MICROPOWER SERIES

MULTIPLAN™
for the Apple® II Plus and IIe

Michael V. Laric • M. Ronald Stiff

- Easy to follow step-by-step instructions for the mastery of MULTIPLAN
- Includes 64 worksheets

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Preface

Multiplan™ makes a computer as easy to use as a calculator, and it gives you far more power than a calculator. This book is intended to show you how to use Multiplan effectively. It is designed so those with no previous experience with computers as well as experienced users can learn to use Multiplan.

The first chapter sketches the types of uses in which Multiplan excells. The next chapter shows you how to start using the Apple Computer. Then we start looking at the specifics of using Multiplan. Although it is easier to keep reading the chapters in the order in which they appear, you can often skip ahead if you wish to look into some feature of special interest to you. The table of contents and a comprehensive index will help you find your way.

Most of Multiplan's features are presented while solving a sequence of realistic problems, such as evaluating the accumulation in an IRA (Individual Retirement Account). Some of these problems are solved a second time, so you can better appreciate the contrast between different approaches.

Almost everyone has to come to grips with numbers at one time or another, lots of them. Multiplan is such a powerful assistant in helping you manage numeric information that you should seriously consider equipping yourself with this tool. Perhaps this book will help decide.

Although the book contains detailed instructions on how to do everything shown, an optional diskette may be used to reduce the typing which would otherwise be required. See Chapter 15 for further information. It is assumed that you have the appropriate version of Multiplan for your computer. If not, this book will give you a good idea of the things you can do with Multiplan.

Contents

Chapter 1

WHY USE MULTIPLAN?

Electronic computers have been in use for more than 30 years. Why is it that Multiplan and similar programs are among the best selling computer software packages since the beginning of the computer age? These programs offer a friendly and straight forward set of commands that allows you to manipulate complex formulas and data. The tables you create can be easily changed by the computer following your commands. The greatest appeal of these programs is how easily they can be applied to a wide variety of problems from personal finances to real estate calculations to business planning analysis.

What is it about Multiplan that sets it apart from ordinary computer programming languages? There can be no doubt that any solution Multiplan can produce can also be produced by writing a computer program to generate that solution. For any problem you might wish to solve with Multiplan, a computer program to solve it could be written, using some computer programming language such as BASIC, FORTRAN, COBOL, or PASCAL.

That is exactly the reason for using Multiplan. You <u>don't</u> have to write a program to solve your problem when you use Multiplan. You key in the relevant data. (There is no way to avoid this completely, no matter what you are using.) You then specify how the data items are related, and what answers you want calculated. At this point, the computer expert might object: "This is the same as writing a program." Theoretically that may be true; in practice, it makes all the difference in the world. Writing computer programs can be very tricky and time-consuming, and that is after you have invested your time and effort in learning the programming language.

When you solve a new problem using a computer, you usually have to write a program to solve that problem, using one of the programming languages we mentioned earlier. That usually means you also have to use some kind of editing program just to prepare the program you need. Then you may have to prepare a data file, with the help of the editing program.

The data file is considered <u>input</u> to the program you wrote, and the results produced by your program are called its <u>output</u>. We often depict the input as flowing into the program which has been placed into the computer's memory, and show the results produced by your program as flowing out from it, as we see in Figure 1.1.

Figure 1.1 Input, Program, and Output Relationships

After you examine the output from your program, you may come to one of several conclusions:

1. Great- let's stop computing.
2. Oops!- there must be a "bug" in the program; try to find it and fix it.
3. It's ok, but what if ...?

Case 3 might involve wondering what would happen if some data item had a slightly larger value, or what would happen if the formula in the program was just a little different.

With Multiplan, you are more likely to get the first conclusion first. Number two is much less probable, simply because Multiplan won't let you request many ridiculous computations. Multiplan really shines in the third situation. You simply change the desired number or formula, and you immediately see the consequences. You don't have to fool with an editing program, or even request that your program be rerun.

