 1, then none of the options of the compute ORDER command will correctly calculate the percentage profit for the total column.

You can use the FIX (38) command as illustrated in Chapter 6, or you can use a MicroPlan program to do the correct calculation for you. The correct computing order for such a calculation would be:

1. Do rows 1 through 6 of the Five-Year Forecast table.
2. Calculate the total column.
3. Calculate the percentage margin row for all columns including the total column.

In essence, you need to specify a computation order that is more complex than the options available with the ORDER command. For example, when you foot and cross-foot rows and columns, the ratio computations will be incorrect because the ratios will be summed instead of calculated as an overall ratio. These problems can be easily solved by using a MicroPlan program.

Let's create a program to demonstrate the above problem. Start by clearing any current program steps from memory using the CLEAR PGM (124) command. Then load the Five-Year Forecast table using the SAVE TBL (112) command.

ENTER COMMAND: 124 <Return>

Clear program

VERIFY (Y OR N): Y <Return>



ENTER COMMAND: **111** <Return>

Load table

TABLE NAME: **FORECAST** <Return>

The following table should be loaded on your screen:

```

FORECAST                                MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 1 (SALES) <--
ENTER COMMAND:

ROW      TOTAL
-----
1 SALES      1,000.0  1,100.0  1,210.0  1,331.0  4,641.0
2 COST OF GOODS  450.0  495.0  544.5  599.0  2,088.5
3 SALES AND ADM  200.0  220.0  242.0  266.2  928.2
4 RESEARCH AND  500.0  300.0  300.0  300.0  1,400.0
5 TOTAL COSTS  1,150.0  1,015.0  1,086.5  1,165.2  4,416.7
6 GROSS PROFIT  -150.0  85.0  123.5  165.9  224.4
7 PROFIT RATIO  -15.0  7.7  10.2  12.5  4.8
8              0.0  0.0  0.0  0.0  0.0
9              0.0  0.0  0.0  0.0  0.0
10             0.0  0.0  0.0  0.0  0.0
11             0.0  0.0  0.0  0.0  0.0
12             0.0  0.0  0.0  0.0  0.0
13             0.0  0.0  0.0  0.0  0.0
14             0.0  0.0  0.0  0.0  0.0
15             0.0  0.0  0.0  0.0  0.0
16             0.0  0.0  0.0  0.0  0.0
17             0.0  0.0  0.0  0.0  0.0

```

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE

Make a change in the FORECAST table and compute the results. You will notice that the figure in row 7 is incorrect. Now, set MicroPlan to the Program Mode, set the compute order to rows, then columns (R/C), and calculate the percent profit ration using the steps below.

ENTER COMMAND: **32** <Return>

Change

ROW (1-50): **4** <Return>

COL (1-20): **1** <Return>

VALUE: **300** <Return>

ENTER COMMAND: **97** <Return>

Set MicroPlan to Program Mode.

ENTER COMMAND: 102 <Return>

Select computing order.

[ROW/ONLY=1, COL/ONLY=2, ROW/COL=3, COL/ROW=4]: 3 <Return>

ENTER COMMAND: 98 <Return>

Compute

ENTER COMMAND: 33 <Return>

Select row 7

ROW (1-50): 7 <Return>

ENTER COMMAND: 67 <Return>

Calculate % ratio

ROW (1-50): 6 <Return>

ROW (1-50): 1 <Return>

ENTER COMMAND: 99 <Return>

Set to Normal Mode

Your screen will show the following:

FORECAST  
ROW 1 (SALES) <--  
ENTER COMMAND:

MODE=NORMAL ORDER=R/C ROW=1-50 COL=1-20

ROW	1	2	3	4	TOTAL	
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	1 format:
2 COST OF GOODS	450.0	495.0	544.5	599.0	2,088.5	2 data:
3 SALES AND ADM	200.0	220.0	242.0	266.2	928.2	3 math:
4 RESEARCH AND	300.0	300.0	300.0	300.0	1,200.0	4 finance:
5 TOTAL COSTS	950.0	1,015.0	1,086.5	1,165.2	4,216.7	5 print:
6 GROSS PROFIT	50.0	85.0	123.5	165.9	424.4	6 status:
7 PROFIT RATIO	5.0	7.7	10.2	12.5	9.1	7 HELP
8	0.0	0.0	0.0	0.0	0.0	8
9	0.0	0.0	0.0	0.0	0.0	9 STOP
10	0.0	0.0	0.0	0.0	0.0	10 utility:
11	0.0	0.0	0.0	0.0	0.0	11 program:
12	0.0	0.0	0.0	0.0	0.0	12 stats:
13	0.0	0.0	0.0	0.0	0.0	13
14	0.0	0.0	0.0	0.0	0.0	14
15	0.0	0.0	0.0	0.0	0.0	15
16	0.0	0.0	0.0	0.0	0.0	16 format:
17	0.0	0.0	0.0	0.0	0.0	17 INSERT
						18 DELETE
						19 rows:
						20 ROW TITLE

Using the SHOW PGM (125) command, you will see that you have created the following program:

-----  
-----

Press any cursor key to recover your display.

ROW 1 (SALES) <--

ENTER COMMAND:

ROW	1	2	3	4	TOTAL
1 SALES	STEP	COMMAND	PARAMETERS		
2 COST OF GOODS					
3 SALES AND ADM	1	ORDER	3		
4 RESEARCH AND	2	COMPUTE			
5 TOTAL COSTS	3	ROW 7 <-- RATIO	ROW=6 ROW=1		
6 GROSS PROFIT					
7 PROFIT RATIO					
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0

1 format:  
2 data:  
3 math:  
4 finance:  
5 print:  
6 status:  
7 HELP  
8  
9 STOP  
10 utility:  
11 program:  
12 stats:  
13  
14  
15  
16 format:  
17 INSERT  
18 DELETE  
19 rows:  
20 ROW TITLE

-----  
-----

Press any cursor key to recover your display.

To do a "what-if" analysis with this model, make some changes to the table using the CHANGE (32) command. Then, instead of using the COMPUTE command, use the RUN PGM (96) command to see the impact of the changes on your table. Of course, the program will issue a COMPUTE command for you; but it also issues the extra command that correctly computes that last value on your table.

## Prompting

You can include steps in your program that prompt the user for input. By building prompts into the program, you allow other users to work with your models as a customized problem-solving tool.

For example, the INCOME model discussed earlier uses customized prompts to ask the user for the data necessary to complete the real estate analysis problem. You can build models that prompt

division personnel for budget data, help manufacturing personnel through a capital expenditure analysis, or aid marketing personnel in setting product prices.

Creating your own prompting program is simple. When MicroPlan is in the PROGRAM mode, it will automatically print the message:

**PROMPTING MSG:**

whenever you use the ENTRY (30), ENTER (31), or the CHANGE (32) commands. These commands allow you to design your own prompting messages. When you run the program these messages will appear on the second line in the top left corner of your screen, prompting the user for input. This prompting feature is only available in the MicroPlan Program Mode during data entry.

## **MicroPlan's Add-On Consolidation Module**

Sometimes, you may have a problem that requires the use of several tables. Or, you may have a situation that can be handled more efficiently with several smaller tables rather than a large and unwieldy worksheet.

The solution? MicroPlan's Add-On Consolidation Module.

MicroPlan's Consolidation Module allows you to work with more than one table at a time. You can bring data from one table to another by issuing a single command. You can also add, subtract, multiply and divide across tables to produce sophisticated models customized to your specifications.

The problems described above can be solved by using a carry-forward action from a previous table, just as you would use a carry-forward action from a previous page of a 13-column spreadsheet. Using several tables to solve a single problem helps maintain clarity.

When you do "what-if" analysis, it would be useful if changes in all of your tables were automatically updated at a push of a button. You can do this with the Add-On Consolidation Module by creating a program that loads each table and issues a COMPUTE command to update the values in that table. For example, you could create a program that contains the following:

```
-----  
-----  
  
STEP  DATA POINTER  COMMAND  ARGUMENTS  
-----  
1      LOAD TBL      INCOME  
2      COMPUTE  
3      REPORT  
4      LOAD TBL      CASHFLOW  
5      COMPUTE  
6      REPORT  
7      LOAD TBL      BALANCE  
8      COMPUTE  
9      REPORT  
  
-----  
-----
```

After making changes to the tables, use the RUN PGM (96) command to do the "what-if" analysis. The problem above will take each table, update table values, and print a report. You can see the final reports and the associated table logic for the above program in Appendix C.



## Section III

# Command Reference

The Command Reference Section is a convenient, quick reference that provides you with a detailed explanation for each MicroPlan command. The reference section outlines the prompts and defaults associated with each command. In addition, the command reference section will help you locate related information in the preceeding tutorial sections.

### How To Use This Reference

The MicroPlan commands are organized by their menu grouping. The command number, command name, screen prompts, defaults, and a description are given for each command.

MicroPlan memorizes your commands for "what-if" analysis. In the NORMAL mode, commands are stored in your table logic for recalculation. In the PROGRAM mode, commands that can be programmed are stored in your program logic file.

Throughout the following section, the notation below is used to describe how MicroPlan handles each command:

**T** Means this command can be stored in your tables.

**P** Means this command can be stored in your program.

**PT** Means this command can be stored in tables and programs.

If neither letter is given, MicroPlan does not store that command in either tables or programs.

## Main Menu

### 1 format:

Display format commands: enter row and column titles, set row and column print options, look at options, insert and delete rows and columns, and reorder rows and columns. (Page 3.1)

### 2 data:

Display data entry commands: enter data, select row and column modes, fix, nullify, and go to commands. (Page 2.1)

### 3 math:

Display math commands: arithmetic functions, formula, plug, cumulate, negate, get, ceiling, floor, and row and column summation commands. (Pages 1.8, 4.1)

### 4 finance:

Display finance commands: depreciation, mortgages, internal rate of return, ratios, percentages, growth, and tax schedule commands. (Page 7.1)

### 5 print:

Display print commands: set report titles and options, and print reports, models, and programs, list table and program directories, and send reports to printer or disk files.

### 6 status:

Display status commands: range settings, mode selection, and computing order.

### 7 HELP

WHICH COMMAND (1-200):

Gives brief on-screen description for each command by entering command number or command alpha code. Description will appear at the bottom of the screen. (Page 1.9)



**9 STOP (P)**

OK TO ERASE CURRENT DATA?  
VERIFY (Y OR N):

Exit to operating system. The current table logic and program, if any, are **NOT** automatically saved. (Pages 1.11, 2.9)

**10 utility:**

Display utility commands: save and load tables, enlarge table size, select drive, reset, and redisplay screen. (Page 3.9)

**11 program:**

Display program commands: save, load, clear, print, list, and erase programs. (Page 9.1)

**12 stats:**

Display statistical commands: delta, mean, variance, standard deviation, logarithms, exponentials, minimums and maximums, moving averages, exponential smoothing, and powers. (Page 8.1)

## Format Commands

### 16 **format:**

Display format commands: enter row and column titles, set row and column print options, look at options, insert and delete rows and columns, and reorder rows and columns. (Page 3.1)

### 17 **INSERT**

Insert row or column by moving last row/column of the current table to the row or column indicated by the data pointer. Any logic reference is automatically maintained. (Page 3.12)

### 18 **DELETE**

VERIFY (Y OR N):

Delete row or column indicated by the data pointer by moving it to the last row or column of the current table. Requires positive verification before deleting. Any logic reference is automatically maintained. (Page 3.12)

### 19 **rows:**

Row section of format commands.

