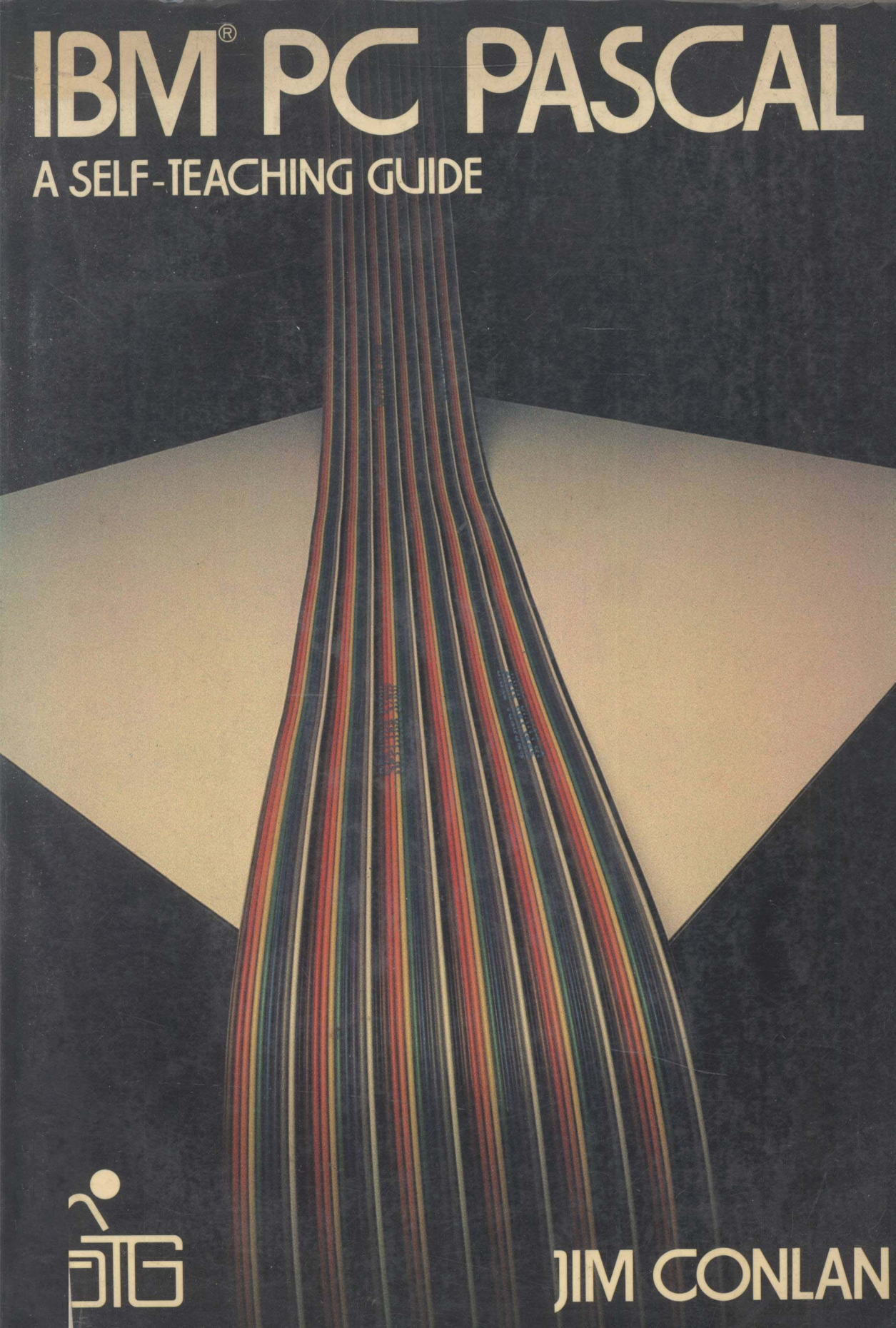
IBM® PC PASCAL

A SELF-TEACHING GUIDE



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IBM PC Pascal

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Introduction

This book is designed to help you learn the Pascal programming language. It begins at the beginning. You will learn the most important features and techniques of Pascal programming and how to create useful programs of your own.