With the conventional approach, the input data is laid out for the convenience of the computer program (or whoever wrote the program). The actual layout of the input data has little if any spatial relationship to the results. With Multiplan, you begin by putting the numbers where they should be at all times. Then you decide where the results should appear, in relationship to the other input. If you should change your mind, it is a simple and painless matter to move things around. If you then decide to change a number, you simply locate its old value where you expect to find it (not at some strange location chosen for a program's convenience). As soon as you change that number, all the other outputs depending on that number immediately change.

A Brief Example

The following simple example will give you a better idea of the difference between solving a problem using Multiplan versus solving a problem using the conventional computer approach.

Suppose you were a budding author, and had just had your manuscript accepted by a publisher. The publisher might have proposed that you be paid royalties based upon the following sliding schedule:

Earn 5% of selling price, for the first 3,000 copies.
Earn 7% of selling price, for the next 4,000 copies.
Earn 8% of selling price, for next 5,000 copies.
Earn 10% of selling price, for all additional copies.

With Multiplan, you would lay out the essential data in the form of a table, as we see here in Table 1.1.

Rate	Copies
5	3,000
7	4,000
8	5,000
10	?

Table 1.1 Raw Data

You would then make an educated guess as to what number to use for the ? in Table 1.1. You might like to project your potential income (before taxes) if the book sold, say, 50,000 copies, assuming that it sells for $1 per copy. So the ? is replaced by 50,000-(3,000+4,000+5,000), giving us $38,000. You then ask Multiplan to work out the product (rate multiplied by copies) for each line, which results in Table 1.2, since our rate figures are actually percentages.

Rate	Copies	Income
5	3,000	150
7	4,000	280
8	5,000	400
10	38,000	3,800

Table 1.2 Projected Income

Of course, what you really want is a running total, so you ask Multiplan to produce another column, headed "Total," which is to show, for each row, the sum of the current and all preceding income figures. That being done, you now see the results in Table 1.3.

Rate	Copies	Income	Total
5	3,000	150	150
7	4,000	280	430
8	5,000	400	830
10	38,000	3,800	4,630

Table 1.3 Projected Total Income

This may seem like much ado about nothing, at this point. You could have done the same thing with a calculator, or merely with paper and pencil. True, but having gone this far, you can now begin the "what if ..." phase. As the budding author, you might want to negotiate a better royalty schedule.

So you begin by thinking, "What if my first book is not a terrific success? I should ask for a higher percentage for the first few thousand sold, just to be safe." Suppose you settled on 6, 8 and 9, in place of the 5, 7 and 8 that was offered; you don't want to be greedy. You can now proceed to replace the 5, 7, and 8 by the 6, 8, and 9 and, lo and behold, you immediately see the consequences, as shown in Table 1.4.

Rate	Copies	Income	Total
6	3,000	180	180
8	4,000	320	500
9	5,000	450	950
10	38,000	3,800	4,750

Table 1.4 Projected Total Using New Rates

You might think about these totals for a while, and because you are now convinced you have a best seller on your hands, perhaps it would be better to focus on negotiating a better top rate than the 10 offered. After all, the other rates will make little difference if you sell 100,000 copies. So you change the 10 to 20 (dreamer) and you decide to increase the 38,000 by 50,000. The results are shown in Table 1.5.

Rate	Copies	Income	Total
6	3,000	180	180
8	4,000	320	500
9	5,000	450	950
20	88,000	17,600	18,550

Table 1.5 New Projected Totals

If you were in the publisher's shoes, you would also like to be able to juggle figures. As the author, you have much less experience with the consequences of manipulating either the rates, the sales thresholds, or the number of steps in the schedule. The publishers can probably do it mentally; you could use a little help.

You could of course have written a computer program to perform these calculations. The data file for this program could very well look like the following list (using the first set of rates and copies):

```
5,3000,7,4000,8,5000,10,38000
```

which is awkward to read and change. It might have looked like:

```
05 3000 or      05070810
07 4000         03000 04000 05000 38000
08 5000
1038000
```

where you find yourself putting in leading zeroes or leading blanks with the data, because the exact spacing between these numbers may be critical, depending upon the programming language used in writing the program. You could easily provide data which looks correct to the naked eye, but which the program takes to be 10 times larger (or 10 times smaller) than what you had in mind.