### 20 **ROW TITLE**

Use cursor keys to select a row (UP, DOWN, CANCEL)

Enter or change row titles. Each title entered is placed in the row indicated by the data pointer. Continues prompting for sequential titles until command is cancelled. Use cursor keys to select the desired row.

Can enter up to 40 characters for each row title. The quote mark (") is an illegal character and should not be used in row title descriptions. Notice that if you have more than 15 characters, in your row title, the description will be truncated on the screen to the 15 character default. Use the SET CRT (86) command to adjust the screen format. The entire row description will be remembered for use in printing. (Pages 1.9, 2.1, 2.2, 3.6)

**21 SET TYPE**

ROW (1-50):

TYPE (DATA=0, SUBT=1, HEADING=2, NOTE=3, OMIT=4):  
Default 0

UNDERLINE (NO=0, [-]=1, [=]=2, [\_]=3):  
Default 0

TRAILING BLANK LINES (NEW PAGE=9):  
Use this option to indicate page breaks in printed report  
Default 0

DECIMAL PLACES (0-3, OFF=4):  
Default global setting (see OPTIONS (81) command)

FORMAT (NO=0, [%]=1, [\$]=2, NO,=3):  
Option 3 indicates no commas to be used in values.  
Default 0

Sets print specifications for designated row. Continues prompting for row numbers until command is cancelled. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. (Pages 5.1-5.4, 7.30)

**22 SHOW ROWS**

Display the current print options and commands for each row shown on the screen. To display settings for rows not shown on the screen, move the screen to the desired location and re-enter SHOW ROWS (22) command. To recover original display, press any cursor key. To print these options and command logic, use the PRINT TBL (118) command. (Pages 2.6, 4.6, 5.4)

**23 REORDER**

OLD NUMBER (1-50):      NEW NUMBER (1-50):

Move old row into position of new row and vice versa. Other rows will be adjusted as necessary. Used to swap, insert, or delete rows. Can also use INSERT (17) command or DELETE (18) command to insert or delete rows. Any logic reference is automatically maintained. (Page 3.13)

## 24 cols:

Column section of format commands.

## 25 COL TITLE

1:  
2:

Use cursor keys to select a column (RIGHT, LEFT, CANCEL)

Enter or change column titles. Each title entered is placed in the column indicated by the data pointer. Continues prompting for sequential titles until command is cancelled. Use the cursor keys to select a column.

Can enter up to 20 characters for each column title. Each line of the column title is automatically right justified in the column. The quote mark (") is an illegal character and should not be used in column titles. Notice that if you have more than 10 characters, in your column title, the description will be truncated on the screen to the 10 character default. Use the SET CRT (86) command to adjust the screen format if desired. The entire column description will be remembered for use in printing. (Pages 3.6, 3.7)

## 26 SET TYPE

COLUMN (1-20):

COLUMN WIDTH (4-20):

Default global setting (see OPTIONS (81) command)

DECIMAL PLACES (0-3, OFF=4):

Default global setting (see OPTIONS (81) command)

FORMAT (NO=0,[%]=1,[\$]=2,NO,=3):

Default 0

Set print specifications for designated column. Continues prompting for column numbers until command is cancelled. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. (Pages 5.1, 5.5, 5.6)

## 27 SHOW COLS

Display the current print options and commands for each column shown on the screen. To display settings for columns not shown on the screen, scroll the screen to the desired location and re-enter SHOW COL (27) command. To recover original display, press any cursor key. To print these options and command logic, use the PRINT TBL (118) command. (Pages 4.6, 5.6)

## 28 REORDER

OLD NUMBER (1-20):                      NEW NUMBER (1-20):

Move old column into position of new column and vice versa. Other columns will be adjusted as necessary. Use to swap, insert, or delete rows. Can also use INSERT (17) command and DELETE (18) command to insert or delete columns. Any logic reference is automatically maintained. (Page 3.13)

## Data Commands

### 29 data:

Display data entry commands: enter data, select row and column modes, fix, nullify, and go to commands. (Page 2.1)

### 30 ENTRY (PT)

VALUE:

One step data entry for entering individual values, cell by cell. Use the cursor keys to select location of entry. Data can only be entered within current row and column ranges. Pressing <Return> instead of a specific value will repeat the last value entered. Action is the same as the VALUE ("0") option in the ENTER (31) command.

If MicroPlan is in the Program Mode, you have the option to enter a prompting message after entering each value. The prompting message will be displayed when the program is run. (Pages 3.2-3.4, 3.7)

### 31 ENTER (PT)

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3):0

VALUE:

Continues prompting for individual values within current row and column ranges until command is cancelled. Pressing <Return> will repeat last value entered. Same action as ENTRY (30) command.

or

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1

BASE VALUE:

Prompts for a base value. Same value will be entered for entire row or column within row and column ranges.

or

CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 2

BASE VALUE:

RATE:

Prompts for a base value and growth rate. Value will grow by percentage specified, within current row and column ranges.

or  
CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 3

BASE VALUE:

RATE:

Prompts for a base value and amount of increase. Value will increase by rate specified for row or column within current row and column ranges.

and

If MicroPlan is in Program mode:

PROMPTING MSG:

Prompting message will be displayed when program is run.

Enter row or column values in table within current row and column ranges. Constant, grow, and increase options allow quick entry. Cursor keys allow individual data entry. Default value is the 0 option (VALUES). (Pages 2.3, 2.4, 3.1, 3.2, 4.13, 7.20)

### 32 CHANGE (P)

ROW (1-50) :        COLUMN (1-20) :

VALUE:

If MicroPlan is in Program mode:

PROMPTING MSG:

Prompting message will be displayed when program is run.

Change a single value in the table. (Pages 2.6, 4.13, 7.11)

### 33 SELECT ROW

ROW (1-50) :

Move the data pointer to a new row of the table and put MicroPlan into the row mode. You may also use the up and down arrow cursor keys to move the data pointer. If you are in the column mode, the down cursor arrow will put you in the row mode. (Page 1.9)

### 34 SELECT COL

COLUMN (1-20):

Move the data pointer to a new column of the table and put MicroPlan into the column mode. You may also use the left and right arrow cursor keys to move the data pointer. If you are in the row mode, the right cursor arrow will put you in the column mode. (Pages 1.9, 3.1)

### 35 FORMULA (PT)

Use a formula to calculate the results for a row or column. Depending on whether MicroPlan is in the row or column mode, formulas may reference a row or column (L), values (Vr,c) or positive constants. Negative numbers are not allowed in MicroPlan formulas except as an expression, (0-1=-1). Formulas may contain arithmetic functions +, -, \*, and /, and may be up to 40 characters long. Results are stored in the row or column indicated by the data pointer. (Pages 4.7-4.10, 7.14, 7.38, 8.19)

### 36 GOTO (P)

ROW (1-50):            COLUMN (1-20):

Position the screen with designated row and column in the upper left corner of the display. MicroPlan will always display a full screen. Thus GOTO may also be used to display the last screenfull of the top right, bottom left, or bottom right of the table. For example, if you GOTO the first row number and the last column number of the table, MicroPlan displays the last full screen of the top right corner of the table. Cursor keys can also be used to move around the table. (Page 1.9)

### 37 PLUG (PT)

ROW (1-50):            COLUMN (1-20):

Use a formula to calculate results for a particular cell. Differs from the FORMULA command in that results are stored in the cell designated by the above prompts. PLUG formulas may reference table values (Vr,c) or positive constants. Negative numbers are not allowed except as an expression, (0-1=-1). PLUG formulas may contain arithmetic functions +, -, \*, and /, and may be up to 40 characters long. PLUG formulas cannot reference a row or column.



Like other MicroPlan commands, the actual PLUG formula is stored in the row or column indicated by the data pointer and replaces any previous command associated with that row or column. You may elect to move the data pointer to an unused row or column before issuing the PLUG command. (Pages 4.7-4.9, 4.11, 4.12)

### **38 FIX R/C (P)**

Recompute only the current row or column, without computing other rows and columns. Use cursor keys or SELECT ROW or SELECT COL commands to move the data pointer to the row or column to be computed before using the FIX command. Similar to COMPUTE (98) command except it applies to a single row or column. (Pages 6.5, 6.7, 6.8, 9.14)

### **39 NULLIFY (PT)**

VERIFY (Y OR N):

Nullify a command associated with a row or column without affecting the data. Applies to the current row or column, designated by the data pointer. Use cursor keys or SELECT ROW or SELECT COL commands to move the data pointer to the right row or column before using NULLIFY. (Page 4.7)

## Math Commands

### 40 math:

Display math commands: arithmetic, formulas, plug, negate, get, floor, ceiling, and row and column summation commands. (Pages 1.8, 4.1)

### 41 ADD (PT)

ROW (1-50):                      ROW (1-50):  
  
or  
COLUMN (1-20):                  COLUMN (1-20):

Add one row or column of values to another row or column, and store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 + row/col\ 2$ . (Pages 4.1, 4.2)

### 42 SUB (PT)

ROW (1-50):                      ROW (1-50):  
  
or  
COLUMN (1-20):                  COLUMN (1-20):

Subtract one row or column of values from another row or column. First prompt is for the row or column to subtract from. Second prompt asks for the row or column to subtract. In other words,  $row/col\ 1$  (first prompt) minus  $row/col\ 2$  (second prompt) equals the result. Store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 - row/col\ 2$ . (Pages 2.5, 4.2)

### 43 MULT (PT)

ROW (1-50):                      ROW (1-50):  
  
or  
COLUMN (1-20):                  COLUMN (1-20):

Multiply one row or column of values by another row or column, and store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 * row/col\ 2$ . (Page 4.2)

**44 DIV (PT)**

ROW (1-50):                      ROW (1-50):

or

COLUMN (1-20):                  COLUMN (1-20):

Divide one row or column of values by a second row or column, and store the results in the row or column indicated by the cursor and data pointer.  $RESULT \leftarrow \text{row/col 1} / \text{row/col 2}$ . (Page 4.3)

**45 NEGATE (PT)**

ROW (1-50):

or

COLUMN (1-20):

Negate a row or column of values and store the results in the row or column indicated by the data pointer. Positive values become negative and negative values become positive. Negative values are preceeded by minus signs.  $RESULT \leftarrow -(\text{row/col})$ . (Page 4.3)

**46 INVERSE (PT)**

ROW (1-50):

or

COLUMN (1-20):

Compute the inverse for a row or column of values and store the results in the row or column indicated by the cursor and data pointer. Values will be rounded to one decimal place on the screen unless otherwise set with the SET CRT (86).  $RESULT \leftarrow 1/(\text{row/col})$ . (Page 4.3)

**47 INTEGER (PT)**

ROW (1-50):

or

COLUMN (1-20):

Compute the integer part of a row or column of values by dropping the fractional portion of values and converting values to whole numbers. Results are stored in the row or column indicated by the data pointer.  $RESULT \leftarrow \text{INT}(\text{row/col})$ . (Page 4.3)

#### 48 ROUND (PT)

ROW (1-50):

or

COLUMN (1-20):