The data file

```
 5    3000
 7  4000
 8   5000
10 38000
```

seems to have the right numbers, even though the alignment for the 4000 and the 10 is a little sloppy. Some computer programs would interpret this 4000 as if you had written 40,000 because the actual position of the number on the line was critical. This is much less of a problem with Multiplan. You immediately see what Multiplan thinks you just typed. If it is not what you intended, you can change it right away.

What About Big Problems?

Suppose you had a really big problem to solve. Could Multiplan handle it? Suppose you were going to be a real estate tycoon and were working out a 10 year projected statement of cash flow. Such a statement is a table with at least 10 columns of numeric data, and some 33 rows, depending upon how much detail you want to include in projecting your cash disbursements. Then you also need some labels to keep track of things. If each column is to hold numbers as large as 8 digits, and we leave a little space between columns for ease of reading, the cash flow table will be about 120 characters wide. Since most computer video display terminals (VDTs) can display only 24 or 25 rows of 80 characters at one time, you would be hard pressed to squeeze all of the cash flow table onto the VDT screen at once.

With Multiplan, you can construct and display tables with as many as 63 columns and 255 rows and you can "browse" over parts of the table very easily. If the whole table won't fit on your screen, Multiplan treats your VDT screen as if it were a "window." Your screen window lets you see any part of the table you wish getting as much of it as will fit on your screen at one time. Trying to do this with a conventional computer program would be far more difficult. Figure 1.2 illustrates the idea of a window.

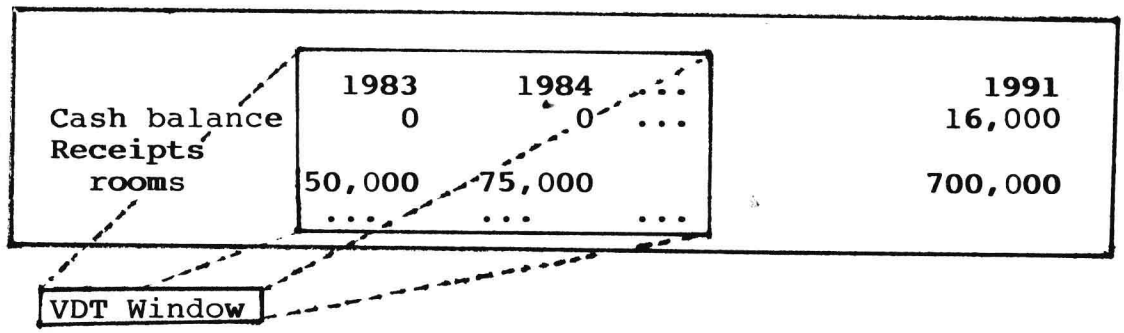


Figure 1.2 VDT Window into a Large Table

Coming Up

Specifics on using Multiplan: How do you tell Multiplan to do something? What if you made a mistake? What if you were in the middle of filling out a worksheet and had to leave suddenly: how can you save worksheets and recall them later? These and many other features of Multiplan will be described, discussed, and illustrated as we proceed. It goes without saying that you will learn more, faster and better, if you can be using Multiplan and trying the things we are discussing. We hope, however, to provide sufficiently detailed examples so that you can follow what is going on even if you don't have immediate access to a computer equipped with Multiplan.

Summary

Multiplan is data oriented, very much like a calculator. You begin with your own raw data, laying it out on what amounts to an electronic worksheet and using your VDT's screen as an easily erasable worksheet. Then you begin specifying the relationships between your data and the desired results. You build up to the desired end product in a step-by-step fashion, seeing the results at every step. You always see your input data in the natural spatial relationship intended with respect to any computed results.

Problem solving with computers, using the conventional approach, is program oriented rather than data oriented. Most people who are not computer experts feel more at ease with the data they know well than with unfamiliar computer programming languages. Most people are familiar with the everyday use of a simple worksheet. Multiplan combines the ease of using a calculator and the familiarity of a worksheet with the power of a computer. It follows that most people will find that Multiplan provides a natural, user-friendly way to make the computer work for you.