Round a row or column of values to the nearest whole number and store the results in the row or column indicated by the cursor and data pointer. Number of decimal places can be changed on the screen using the SET CRT (86) command and can be changed on printed reports using the OPTIONS (81) or SET TYPE (21, 26) commands.  $RESULT \leftarrow INT (row/col + 0.5)$ . (Page 4.3)

#### 49 CUMULATE (PT)

VALUE: ROW (1-50):

or

VALUE: COLUMN (1-20):

Compute cumulative sums for a row or column and store the results in the row or column indicated by the data pointer. Cumulate prompts for beginning value to accommodate a beginning balance. If there is no beginning value, enter "0" in response to the VALUE prompt. Use CUMULATE for ending balance calculations.  $RESULT_t \leftarrow RESULT_{t-1} + row/col_t$ . (Pages 4.3, 4.4, 7.6, 7.7, 7.30, 7.35)

#### 50 ABSOLUTE (PT)

ROW (1-50):

or

COLUMN (1-20):

Compute the absolute value of a row or column and store the results in the row or column indicated by the cursor and data pointer. If a value is negative, the result is positive. If the value is positive the result is positive.  $RESULT \leftarrow ABS (row/col)$ . (Page 4.3)

**51 ADD K (PT)**

VALUE: ROW (1-50):

or  
VALUE: COLUMN (1-20):

Add a constant value to a row or column and store the results in the row or column indicated by the cursor and data pointer.  $RESULT \leftarrow row/col + value$ . (Page 4.3)

**52 SUB K (PT)**

VALUE: ROW (1-50):

or  
VALUE: COLUMN (1-20):

Subtract a constant value from a row or column and store the results in the row or column indicated by the cursor and data pointer.  $RESULT \leftarrow row/col - value$ . (Page 4.3)

**53 MULT K (PT)**

VALUE: ROW (1-50):

or  
VALUE: COLUMN (1-20) :

Multiply a row or column by a constant value and store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col * value$ . (Pages 2.3-2.4, 4.3, 4.13-4.14, 8.16)

**54 DIV K (PT)**

VALUE: ROW (1-50):

or  
VALUE: COLUMN (1-20):

Divide a row or column by a constant value and store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col / value$ . (Page 4.3)

**55 SUM (PT)**

ROW BEGIN (1-50):                      END (1-50):

or  
COLUMN BEGIN (1-20) :              END (1-20):

Sum a consecutive series of rows or columns and store the results in the row or column indicated by the data pointer. RESULT <-- SUM (row/col 1 THROUGH row/col 2). (Pages 2.4, 4.4, 8.9)

**56 GET (PT)**

ROW (1-50):

or  
COLUMN (1-20):

Get values from a row or column in the current table and store the results in the row or column indicated by the data pointer. RESULT <-- row/col. (Page 4.4)

**57 FLOOR (PT)**

VALUE :                                  ROW (1-50):

or  
VALUE :                                  COLUMN (1-20):

Compare row or column values to a designated value. If any row or column value is less than the designated value, then the result is the new value. Otherwise, result is row or column value. Store the results in the row or column indicated by the data pointer. Use for simple if/then calculations. RESULT <-- MAX (row/col, value). (Page 4.5)

**58 CEILING (PT)**

VALUE:

ROW (1-50):

or

VALUE:

COLUMN (1-20):

Compare row or column values to a designated value. If row or column value is greater than designated value, then the result is the new value. Otherwise result is row or column value. Store the results in the row or column indicated by the cursor and data pointer. Use for simple "if/then" calculations. `RESULT <-- MIN (row/col, value)`. (Page 4.5)

## Finance Commands

### 60 finance

Display finance commands: depreciation, mortgages, internal rate of return, ratios, percentages, growth, and tax schedule commands. (Page 7.1)

### 61 SET DEPR

CHOOSE (SL=1, SYD=2, DDB=3, DDB-SW=4):

SL=straight line depreciation schedule; SYD=sum of years digits; DDB=double declining balance; and DDB-SW=double declining balance with automatic switchover to straight-line schedules.

BOOK VALUE:

SALVAGE VALUE:

LIFE (IN YEARS):

Prompt for assumptions for the DEPR (62) command. Store these parameters in the first four cells of the row indicated by the cursor and data pointer, in the order the prompts are listed. After answering the SET DEPR prompts for the necessary variables, the cursor will not move to the next line. If you want to keep your assumptions for future reference, you must move your cursor to the next line using the cursor keys. Otherwise, the depreciation schedule will appear on the same line as your assumptions and overwrite those values. Use the SET DEPR command with subsequent DEPR (62) command. Straight line, sum of years, double declining, and double declining with an automatic switchover methods of depreciation are supported. You must be in the row mode to use this command.

To use the declining balance depreciation method with a depreciation rate other than 2 (double declining balance) choose the DDB (3) option. After answering the book value, salvage value, and life (in years) prompts, enter the desired depreciation rate (e.g. 1.25, 1.75, 1.5 etc.) in column 5 of the row containing your other assumptions. Then use the DEPRECIATE (62) command to calculate the depreciation schedule according to the given assumptions. You can also choose the DDB-SW (4) option and enter the desired depreciation rate as outlined above. (Pages 7.8-7.9)



**62 DEPRECIATE (PT)**

ROW (1-50) :

Calculate period by period depreciation schedule using the parameters entered with the SET DEPR (61) command above. Store the results in the row or column indicated by the data pointer. To avoid overriding your assumptions with your depreciation schedule, you may set your row ranges to exclude the row containing the depreciation assumptions. RESULT <-- DEPRECIATE (row/col). (Pages 7.8-7.11)

**63 SET LOAN**

CHOOSE (ANNUAL=1, QUARTERLY=4, MONTHLY=12):

LOAN AMOUNT :

TERMINAL BALLOON PAYMENT AMOUNT:

TERM OF LOAN (YEARS):

ANNUAL INTEREST RATE (%):

ANNUAL PAYMENT:

Prompts for data for the LOAN (64) command. Supply four of the five values necessary to calculate a loan schedule and like a financial calculator MicroPlan will solve for the fifth. For example, enter values for the loan amount (PV), the terminal balloon payment amount (FV), the term of loan (N), and the annual interest rate (I), and MicroPlan will solve for the annual payment (PMT). Store these parameters in the first six cells of the current row indicated by the data pointer, in the order the prompts are listed. Use with subsequent LOAN (64) command. You must be in the row mode to use this command. (Pages 7.11-7.12)

**64 LOAN (PT)**

ROW (1-50):

Calculate the interest schedule on a loan using the parameters entered with the SET LOAN (63) above. Store the results in the row or column indicated by the data pointer. RESULT <-- LOAN (row/col). (Pages 7.11-7.12, 7.15)

## 65 DCF (PT)

% RATE: ROW (1-50):

or  
% RATE: COLUMN (1-20):

Discount cash flows in row or column by given rate and store the results in the row or column indicated by the data pointer. The first period is not discounted. Use CUMULATE (49) to calculate net discounted cash flow.  $RESULT \leftarrow row/col / (1 + rate/100)^t$ . (Pages 7.15-7.18)

## 66 IRR (PT)

ROW (1-50) :

or  
COLUMN (1-20):

Calculate internal rate of return for a row or column containing cash flow figures, and store the results in the row or column indicated by the data pointer. The first value of cash flow signifies an initial investment, and must be a negative number. MicroPlan can handle a maximum of 50 values in calculating the internal rate of return.

The IRR is the discount rate which sets the sum of discounted cash flows equal to zero. The IRR command may take longer than a regular calculation because it uses a trial-and-error method to search for the answer. MicroPlan will do 50 trials to try and calculate the internal rate of return.  $RESULT \leftarrow IRR (row/col)$ . (Page 7.19)

## 67 RATIO (PT)

ROW (1-50): ROW (1-50):

or  
COLUMN (1-20): COLUMN (1-20):

Calculate percentage ratios by dividing values from one row or column by values from another row or column. Results are expressed in percentages and stored in the row and column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 / row/col\ 2 * 100$ . (Pages 7.3, 8.15)

**68 % OF TOT (PT)**

VALUE: ROW (1-50):

or  
VALUE: COLUMN (1-20):

Calculate row or column as a percentage of a total value, and store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 / value * 100$ . (Page 7.3-7.4)

**70 PCT (PT)**

ROW (1-50): ROW (1-50):

or  
COLUMN (1-20): COLUMN (1-20):

Calculate percentages using rates stored in another row or column of the table. Results are stored in the row or column indicated by the data pointer.  $RESULT \leftarrow row/col\ 1 / 100 * row/col\ 2$ . (Page 7.1-7.2)

**71 K PCT (PT)**

% RATE: ROW (1-50):

or  
% RATE: COLUMN (1-20):

Calculate the constant percentage of values in a specified row or column. Store the results in the row or column indicated by the data pointer.  $RESULT \leftarrow rate / 100 * row/col$ . (Pages 7.1-7.2, 7.24)

**72 LAG (PT)**

PERIODS (1-12): ROW (1-50):

or  
PERIODS (1-12): COLUMN (1-20):

Shift row or column to the right (backward) by the number of periods indicated and store the results in the row or column indicated by the data pointer. Use for cash flow calculations (e.g. receipts is a lag function of posted orders).  $RESULT_t \leftarrow row/col_{(t-period)}$ . (Pages 7.28, 7.35)

### 73 LEAD (PT)

PERIODS (1-12):                      ROW (1-50) :

or  
PERIODS (1-12):                      COLUMN (1-20):

Shift row or column to the left (forward) by the number of periods indicated and store the results in the row or column indicated by the data pointer. Use for cash flow calculations (e.g, inventory is a function of expected sales).  $RESULT_t \leftarrow row/col[t+period]$ . (Page 7.28)

### 74 GROW (PT)

VALUE:                                      ROW (1-50) :

or  
VALUE:                                      COLUMN (1-20):

Increase values using growth rates stored in a separate row or column. Store the results in the row or column indicated by the data pointer. Growth rates are entered as whole numbers but are treated as percentages, thus 4 is equal to 4% and 50 is treated as 50%. Grow prompts for a beginning value. If no beginning value is required, enter "0" and <Return>.  $RESULT_t \leftarrow RESULT_{t-1} * [1 + row/col_t / 100]$ . (Pages 7.20, 7.35, 8.10)

### 75 SAVINGS (PT)

% RATE :                                      ROW (1-50):

or  
% RATE :                                      COLUMN (1-20) :

Calculate savings balances and store the results in the row or column indicated by the data pointer. Rate is the compounding rate for savings; row or column contains period by period deposits or withdrawals.  $RESULT_t \leftarrow RESULT_{t-1} * rate / 100 + row/col_t$  (Pages 7.5-7.8)

**76 SET SCHED**

NUMBER OF BRACKETS (1-10):

By pressing <Return>, MicroPlan takes you directly to the

ENDING MARGINAL TAX RATE (%) option.

UPPER LIMIT FOR BRACKET 1:

MARGINAL TAX RATE (%):

Continues prompting for LIMIT and TAX RATE until top bracket is reached.

ENDING MARGINAL TAX RATE (%):

Prompt for tax computation schedule to be used in DO TAX (77) command. Store these parameters in the row indicated by the data pointer in the same order as the prompts, starting with column 1. You must be in the row mode to use this command. (Page 7.22)

**77 DO TAX (PT)**

SCHEDULE (1-50) :

EARNINGS (1-50):

Calculate taxes using the tax schedule and the pre-tax earnings stored in the rows designated with the SET SCHED (76) command. Store the results in the row indicated by the data pointer. (Pages 7.23-7.24)

## Print Commands

### 80 print:

Display print commands: set report and title options, print reports, table logic and programs, list table and program directories, send reports to printer or disk files.

### 81 OPTIONS

TOP MARGIN (0-50):  
Default 0

LEFT MARGIN (0-50):  
Default 0

Paper adjustment options for printers with automatic paper feed.

ENHANCEMENT (0-3):  
Default 0

ROW TITLE WIDTH (4-40):  
Default 20

COLUMN WIDTH (4-20):  
Default 10

COLUMNS PER PAGE (1-30):  
Default 10

DECIMAL PLACES (0-3) :  
Default 1

OMIT ZERO ROWS (NO=0, YES=1):  
Default 0

SUPPRESS ZERO VALUES (NO=0, DASH=1, BLANK=2):  
Default 0

PRINT ROW TITLE AFTER WHICH COLUMN (0-9):  
Default 0

NEGATIVE NUMBERS (-N=0, N-=1, (N)=2):  
Default 0

PAGE CONTROL (OFF=0, FEED=1, PAUSE=2):  
Default 0

OMIT COMMAS (NO=0, YES=1):  
Default 0

DOUBLE SPACE (NO=0, YES=1):  
Default 0

OMIT LINE NUMBERS (NO=0, YES=1):  
Default 0

Set global report options. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. Option settings are saved with the SAVE TBL (112) command. To print these options use command 126 PRINT TBL. (Pages 1.5, 5.1, 5.7-5.10, 5.13)

## 82 TITLES (P)

PAGE NUMBER (0-999):  
Default 0

DATE (YEAR AS YY):  
Default 0

MONTH (1-12):  
Default 0

DAY (1-31):  
Default 0

ROW-RANGE BEGIN (1-50):           END (1-50):  
Default 50

COL-RANGE BEGIN (1-20):           END (1-20):  
Default 20

Setting row and column ranges will set the ranges for the entire table. If, after you print, you wish to continue working with the whole table, change the row and column ranges to their original settings using the ROW RANGE (92) and COL RANGE (93) commands.

TITLE 1:  
TITLE 2:  
TITLE 3:

SET PAPER; HIT RETURN

Set global title options. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. To print these options use the PRINT TBL (118) command. These options are saved with the SAVE TBL (112) command. The three title lines are stored in the program directory for reference in subsequent LOAD TBL (111) commands.

Each report title can be up to 40 characters. The quote mark (") is an illegal character and should not be used in titles. To set titles without immediately printing out the report, cancel this command once the title options have been entered. To print a report check to see that printer is connected and turned on, and paper adjusted before you press <Return>. (Pages 2.7-2.8, 5.10-5.11, 5.13)

### 83 REPORT (P)

SET PAPER; HIT RETURN

Send report to printer. Report options and titles should be set before printing report. Check to see that printer is connected and turned on, and paper adjusted before you press <Return>. (Pages 5.13, 6.10)

### 84 SHOW OPTS

Display report options and title information on screen. To print these options use command 118 PRINT TBL. (Page 5.12)

### 85 SAVE REP (P)

OUTPUT NAME:

Hit RETURN to see the available tables or programs.

Save MicroPlan table with options and titles to a disk file. Can interface with word processors, or spool output to printer. The files are standard ASCII carriage-return-delineated files. Can press <Return> to see available tables or programs on current disk. If you choose a file name that already exists, MicroPlan will write over the existing file. Files saved under this command cannot be read by the LOAD TBL (111) command. (Page 6.10)



**86 SET CRT**

DECIMAL PLACES (0-3):

Default 1

ROW TITLE WIDTH (5-30):

Default 15

COLUMN WIDTH (4-20):

Default 10

DISPLAY ZERO VALUES (NO=0, YES=1):

Default 1

Set CRT display options that will be shown on the screen. Row titles may be up to 40 characters on a printed report, however, only a maximum of 30 characters will be shown on the screen. SET CRT settings do **NOT** affect the printed report. Current settings for the SET CRT options are displayed in the upper right corner of the screen. (Pages 6.10-6.11)

## Status Commands

### 90 status:

Display status commands: range settings, mode selection, and computing order.

### 91 range:

Range selection commands for rows and columns.

### 92 ROW RANGE (P)

ROW BEGIN (1-50):                      END(1-50):  
Default 50

Set row range to restrict computations and data entry to affect only a portion of the table. Impacts calculations, printed reports, and general data manipulation. Change of row range is reflected on the status line. (Pages 5.11, 6.2, 7.11, 9.10)

### 93 COL RANGE (P)

COL BEGIN (1-20):                      END (1-20):  
Default 20

Set column range to restrict computations and data entry to affect only a portion of the table. Impacts calculations, printed reports and general manipulation. Change of column range is reflected on the status line. (Pages 5.11, 6.2, 7.31-7.32)

### 95 mode:

Mode selection commands.

### 96 RUN PGM

Set mode to run program. Current program is executed and any prompting messages displayed. Mode changes back to Normal Mode automatically. (Pages 6.1, 9.1-9.2, 9.6, 9.10, 9.13, 9.17)

## 97 PROGRAM

NEXT STEP = 1

NEXT STEP = 2

Continues to prompt for NEXT STEP until program mode is exited by issuing a NORMAL (99), RUN PGM (96), or another PROGRAM (97) command. If there is a program already in memory when using this command, MicroPlan prompts:

FOLLOWING WHICH STEP: (0-N):

Set mode to program mode. Each programmable command (P) used will be recorded as a step of a program. If current program exists, this command is used to add steps to the current program. To exit the program mode, use the NORMAL 99 command to change the mode. The mode change will be reflected on the status line. Use the SAVE PGM (122) command to save a program; use the SAVE ALL (107) command to save a program and the associated table. (Pages 6.1, 9.1-9.2, 9.8-9.10 )

## 98 COMPUTE (P)

Set mode to compute. Recompute table according to the order specified on the MicroPlan status line to see the impact of any changes. Computations are done only within the range limit as specified on the status line. (Pages 2.7, 4.12-4.14, 6.1, 6.3, 7.32, 9.14, 9.17)

## 99 NORMAL

Turns off the Program mode and returns MicroPlan to the Normal mode. Current programs still exist in memory, but are not saved. To save programs use the SAVE PGM (122) or SAVE ALL (107) commands. (Pages 6.1, 9.1-9.2, 9.8, 9.10)

## 100 DEL STEPS

STARTING STEP (1-N):                      TO STEP (1-N):

Delete steps from program. MicroPlan will automatically re-number steps after EACH step is deleted. (Pages 9.11-9.12)

## 101 PROTECT

Turns protect mode on and off. A "P" will be displayed in the upper right corner to indicate that the protect mode is on. While in the protect mode, changes can be made to the data without affecting the underlying table logic. (Pages 6.2, 9.2)

## 102 ORDER (P)

(ROW/ONLY=1, COL/ONLY=2, ROW/COL=3, COL/ROW=4):  
Default 3

Select the order in which the COMPUTE (98) command performs calculations. Current computing order is displayed on the MicroPlan status line. For example, ROW ONLY performs calculations only on those commands associated with rows; ROW/COL computes row commands and then column commands. (Pages 6.3-6.5, 9.14)

## Utility Commands

### 105 utility:

Display utility commands: load, save, list, print, erase, redisplay screen, and clear and reset tables. (Page 3.9)

### 106 LOAD ALL (P)

TABLE NAME:

Hit RETURN to see the available tables or programs.

Load table and associated program from disk and set to RUN PGM mode. Program steps will be executed and any prompting messages displayed with no additional commands. Press <Return> to see the names of available tables and programs on the current disk. (Page 9.13)

### 107 SAVE ALL

TABLE NAME:

Hit RETURN to see the available tables or programs.

Save both table AND program onto disk for permanent storage. Referenced by table name. If the name of a table already on the disk is specified, MicroPlan will display the following message:

Your file already exists. Continue with save?  
VERIFY (Y OR N):

Press <Return> to see the names of available tables and programs on the current disk. If you choose a program name that already exists, MicroPlan will write over the existing file. (Page 9.13)

### 108 SET DRIVE (P)

DRIVE (A-P):

Default A

Select disk drive for saving and loading tables and programs. Current drive is used for saving and loading files unless otherwise specified. Current drive is displayed on the MicroPlan status line when loading or saving tables or programs. (Pages 6.9, 9.13)

## 109 SET UP

OK TO ERASE CURRENT DATA?  
VERIFY (Y OR N)

NUMBER OF COLUMNS (1-99):      ROWS (1-200):  
VERIFY (Y OR N):

Enlarge current MicroPlan table to a greater number of rows or columns. With 64K of RAM, each table can have approximately 1000 entries; 16-bit machines generally permit larger tables. (Pages 3.5, 3.11, 6.2)

## 111 LOAD TBL (P)

TABLE NAME:  
Hit RETURN to see available tables or programs.

Load table from disk. Press <Return> to see the names of available tables and programs on the current disk. Keep pressing <Return> to see more table names. Enter the name of table to load. MicroPlan will clear the screen and display the specified table.

If the dimensions of a new table are smaller than the dimensions of current table, the following message is displayed:

New table is smaller than current table dimensions. Enlarge?  
CHOOSE (NEW=0, CURRENT=1):

MicroPlan will clear the screen and display the specified table. (Pages 3.9-3.11)

## 112 SAVE TBL (P)

TABLE NAME:  
Hit RETURN to see the available tables or programs.

Save table onto disk for future use. Row and column descriptions, data, logic, and all print options will be saved as part of the table. Press <Return> to see the names of available tables and programs on the current disk. If the name of a table already on the disk is specified, MicroPlan will display the following message:

Your file already exists. Continue with save?  
VERIFY (Y OR N):

Choose "Y" to overwrite existing table, and "N" to give the current table another name. If you choose a file name that already exists, MicroPlan will write over the existing file. (Pages 2.8, 3.9-3.11, 6.10)

### 113 CLR DATA

OK TO ERASE CURRENT DATA ?  
VERIFY (Y OR N):

Clear all data from current table within row and column ranges. Row and column titles, printing options, table logic, and program steps, if any, remain intact; only values in the table are replaced with zeros. (Page 6.12)

### 114 RESET

OK TO ERASE CURRENT DATA?  
VERIFY (Y OR N):

Delete all current information in table. Reset table values to zero, row and column titles to blanks. Erase table logic and program steps. (Pages 3.1, 6.12)

### 115 REDISPLAY

Clear screen and redisplay table, menu, and status information. No changes are made to data. (Page 6.12)

### 116 LIST TBLS

SET PAPER; HIT RETURN

Provide a printed listing of names, titles, and sizes of tables currently on disk. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 6.9)

### 117 ERASE TBL

TABLE NAME:  
Hit RETURN to see the available tables or programs.