Chapter 2

GETTING ACQUAINTED WITH THE APPLE COMPUTER

This chapter deals with the operation of the Apple II+ and Apple IIe Computers. There is a great deal of similarity in these two computers when you are using Multiplan. For this reason we will refer to both machines as the Apple Computer throughout this book, **except** when there is a specific difference in the operations of the two computers. There are several useful features available on the Apple IIe that are not found on the Apple II+. No previous experience with computers is required to use Multiplan with the Apple Computer. Here the rudiments of turning the computer on and setting it up so you can use Multiplan effectively will be described. If you are already familiar with this computer, you might want to merely skim most of this chapter and proceed to the next.

Physical Components of an Apple Computer

Every Apple Computer has a system unit which includes a keyboard. In order to use Multiplan, a diskette drive is also required. The computer can have optional devices, such as a printer, as well as a second diskette drive (which is also called a floppy disk drive, or simply a disk drive, dropping the "ette").

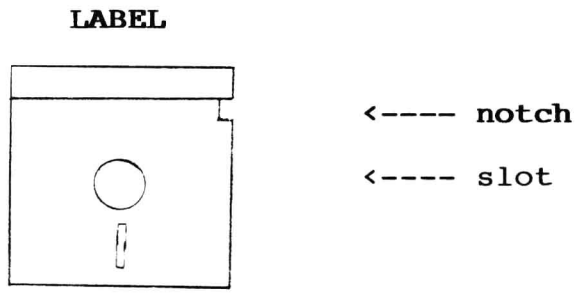
Figure 2.1 on the next page shows the display console above the system unit with the keyboard, and it identifies important items. The system unit contains one or two floppy disk drives. Each drive can hold one five-inch diskette. Each diskette can record over 100,000 characters of information. Some of these characters may be used to represent computer programs such as Multiplan and some of them are used to represent your data. The word "byte" is often used in place of the word "character"; for our purposes, these words are equivalent.

If you have two disk drives on an Apple Computer, you can have immediate access to over 200,000 characters of information. In the Apple DOS operating system the first disk drive is called drive 1 and the second is called drive 2. If you have the CP/M operating system the first disk drive is called drive A and the second drive is called drive B. Since disk drives for the Apple can be located wherever is convenient to you, you should be careful to correctly label the drives as either 1 and 2 for the DOS operating system and A and B for the CP/M operating system.

Figure 2.1 The Apple II Computer

Using Diskettes

Diskettes are normally stored in protective jackets or sleeves and they should be kept in an upright position. When you are ready to use a diskette, you should remove its protective jacket. This will reveal a rigid black square protective envelope. The envelope has an oval slot through which you can see the diskette. Never touch this open area in the square envelope. The disk drive's read and write mechanism uses this opening to record on, and read from, the diskette. The diskette is shown below:



If you see a small notch on the edge to the right of the label, the information on that diskette can be changed and new information added. In such a case, we say that this diskette is "write-enabled." If, on the other hand, you see a piece of tape in the same position covering the notch, then the computer will refrain from changing any information on that diskette; the diskette is said to be "write-protected."

If you are inserting your one and only Multiplan diskette into the diskette drive, make sure its write-protect notch is covered. That will prevent accidental overwriting of your master copy. Your Multiplan diskette is then identified as being "write-protected."

When you insert the diskette into the diskette drive, the label side should be facing up and the edge furthest from the label must be inserted into the drive first. Gently push the diskette through the drive door slot. Push the drive door shut. Each disk drive has an indicator light just below the disk drive slot. The indicator light will glow whenever the disk drive is being used by the computer. You should not attempt to insert or extract a disk when this light is glowing. Doing so could destroy the diskette and damage the disk drive. If it seems that the indicator light won't ever stop glowing, it would be better to turn off the computer to perform this operation.

Some Preliminaries

Multiplan is very easy to start up and use. Before we in, however, it is useful to learn about another tool, namely