Delete a saved table from disk permanently. Can press <Return> to see available tables or programs on current disk. (Page 6.9)

## 118 PRINT TBL

SET PAPER; HIT RETURN

Print a description of current table. Listing will include row titles, options, table commands, and global options. The PRINT TBL command will always start with row 1, column 1 regardless of the current range settings. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 5.13)



## Program Commands

### 120 program:

Display program commands: save, load, and clear programs, delete steps, print, list, run programs, list program directory, and erase program. (Page 9.1)

### 121 LOAD PGM (P)

PROG NAME:

Hit RETURN to see the available tables or programs.

Load program from disk. Program steps will be executed and any prompting messages displayed. Press <Return> to see available tables or programs on current disk. Program descriptions and number of steps in each program will also be displayed. (Pages 9.8, 9.12-9.13)

### 122 SAVE PGM

PROG NAME:

Hit RETURN to see available tables or programs.

PROGRAM DESCRIPTION:

Save program onto disk for permanent storage. Can press <Return> to see available tables or programs on current disk. If the name of a table already on the disk is specified, MicroPlan will display the following message:

Your file already exists. Continue with save?  
VERIFY (Y OR N):

If you choose a file name that already exists, MicroPlan will write over the existing file. (Pages 9.12-9.13)

### 123 PRINT PGM

SET PAPER; HIT RETURN

Print a copy of the current program. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 9.12)

#### 124 CLEAR PGM

OK TO ERASE CURRENT PROGRAM?  
VERIFY (Y OR N):

Clear current program from memory. Will not erase program on disk. (Pages 9.8, 9.13)

#### 125 SHOW PGM

Display the current program on the screen. Press any cursor key to recover display. (Pages 9.9-9.10, 9.17)

#### 126 LIST PGMS

SET PAPER; HIT RETURN

Send a listing of programs available on the current disk to the printer. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 9.13)

#### 127 ERASE PGM

PROG NAME:  
Hit RETURN to see the available tables or programs.

Delete a saved program from current disk. Can press <Return> to see available tables or programs on current disk. Program descriptions and number of steps in each program will also be displayed. (Page 9.13)

## Statistical Commands

### 130 stats:

Display statistical commands: delta, mean, variance, standard deviation, logarithms, exponential, minimums and maximums, moving averages, exponential smoothing, and powers. (Page 8.1)

### 131 DELTA (PT)

PERIODS (1-12):

ROW (1-50):

Calculate the change in value between periods of a row or column.  $RESULT_t \leftarrow row/col_t - row/col_{(t-period)}$ . (Pages 8.5-8.6)

### 132 % GROWTH (PT)

PERIODS (1-12):

ROW (1-50):

Calculate the % rate of growth in values between periods of a row or column.  $RESULT_t \leftarrow PCT (row/col, period)$ . (Pages 8.4-8.5)

### 133 MOV AVG (PT)

PERIODS (1-12):

ROW (1-50):

Compute the moving average for a row or column. The average is calculated over a variable number of periods.  $RESULT_t \leftarrow (row/col_t + row/col_{t-1} + row/col_{t-period+1...}) / period$ . (Page 8.7-8.8).

### 134 SMOOTH (PT)

% RATE

ROW (1-50)

Compute exponential smoothing for a row or column. The "f" is a smoothing coefficient entered as a percentage.  $RESULT \leftarrow f / 100 * RESULT_{(t-1)} + (1-f) / 100 * row/col_t$ . (Page 8.10)

**135 MEAN (PT)**

ROW BEGIN (1-50):

END (1-50):

Calculate the mean values for a series of rows or columns. Mean values are calculated row by row or column by column. RESULT <-- MEAN (row/col 1 through row/col 2). (Page 8.9)

**136 SIGMA (PT)**

ROW BEGIN (1-50):

END (1-50):

Compute the standard deviation for a series of rows or columns. RESULT <-- SIGMA (row/col 1 through row/col 2). (Page 8.9)

**137 VARIANCE (PT)**

ROW BEGIN (1-50):

END (1-50):

Compute the variances for a series of rows or columns. RESULT <-- VARIANCE (row/col 1 through row/col 2). (Page 8.9)

**138 LOG (PT)**

ROW (1-50):

Compute the natural logarithm for a row or column. RESULT <-- LOG (row/col). (Page 8.9)

**139 EXP (PT)**

ROW (1-50):

Calculate the exponents for a row or column of values. RESULT <-- EXP (row/col). (Page 8.9)

**140 POWER (PT)**

ROW (1-50):

ROW (1-50):

Raise values in row or col 1 to the power of the values in row or col 2. RESULT  $\leftarrow$  (row/col 1  $^$  row/col 2).

**141 MAX (PT)**

ROW BEGIN (1-50):

END (1-50):

Find the largest value in a series of rows or columns. RESULT  $\leftarrow$  MAX (row/col 1 through row/col 2). (Page 8.9)

**142 MIN (PT)**

ROW BEGIN (1-50):

END (1-50):

Find the smallest value in a series of rows or columns. RESULT  $\leftarrow$  MIN (row/col 1 through row/col 2). (Page 8.9)

**143 COUNT (PT)**

ROW BEGIN (1-50):

END (1-50):

Count the number of values included in the mean, sigma, and variance calculations. RESULT  $\leftarrow$  COUNT (row/col 1 through row/col 2).

**144 TOTAL (PT)**

ROW BEGIN (1-50):

END (1-50):

Calculate the total of values for a series of rows or columns. Result is the same as SUM. RESULT  $\leftarrow$  SUM (row/col 1 through row/col 2). (Pages 8.9, 8.15)



## Appendix A

# Alternate Command Keys

MicroPlan will respond to alpha characters that are codes for the regular numeric commands. So, if it is easier for you, simply use a "+" for the ADD (41) command, a "F" for the FORMULA (35) command, or any of the other single keystroke codes. Of course, the regular MicroPlan menu will still be available to provide you with a constant reference.

+	ADD	I	INVERSE
-	SUBTRACT	K	K PCT
*	MULTIPLY	L	LOG
/	DIVIDE	M	MEAN
%	PCT	N	NULLIFY
=	GET	P	PLUG
\$	CUMULATE	Q	CHANGE
^	EXP	R	RATIO
A	ADD K	S	SUM
B	SUB K	T	% OF TOTAL
C	MULT K	V	VARIANCE
D	DIV K	X	FIX
E	ENTRY	<	LAG
F	FORMULA	>	LEAD
G	GOTO	@	GROW





# **Appendix B**

## **MicroPlan**

### **Customization Notes**

This memo assists dealers in customizing MicroPlan version 4 to specific systems. Features supported include:

1. Display attributes, table sizes, and identification.
2. CRT feature control.
3. Keyboard customization.
4. Function key customization.

#### **MPSETUP.FIL**

MPSETUP.FIL is a CP/M file used to store customized parameters for MicroPlan. The MPSETUP.FIL is one of the files on the MicroPlan system diskette. It contains numbers that allow you to customize MicroPlan to your microcomputer system and terminal.

Normally, MPSETUP.FIL is created by the MicroPlan CUSTOM program. If your system is listed on the CUSTOM menu, you simply select that system to get started. Otherwise, you need to change the contents of the MPSETUP.FIL to match your system. These numbers can be changed using any CP/M editor or word processor.

Technically, the contents of MPSETUP.FIL are a series of numbers. These numbers must be separated by commas or placed on individual lines of the MPSETUP.FIL. These numbers are used to tell MicroPlan what specific features are available on the hardware and how to use them.

The following is a sample printout of the MPSETUP.FIL.

**Sample MPSETUP.FIL**

```
"MicroPlan"
50,20
15,10,1,""
0,0,0
"Televideo/Soroq/WYSE"
9,80,24
2,27,0,0,0,61,32
0,0,0,0,0,0
27,41,0
27,40,0
27,41,0
27,40,0
0
27,40,0
0
27,40,0
27,41,32,0
27,41,0
27,40,32,0
27,40,0
27,40,0
27,89,0
27,84,0
11,10,12,8,30
27,127,13
"COMMAND KEY"
37
65,51, 66,52, 67,53, 68,54, 69,30, 70,35, 71,36, 72,79, 73,46, 74,79
75,71, 76,138,77,135,78,39, 79,79, 80,37, 81,32, 82,67, 83,55, 84,68
85,79, 86,137,87,79, 88,38, 89,79, 90,79, 43,41, 45,42, 42,43, 47,44
36,49, 37,70, 60,72, 61,56, 62,73, 94,139,64,74
"FUNCTION KEY SECTION"
1,-1,16
64,111,65,31,66,98,67,83,68,33,69,20,70,21,71,9
72,112,73,32,74,96,75,81,76,34,77,25,78,26,79,108
```

## SETUP PARAMETERS

This section controls the initial MicroPlan table size, the row title display area, the column sizes, the number of decimal places, handling of zeroes and print page margins.

```
"MicroPlan"  
ROW.N, COL.N  
ROW.SIZE, COL.SIZE, DEC.SIZE, DATA.DRIVE  
OMIT.ZERO, TOP.MARGIN, LEFT.MARGIN
```

Example:

```
"MicroPlan"  
50, 20  
15, 10, 1, "A:"  
0, 0, 0
```

ROW.N and COL.N are the initial table size for MicroPlan. Normally, these are set at 50 rows and 20 columns. They can be set to smaller values for small machines or larger values for 16-bit machines with larger memory capacity. In 8-bit CP/M systems, MicroPlan can normally accommodate approximately 1000 entries (i.e. 50 times 20 equals 1000) per table. Of course, the MicroPlan SETUP command allows the user to dynamically set the table sizes.

ROW.SIZE is the row title display area. Normally, 15 spaces are used. You can set it to any value from 5 to 40.

COL.SIZE is the size for each column. 10 is the default.

DEC.SIZE is the number of decimal places. 1 is the default.

DATA.DRIVE is the name of the drive for storing MicroPlan tables. If this value is set to select drive "B:", then MicroPlan will automatically store and retrieve MicroPlan tables from drive B.

OMIT.ZERO is treatment of zero values on the screen. A value of -1 says to display zeroes as blanks. 0 is the default.

TOP.MARGIN is the number of lines to skip at the top of a page.

LEFT.MARGIN is the number of columns to skip at the left side of a page. (Top and left margins support printers with single page sheet feeders.)

## **CRT CONTROL FEATURES**

This section describes the CRT interface for MicroPlan. Specific features include cursor control, highlighting, screen clear and line clear.

Normally, for an application like MicroPlan to instruct the CRT to clear the screen, a special command is sent by MicroPlan to the CRT. This command might be the number 5 or a string of numbers starting with a 27 followed by an 89. Unfortunately, this command varies for each system and terminal. However, you can look up the appropriate commands in your system or terminal CRT interface section and enter the command sequence into MPSETUP.FIL.

### **Screen Size**

"Terminal/System name"  
CRT.TYPE, CRT.WIDTH, CRT.LENGTH

Example:

"DEC VT/100"  
0, 80, 24

CRT.TYPE is used to identify specific terminals that may require special adjustments. Use 1 for Hazeltine terminals. Otherwise, any value is OK.

CRT.WIDTH and CRT.LENGTH control the screen size. Most terminals display 80 columns by 24 rows. 132 column screens are fully supported.

### **Cursor Addressing**

FORMAT, LEAD.IN, LEAD.IN-2, LEAD.IN-3, DELIMITER  
ADDR.CURSOR, ADDR.OFFSET

Example:

1, 27, 38, 97, 121  
67, 0

These numbers control positioning of the cursor at specific locations on the screen. MicroPlan supports 3 techniques for cursor addressing. They are:

- 0. Hazeltine x, y format
- 1. ANSI standard
- 2. y, x format (most popular)

The Hazeltine format uses the following command structure for cursor addressing:

```
ESC ADDR.CURSOR x-value y-value
```

In MPSETUP.FIL, the numbers would be set as follows:

<u>settings</u>	<u>description</u>
FORMAT = 0	select Hazeltine format.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 0	2nd lead-in set to null.
LEAD.IN-3 = 0	
DELIMITER = 0	set to null.
ADDR.CURSOR = 17	address cursor command.
ADDR.OFFSET = 96	address offset.

You can use the Hazeltine format for any terminal that closely matches the Hazeltine format by substituting the correct values. For example, if your terminal uses the x,y format, but uses a different command for cursor addressing, the correct value may be entered into MPSETUP.FIL in place of the original value.

The ANSI standard uses the following command structure:

```
LEAD.IN LEAD.IN-2 LEAD.IN-3 y-value DELIMITER x-value ADDR.CURSOR
```

For example, the HP-2621A would use the following settings:

<u>settings</u>	<u>descriptions</u>
FORMAT = 1	select ANSI standard.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 38	2nd lead-in character.
LEAD.IN-3 = 97	3rd lead-in character.
DELIMITER = 121	delimiter.
ADDR.CURSOR = 67	address cursor command.
ADDR.OFFSET = 0	address offset.

If your terminal follows the ANSI standards, you can use this format by changins selected values to suit your terminal. If your terminal uses less than 3 lead-in characters, then the remaining values should be set to zero.

The most popular format is the abbreviated y,x format:

```
ESC ADDR.CURSOR y-value x-value
```

For example, the Televideo terminal would use the following values:

<u>settings</u>	<u>descriptions</u>
FORMAT = 2	select y, x format.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 0	2nd lead-in character.
LEAD.IN-3 = 0	3rd lead-in character.
DELIMITER = 0	delimiter.
ADDR.CURSOR = 61	address cursor command.
ADDR.OFFSET = 32	address offset.

As with all 3 methods for cursor addressing, you can set the individual values to suit your system or terminal.

### Printer Features

Printer features are supported. There are an initialization, termination and 4 enhancements that you may implement for any printer. These features can be used to select compressed, expanded or alternate fonts, to issue paper feed messages and for other printer control uses.

PRINTER.INIT	0	Initilization string.
PRINTER.END	0	Termination string.
ENHANCE.0	0	Zeroth enhancement.
ENHANCE.1	0	First enhancement.
ENHANCE.2	0	Second enhancement.
ENHANCE.3	0	Third enhancement.

Each line can contain as many numbers as necessary and must be terminated by a zero. At minimum, each line must contain a zero.

The initialization sequence and one of the enhancement choices are sent to the printer at the beginning of every command that uses the printer. The end sequence is sent to the printer at the end of every command that uses the printer. The choice of enhancement is set in the OPTIONS command.

Initialization is used to send special Paper Load instructions or LPI commands. Each enhancement generally controls various CPI choices. The end sequence resets the printer to its original state.

**Highlighting**

You can highlight each portion of the MicroPlan display screen using features available in your system. For example, you can display the titles and the MicroPlan menu in reverse video and blink the status line.

	<u>Example</u>	<u>Adds</u>
INITIAL.SET	27, 91, 48, 0	CRT initialization.
END.SET	0	CRT ending set.
DEF.SET	14, 0	Default setting.
PROMPT.ON	0	Not used.
STATUS.ON	15, 0	MicroPlan status line.
MESSAGE.ON	15, 0	Message line.
ROW.ON	0	Not used.
TBL.ON	15, 0	Row and column title area.
POINTER.ON	14, 32, 0	Row/column pointer.
DATA.ON	0	Data area.
DPOINTER.ON	15, 32, 0	Data pointer.
NEGATIVE.ON	0	Negative values.
MENU.ON	15, 0	Menu area.

Each line can contain as many numbers as necessary and must be terminated by a zero. At minimum, each line must contain a zero.

The numbers are commands that are sent to the CRT to select specific features such as reverse, blink, underline, color or other highlighting activities.

The INIT.SET sequence is sent to the CRT at the beginning of every MicroPlan session. The END.SET sequence is sent to the CRT at the end of every MicroPlan session. Other sequences are sent to the CRT prior to displaying that section of the MicroPlan screen. The DEF.SET sequence is sent to the CRT at the completion of any display on the CRT.

For example, whenever a message is printed on line 1 of the CRT, MicroPlan will send the MESSAGE.ON sequence to the CRT, followed by the message and the DEF.SET sequence.

For POINTER.ON and DPOINTER.ON, a space (32 decimal or 20H) needs to be inserted. If the highlighting feature used to distinguish the data pointer already occupies a space on the CRT, then the space should be omitted.

**Clear screen and line**

CLEAR.SCREEN	27, 84, 0
CLEAR.LINE	27, 89, 0

The clear screen and clear to end of line sequence is handled the same way as highlighting. A sequence of numbers is sent to the CRT to clear the screen or to clear the line. These sequences must be terminated by a zero value.

## **KEYBOARD CUSTOMIZATION**

MicroPlan allows single keystroke cursor control. In addition, you can customize the alphabetic portion of the keyboard to generate specific MicroPlan commands. You can match specific keys to functions in MicroPlan by looking up the values generated by a key and entering the values into MPSETUP.FIL as follows.

### **Cursor control**

UP.KEY, DOWN.KEY, RIGHT.KEY, LEFT.KEY, CANCEL.KEY

Example:

5, 24, 4, 19, 1

Cursor control allows the user to move the MicroPlan data pointer. Most keyboards have a set of keys with arrows on them that point in the up, down, right, left and home positions. You can customize MicroPlan to respond to these arrow keys by entering the values generated by these keys into MPSETUP.FIL.

The above example allows the user to use CTRL-E, CTRL-X, CTRL-D, CTRL-S and CTRL-A for the above actions.

### **Backspacing**

ESC.KEY, BACKSPACE, CR.KEY

Example:

27, 127, 9

Backspacing is used to correct typing errors. Different keys are used on different systems to handle backspacing. For example, you can choose the BACK key, the DEL key, or the RUBOUT key depending on your keyboard. (If not defined for other uses, 8H is always used as the backspace key. In the current example, both 8H and the DEL key would perform backspacing.)

ESC.KEY can be used to capture a two character cursor key. In other words, if the cursor keys generate 2 ASCII characters, ESC.KEY should be set to the value of the first key.



The CR.KEY is an alternate carriage return key. OCH by default, is always the carriage return key. CR.KEY defines an alternate key (TAB in the above example.)

### Command Key Synonyms

This section allows you to map any alphabetic keystroke into specific MicroPlan commands. This provides each MicroPlan with an alphabetical synonym. For example, the S key can be trained to map into the SUM command (55) in MicroPlan. Normally, the S key generates a decimal 83 (or 53H). In the example below, it has been mapped into a 55 for SUM.

```
"Command key section"
COUNT
KEY1, COMMAND1
.
:
KEYN, COMMANDN
```

Example:

"Command key section"	
3	3 keys.
43, 41	+ key, MicroPlan ADD (41)
45, 42	- key, MicroPlan SUB (42)
83, 55	S key, MicroPlan SUM (55)

You can specify as many keys as you wish. Note, only alphabetic keys can be used since numeric keys interfere with normal MicroPlan command entry conventions.

### FUNCTION KEY SECTION

Please set as follows:

```
"Function key section"
0,0,0

FUNCTION.INIT
FUNCTION.END      (true=-1 or false=0)
#-OF-KEYS
```



# Appendix C

## Corporate Planning Model

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Page 1

PMD Company - Division A Product 1  
1981 Budget  
Income Statement (\$000)

	Jan	Feb	Mar	1st Qtr	Apr	May	Jun	2nd Qtr
Gross Sales	\$150	\$160	\$170	\$330	\$180	\$190	\$200	\$420
Less: Sale Deductions	10	10	10	30	10	10	10	30
Net Sales	\$90	\$100	\$110	\$300	\$120	\$130	\$140	\$390
Cost of Goods Sold	\$50	\$55	\$60	\$165	\$65	\$70	\$75	\$210
Gross Profit	\$40	\$45	\$50	\$135	\$55	\$60	\$65	\$180
Operating Expenses								
Selling	\$10	\$10	\$10	\$30	\$12	\$12	\$12	\$36
A and G	17	17	17	51	19	20	20	59
Research	2	2	2	6	2	2	2	6
Total Operating Expenses	\$29	\$29	\$29	\$87	\$33	\$34	\$34	\$101
Operating Profit	\$11	\$16	\$21	\$48	\$22	\$26	\$31	\$79
Other Income & Expense								
Corporate Overhead	\$5	\$5	\$5	\$15	\$5	\$5	\$5	\$15
Other Income (Exp.)	1	1	1	3	1	1	1	3
Tot. Other Income & Expen	\$(4)	\$(4)	\$(4)	\$(12)	\$(4)	\$(4)	\$(4)	\$(12)
Profit Before Int & FIT	\$15	\$20	\$25	\$60	\$26	\$30	\$35	\$91
Interest Expense	\$15	\$15	\$15	\$45	\$15	\$15	\$15	\$45
Federal Income Tax								
-Current	-	\$2	\$5	\$7	\$5	\$7	\$9	\$21
-Deferred	5	5	5	15	5	5	5	15
Total Taxes	\$5	\$7	\$10	\$22	\$10	\$12	\$14	\$36
Net Income	\$(5)	\$(2)	\$0	\$(7)	\$1	\$3	\$6	\$10
	=====	=====	=====	=====	=====	=====	=====	=====

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PMD Company - Division A Product 1  
1981 Budget  
Income Statement (\$000)

	Jul	Aug	Sep	3rd Qtr	Oct	Nov	Dec	4th Qtr	Tot Yr.
Gross Sales	\$210	\$220	\$230	\$660	\$190	\$200	\$210	\$600	\$2,010
Less: Sale Deductions	10	10	10	30	10	10	10	30	120
Net Sales	\$200	\$210	\$220	\$630	\$180	\$190	\$200	\$570	\$1,890
Cost of Goods Sold	\$80	\$85	\$90	\$255	\$95	\$100	\$105	\$300	\$930
Gross Profit	\$120	\$125	\$130	\$375	\$85	\$90	\$95	\$270	\$960
Operating Expenses									
Selling	\$15	\$15	\$15	\$45	\$17	\$17	\$17	\$51	\$162
A and G	22	22	23	67	23	23	24	70	247
Research	2	2	2	6	2	2	2	6	24
Total Operating Expenses	\$39	\$39	\$40	\$118	\$42	\$42	\$43	\$127	\$433
Operating Profit	\$81	\$86	\$90	\$257	\$43	\$48	\$52	\$143	\$527
Other Income & Expense									
Corporate Overhead	\$5	\$5	\$5	\$15	\$5	\$5	\$5	\$15	\$60
Other Income (Exp.)	1	1	1	3	1	1	1	3	12
Tot. Other Income & Expen	\$(4)	\$(4)	\$(4)	\$(12)	\$(4)	\$(4)	\$(4)	\$(12)	\$(48)
Profit Before Int & FIT	\$85	\$90	\$94	\$269	\$47	\$52	\$56	\$155	\$575
Interest Expense	\$17	\$17	\$17	\$51	\$17	\$17	\$17	\$51	\$192
Federal Income Tax									
-Current	\$31	\$34	\$35	\$100	\$14	\$16	\$18	\$48	\$176
-Deferred	5	5	5	15	5	5	5	15	60
Total Taxes	\$36	\$39	\$40	\$115	\$19	\$21	\$23	\$63	\$236
Net Income	\$32	\$34	\$37	\$103	\$11	\$14	\$16	\$41	\$147
	=====	=====	=====	=====	=====	=====	=====	=====	=====

MicroPlan Version 4.0

Table: 50 x 20

TABLE NAME=I/S

## TITLE SECTION:

-----

DATE: 7/ 8/ 82

PAGE: 1

ROW RANGE: 1 TO 22 COL RANGE: 1 TO 8

TITLE 1: PMD Company - Division A Product 1

TITLE 2: 1981 Budget

TITLE 3: Income Statement (\$000)

## ROW SECTION:

-----

ROW	TYPE	UNDER LINE	BLANK LINES	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
---	----	----	-----	---	---	-----	-----
1 Gross Sales	data	-	-	-	-	\$ ENTER	
2 Less: Sale De	data	dash	-	-	-	- ENTER	
3 Net Sales	data	-	-	-	-	\$ SUBTRACT	ROW=1 ROW=2
4 Cost of Goods	data	dash	-	-	-	\$ ENTER	
5 Gross Profit	data	-	2	-	-	\$ SUBTRACT	ROW=3 ROW=4
6 Operating Exp	head	-	-	-	-	-	
7 Selling	data	-	-	-	-	\$ ENTER	
8 A and G	data	-	-	-	-	- ENTER	
9 Research	data	dash	-	-	-	- ENTER	
10 Total Operat	data	dash	-	-	-	\$ SUM	ROWS 7 TO 9
11 Operating Pr	data	-	1	-	-	\$ SUBTRACT	ROW=5 ROW=10
12 Other Income	head	-	-	-	-	-	
13 Corporate	data	-	-	-	-	\$ ENTER	
14 Other Inco	data	dash	-	-	-	- ENTER	
15 Tot. Other I	data	-	1	-	-	\$ SUBTRACT	ROW=14 ROW=13
16 Profit Befor	data	-	1	-	-	\$ SUBTRACT	ROW=11 ROW=15
17 Interest Exp	data	-	1	-	-	\$ ENTER	
18 Federal Inco	head	-	-	-	-	-	
19 -Current	data	-	-	-	-	\$ .46*(L16-L17)	
20 -Deferred	data	dash	-	-	-	- ENTER	
21 Total Taxes	data	-	1	-	-	\$ ADD	ROW=19 ROW=20
22 Net Income	data	equal	page	-	-	\$ L16-L17-L21	

COLUMN SECTION:  
-----

COLUMN		COLUMN WIDTH	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
-----		-----	-----	-----	-----	-----
1	Jan	6	1	-		
2	Feb	6	1	-		
3	Mar	6	1	-		
4	1st Qtr	6	1	-	SUM	COLS 1 TO 3
5	Apr	6	1	-		
6	May	6	1	-		
7	Jun	6	1	-		
8	2nd Qtr	6	1	-	SUM	COLS 5 TO 7

REPORT OPTIONS SECTION:  
-----

ROW DESCRIPTION WIDTH: 25  
COLUMN WIDTH: 6  
NUMBER OF COLUMNS PER PAGE: 9  
NUMBER OF DECIMAL PLACES: 1  
OMIT ZERO ROWS (NO=0,YES=1): 0  
SUPPRESS ZERO VALUES (NO=0,DASH=1,BLANK=2): 1  
PRINT ROW DESCRIPTION AFTER WHICH COLUMN: 0  
NEGATIVE NUMBERS (-N=0,N-=1,(N)=2): 2  
PAGE CONTROL (OFF=0,FF=1,PAUSE=2): 1  
OMIT COMMAS (NO=0, YES=1): 0  
DOUBLE SPACE (NO=0, YES=1): 0  
OMIT LINE NUMBERS (NO=0,YES=1): 1

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Page 1

PMD Company - Division A Product 1  
1981 Budget  
Balance Sheet (\$000)

	Jan	Feb	Mar	Apr	May	Jun
	-----	-----	-----	-----	-----	-----
<b>Assets</b>						
Current Assets						
Cash	\$2	\$2	\$2	\$2	\$2	\$2
Notes Receivable	4	4	4	6	6	6
Accounts Receivable	20	20	22	22	24	24
Inventories	35	35	35	35	38	38
Other	3	3	3	3	3	3
	-----	-----	-----	-----	-----	-----
Total Current Assets	\$64	\$64	\$66	\$68	\$73	\$73
Total Investments	\$5	\$5	\$5	\$5	\$5	\$5
Plant, Property & Equip						
Gross P.P. & E	\$69	\$72	\$77	\$77	\$78	\$81
Less: Depreciation	10	10	10	10	10	10
	-----	-----	-----	-----	-----	-----
Net P.P. & E	\$59	\$62	\$67	\$67	\$68	\$71
Total Assets	\$128	\$131	\$138	\$140	\$146	\$149
	=====	=====	=====	=====	=====	=====
<b>Liab. &amp; Stkholder's Equity</b>						
Current Liabilities						
L-T Due w/in one Yr.	\$10	\$10	\$10	\$10	\$10	\$10
Notes Payable	14	14	14	14	14	14
Accounts Payable	20	20	25	26	30	30
Other	10	10	10	10	10	10
	-----	-----	-----	-----	-----	-----
Total Current Liabilities	\$54	\$54	\$59	\$60	\$64	\$64
Net Working Capital	\$10	\$10	\$7	\$8	\$9	\$9
Total Non-Current Liabili	\$15	\$15	\$15	\$15	\$15	\$15
	-----	-----	-----	-----	-----	-----
Total Liabilities	\$69	\$69	\$74	\$75	\$79	\$79
Stockholder's Equity						
Common Stock	\$50	\$50	\$50	\$50	\$50	\$50
Retained Earnings						
Bal Jan 1st	\$19	\$19	\$19	\$19	\$19	\$19
Add: Inc. for Period	(5)	(2)	0	1	3	6
Less: Dividends	5	5	5	5	5	5
	-----	-----	-----	-----	-----	-----
Net Retained Earnings	\$9	\$12	\$14	\$15	\$17	\$20
	-----	-----	-----	-----	-----	-----
Total Stockholder's Equit	\$59	\$62	\$64	\$65	\$67	\$70
	-----	-----	-----	-----	-----	-----
Total Liab. & Stkhdrs' Eq	\$128	\$131	\$138	\$140	\$146	\$149
	=====	=====	=====	=====	=====	=====

7/8/82

Page 2

PMD Company - Division A Product 1  
1981 Budget  
Balance Sheet (\$000)

	Jul	Aug	Sep	Oct	Nov	Dec
	-----	-----	-----	-----	-----	-----
Assets						
Current Assets						
Cash	\$2	\$2	\$2	\$2	\$2	\$2
Notes Receivable	7	7	7	8	8	8
Accounts Receivable	26	26	28	28	30	30
Inventories	38	38	38	40	40	40
Other	3	3	3	3	3	3
	-----	-----	-----	-----	-----	-----
Total Current Assets	\$76	\$76	\$78	\$81	\$83	\$83
Total Investments	\$5	\$5	\$5	\$5	\$5	\$5
Plant, Property & Equip						
Gross P.P. & E	\$82	\$84	\$94	\$94	\$94	\$94
Less: Depreciation	10	10	10	10	10	10
	-----	-----	-----	-----	-----	-----
Net P.P. & E	\$72	\$74	\$84	\$84	\$84	\$84
Total Assets	\$153	\$155	\$167	\$170	\$172	\$172
	=====	=====	=====	=====	=====	=====
Liab. & Stkholder's Equity						
Current Liabilities						
L-T Due w/in one Yr.	\$10	\$10	\$12	\$12	\$12	\$12
Notes Payable	14	14	16	16	16	16
Accounts Payable	35	35	40	42	41	39
Other	10	10	10	10	10	10
	-----	-----	-----	-----	-----	-----
Total Current Liabilities	\$69	\$69	\$78	\$80	\$79	\$77
Net Working Capital	\$7	\$7	-	\$1	\$4	\$6
Total Non-Current Liabili	\$15	\$15	\$15	\$15	\$15	\$15
	-----	-----	-----	-----	-----	-----
Total Liabilities	\$84	\$84	\$93	\$95	\$94	\$92
Stockholder's Equity						
Common Stock	\$50	\$50	\$50	\$50	\$50	\$50
Retained Earnings						
Bal Jan 1st	\$19	\$19	\$19	\$19	\$19	\$19
Add: Inc. for Period	5	7	10	11	14	16
Less: Dividends	5	5	5	5	5	5
	-----	-----	-----	-----	-----	-----
Net Retained Earnings	\$19	\$21	\$24	\$25	\$28	\$30
	-----	-----	-----	-----	-----	-----
Total Stockholder's Equit	\$69	\$71	\$74	\$75	\$78	\$80
	-----	-----	-----	-----	-----	-----
Total Liab. & Stkhdrs' Eq	\$153	\$155	\$167	\$170	\$172	\$172
	=====	=====	=====	=====	=====	=====



MicroPlan Version 4.0

Table: 50 x 20

TABLE NAME=B/S

TITLE SECTION:  
-----

DATE: 7/ 8/ 82

PAGE: 1

ROW RANGE: 1 TO 33 COL RANGE: 1 TO 12

TITLE 1: PMD Company - Division A Product 1

TITLE 2: 1981 Budget

TITLE 3: Balance Sheet (\$000)

ROW SECTION:  
-----

ROW	TYPE	UNDER	BLANK	DEC	FOR	COMMAND	PARAMETERS
---	---	LINE	LINES	SIZ	MAT	---	---
1 Assets	head	-	-	-	-		
2 Current Asset	head	-	-	-	-		
3 Cash	data	-	-	-	\$	ENTER	
4 Notes Recei	data	-	-	-	-	ENTER	
5 Accounts Re	data	-	-	-	-	ENTER	
6 Inventories	data	-	-	-	-	ENTER	
7 Other	data	dash	-	-	-	ENTER	
8 Total Current	data	-	1	-	\$	SUM	ROWS 3 TO 7
9 Total Investm	data	-	1	-	\$	ENTER	
10 Plant, Prope	head	-	-	-	-		
11 Gross P.P.	data	-	-	-	\$	ENTER	
12 Less: Depr	data	dash	-	-	-	ENTER	
13 Net P.P. & E	data	-	1	-	\$	SUBTRACT	ROW=11 ROW=12
14 Total Assets	data	equal	2	-	\$	L8+L9+L13	
15 Liab. & Stkh	head	-	-	-	-		
16 Current Liab	head	-	-	-	-		
17 L-T Due w/	data	-	-	-	\$	ENTER	
18 Notes Paya	data	-	-	-	-	ENTER	
19 Accounts P	data	-	-	-	-	ENTER	
20 Other	data	dash	-	-	-	ENTER	
21 Total Curren	data	-	1	-	\$	SUM	ROWS 17 TO 20
22 Net Workin	data	-	1	-	\$	SUBTRACT	ROW=8 ROW=21
23 Total Non-Cu	data	dash	-	-	\$	ENTER	
24 Total Liabil	data	-	1	-	\$	ADD	ROW=21 ROW=23
25 Stockholder'	head	-	-	-	-		
26 Common Sto	data	-	-	-	\$	ENTER	
27 Retained E	head	-	-	-	-		
28 Bal Jan 1	data	-	-	-	\$	ENTER	
29 Add: Inc.	data	-	-	-	-	GET	I/S/YR ROW=22
30 Less: Div	data	dash	-	-	-	ENTER	
31 Net Retain	data	dash	1	-	\$	L28+L29-L30	
32 Total Stockh	data	dash	1	-	\$	ADD	ROW=26 ROW=31
33 Total Liab.	data	equal	-	-	\$	ADD	ROW=24 ROW=32

COLUMN SECTION:  
-----

COLUMN		COLUMN WIDTH	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
-----		-----	-----	-----	-----	-----
1	Jan	8	1	-		
2	Feb	8	1	-		
3	Mar	8	1	-		
4	Apr	8	1	-		
5	May	8	1	-		
6	Jun	8	1	-		
7	Jul	8	1	-		
8	Aug	8	1	-		
9	Sep	8	1	-		
10	Oct	8	1	-		
11	Nov	8	1	-		
12	Dec	8	1	-		

REPORT OPTIONS SECTION:  
-----

ROW DESCRIPTION WIDTH: 25  
COLUMN WIDTH: 8  
NUMBER OF COLUMNS PER PAGE: 6  
NUMBER OF DECIMAL PLACES: 1  
OMIT ZERO ROWS (NO=0,YES=1): 0  
SUPPRESS ZERO VALUES (NO=0,DASH=1,BLANK=2): 1  
PRINT ROW DESCRIPTION AFTER WHICH COLUMN: 0  
NEGATIVE NUMBERS (-N=0,N-=1,(N)=2): 2  
PAGE CONTROL (OFF=0,FF=1,PAUSE=2): 1  
OMIT COMMAS (NO=0, YES=1): 0  
DOUBLE SPACE (NO=0, YES=1): 0  
OMIT LINE NUMBERS (NO=0,YES=1): 1

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Page 1

PMD Company - Division A Product 1  
1981 Budget  
Cash Flow Statement (\$000)

	Jan	Feb	Mar	Apr	May	Jun
	-----	-----	-----	-----	-----	-----
Funds Provided						
Net Income	\$(5)	\$(2)	\$0	\$1	\$3	\$6
D.D. & A.	10	10	10	10	10	10
Deferred F.I.T.	5	5	5	5	5	5
	-----	-----	-----	-----	-----	-----
Total from Operations	\$10	\$13	\$15	\$16	\$18	\$21
L-T Debt Incurred	10	10	10	10	10	10
Disposal of Investments	5	-	-	-	-	-
Other	-	-	-	-	-	-
	-----	-----	-----	-----	-----	-----
Total Funds Provided	\$25	\$23	\$25	\$26	\$28	\$31
Funds Applied						
Capital Expenditures	\$10	\$15	\$15	\$10	\$5	\$2
Other Investments	-	-	-	-	-	-
Dividends Declared	5	5	5	5	5	5
Net Inc. in Working Cap	(2)	-	(3)	1	1	-
	-----	-----	-----	-----	-----	-----
Total Funds Applied	\$13	\$20	\$17	\$16	\$11	\$7
Net Cash Flow	\$12	\$3	\$8	\$10	\$17	\$24
	=====	=====	=====	=====	=====	=====

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Page 2

PMD Company - Division A Product 1  
1981 Budget  
Cash Flow Statement (\$000)

	Jul	Aug	Sep	Oct	Nov	Dec
	-----	-----	-----	-----	-----	-----
Funds Provided						
Net Income	\$5	\$7	\$10	\$11	\$14	\$16
D.D. & A.	10	10	10	10	10	10
Deferred F.I.T.	5	5	5	5	5	5
	-----	-----	-----	-----	-----	-----
Total from Operations	\$20	\$22	\$25	\$26	\$29	\$31
L-T Debt Incurred	10	10	10	10	10	10
Disposal of Investments	5	-	-	-	-	5
Other	-	-	-	-	-	-
	-----	-----	-----	-----	-----	-----
Total Funds Provided	\$35	\$32	\$35	\$36	\$39	\$46
Funds Applied						
Capital Expenditures	\$2	\$2	\$5	\$10	\$15	\$15
Other Investments	-	-	-	-	-	-
Dividends Declared	5	5	5	5	5	5
Net Inc. in Working Cap	(2)	-	(7)	1	3	2
	-----	-----	-----	-----	-----	-----
Total Funds Applied	\$5	\$7	\$3	\$16	\$23	\$22
Net Cash Flow	\$30	\$25	\$32	\$20	\$16	\$24
	=====	=====	=====	=====	=====	=====

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Table: 50 x 20

TABLE NAME=C/F

## TITLE SECTION:

DATE: 7/ 8/ 82

PAGE: 1

ROW RANGE: 1 TO 17 COL RANGE: 1 TO 12

TITLE 1: PMD Company - Division A Product 1

TITLE 2: 1981 Budget

TITLE 3: Cash Flow Statement (\$000)

## ROW SECTION:

ROW	TYPE	UNDER LINE	BLANK LINES	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
1	Funds Provide head	-	-	-	-	OPTIONS	
2	Net Income data	-	-	-	\$	GET	I/S/YR ROW=22
3	D.D. & A. data	-	-	-	-	ENTER	
4	Deferred F. data	dash	-	-	-	GET	I/S/YR ROW=20
5	Total from Op data	-	1	-	\$	SUM	ROWS 2 TO 4
6	L-T Debt In data	-	-	-	-	ENTER	
7	Disposal of data	-	-	-	-	ENTER	
8	Other data	dash	-	-	-		
9	Total Funds P data	-	3	-	\$	SUM	ROWS 5 TO 8
10	Funds Applie head	-	-	-	-		
11	Capital Ex data	-	-	-	\$	ENTER	
12	Other Inve data	-	-	-	-		
13	Dividends data	-	-	-	-	GET	B/S ROW=30
14	B/S Net Wk omit	-	-	-	-	GET	B/S ROW=22
15	Net Inc. i data	dash	-	-	-	ENTER	
16	Total Funds data	-	3	-	\$	L11+L12+L13+L15	
17	Net Cash Flo data	equal	page	-	\$	SUBTRACT	ROW=9 ROW=16

COLUMN SECTION:  
-----

COLUMN		COLUMN WIDTH	DEC SIZ	FOR MAT	COMMAND	PARAMETERS
-----		-----	-----	-----	-----	-----
1	Jan	8	1	-		
2	Feb	8	1	-		
3	Mar	8	1	-		
4	Apr	8	1	-		
5	May	8	1	-		
6	Jun	8	1	-		
7	Jul	8	1	-		
8	Aug	8	1	-		
9	Sep	8	1	-		
10	Oct	8	1	-		
11	Nov	8	1	-		
12	Dec	8	1	-		

REPORT OPTIONS SECTION:  
-----

ROW DESCRIPTION WIDTH: 25  
COLUMN WIDTH: 8  
NUMBER OF COLUMNS PER PAGE: 6  
NUMBER OF DECIMAL PLACES: 1  
OMIT ZERO ROWS (NO=0,YES=1): 0  
SUPPRESS ZERO VALUES (NO=0,DASH=1,BLANK=2): 1  
PRINT ROW DESCRIPTION AFTER WHICH COLUMN: 0  
NEGATIVE NUMBERS (-N=0,N-=1,(N)=2): 2  
PAGE CONTROL (OFF=0,FF=1,PAUSE=2): 1  
OMIT COMMAS (NO=0, YES=1): 0  
DOUBLE SPACE (NO=0, YES=1): 0  
OMIT LINE NUMBERS (NO=0,YES=1): 1

# Appendix D

## Error Messages

CP/M ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
BDOS ERROR on d*: BAD SECTOR  * d = drive name	Operating system cannot get information from diskette because disk being accessed is not correctly formatted.	Format disk correctly according to operating system manual.
	Operating system cannot get information from diskette because disk has physical defect (dust, finger prints, manufacturer's defect).	Press "R" to re-try command. If error persists, reboot system and re-try command. If error persists and is on data diskette, format new diskette and re-try command. If error is on systems disk make new working disk from master and re-try command. If error still occurs check disk drive for malfunction.
BDOS ERROR on d: SELECT	Drive does not exist.	Reboot system and designate correct disk drive. Check to make sure that disk drive cables are properly connected.

CP/M ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
BDOS ERROR on d: READ ONLY (R/O)	Newly inserted diskette was accessed without "C" command being issued to clear the drive.	Press any key to recover. Press "C" and then re-try command.
	Operating system is trying to write to a disk that has been designated as "read only."	Press any key to recover from error. Check diskette for write protect tab: For 5 1/4" diskettes remove tab to make diskette read/write. For 8" diskettes install tab to make diskette read/write.
	Operating system is trying to write to disk that has been designated as "read only" with the CP/M STAT command.	Change disk designation with STAT command.
DISK WRITE ERROR	Operating system is trying to write to a disk that is full. Operating system can read disk, but has no room to write.	Check available diskette space. Most likely an additional diskette will be needed to provide more storage space.



EXECUTION ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
CM ERROR	The program file specified in a chaining statement could not be found in the directory.	Problem with system disk. Use master diskette to make new system disk. If error persists, contact your dealer.
DW ERROR	Disk full. No diskette space left.	Check available diskette space. Most likely an additional diskette will be needed to provide more storage space.
DZ ERROR	A division by zero was attempted.	Check logic and correct.
ME ERROR	Diskette directory is full causing an error while attempting to save a file.	Check available diskette directory space. Most likely an additional diskette will be needed to provide more storage space.
OE ERROR	Open file error. Has no effect on program.	Enter next command to clear error message on screen.
OF ERROR	Arithmetic overflow. A number used in a calculation was too large.	Locate number causing overflow and correct. Re-try calculation.
OM ERROR	System has insufficient memory to complete action.	Break up action causing problem (table size, program, calculation) into smaller pieces.

MICROPLAN ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
"The contents of this file are incorrect. (e.g. old version)"	Table was not saved properly due to full or defective diskette.	Re-save table. Check operating system directory to confirm save. Use new data diskette if necessary.
"New table is smaller than current table dimensions. Enlarge?" 0=New, 1=Current	Table being loaded (new table) has smaller matrix than table shown on the screen (current table).	Decide which table size is desired, then answer Microplan query with an "0" for new table or "1" for the current table.
"Program mode on, command saved, no action."	Command was issued while in the program mode. The command was recorded as a program step but the action did not take place. Message appears when using the STOP and LOAD PGM commands in the program mode.	Informative error message--no corrective action necessary.
"No help files available."	Due to limited disk space on this machine format, help files have been deleted.	Informative error message--no corrective action necessary.

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    omit line numbers 5.10

    omit zero rows 5.8

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