WHERE DID PASCAL COME FROM?

Pascal has a very distinguished pedigree. It is the youngest member of the great family of languages that includes FORTRAN, BASIC, COBOL, and ALGOL. The father of Pascal, Professor Niklaus Wirth, improved the language ALGOL to make a language that is easy to learn, supports good programming practice, and is extremely powerful.

WHO USES PASCAL?

Today Pascal is a standard language used throughout the world. It is used for programming by giant corporations like IBM, Apple, Hewlett-Packard, Digital Equipment, and Texas Instruments. It is the required language for computer science, engineering, and economics at major universities. Business people use the powerful data structures of Pascal for business record keeping.

HOW IS PASCAL DIFFERENT?

Pascal is the result of decades of programming experience with the older languages. It incorporates the best current understanding of languages, problem-solving methods, and programming practice.

WHO CAN LEARN PASCAL?

Anyone can learn Pascal. It was designed to be clear and easy to understand. In this book you will learn to write useful, interesting, and entertaining programs.

Pascal is a rich and powerful language. It is full of important distinctions and new ideas that will help you think clearly about all kinds of complex systems. The more you use it the more you will understand it. This book will help you take the first steps.

WHAT IS NEEDED?

To get the most out of this book you should have frequent access to an IBM PC or compatible computer. You will also need the Pascal language compiler disks. This book is based on the IBM Personal Computer Pascal distributed by IBM. Other versions of Pascal can also be used with this book. Any special features of the IBM PC Pascal are clearly indicated in the text.

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CHAPTER ONE

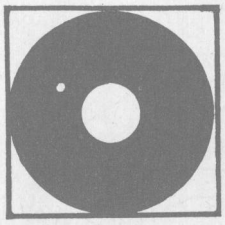
A Dash of DOS

This chapter is about your IBM Personal Computer system. In this chapter you learn:

- about the disk operating system
- about some useful keys
- how to prepare new disks
- how to copy information
- how to arrange your Pascal disks

FLOPPY DISKS

The FLOPPY DISKS used by your IBM PC computer are coated with a magnetic material similar to that used on common audio cassette tapes. Information is recorded on the surface by MAGNETIC MARKS.



A floppy disk inside its cover

Single-Sided and Double-Sided Drives

Your disk drive may a SINGLE-SIDED drive, or it may be a DOUBLE-SIDED drive. A single-sided drive records on only the top side of the disk. A double-sided drive records on both the top side and the bottom side of the disk. A double-sided drive can store twice as much information on a disk as a single-sided drive.

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Double-Density Drives

Your IBM disk drive is a DOUBLE-DENSITY disk drive. A double-density disk drive packs information densely on a disk. Your IBM PC disk drives can store 160,000 characters or more on one side of a floppy disk. A double-sided disk, by storing on both sides of the disk, can store 320,000 or more characters on a disk.

Soft-Sectored Disk

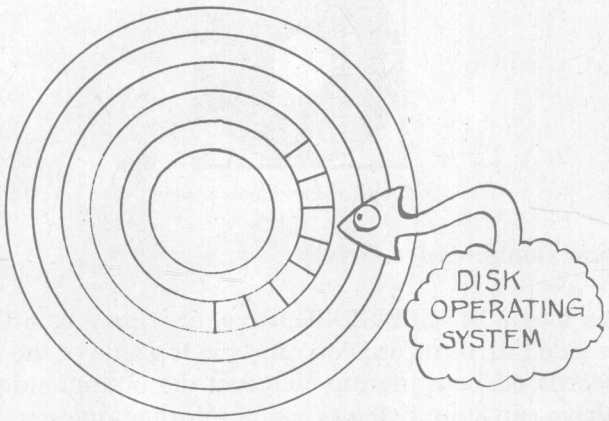
A SOFT-SECTORED DISK is one that needs MAGNETIC REFERENCE MARKS printed on its surface before it can be used to store information. The process of printing these magnetic reference marks is called FORMATTING the disk. Later in this chapter you will learn how to format your blank disks.

HARD, OR FIXED, DISK SYSTEMS

A HARD, or FIXED, disk system has the same sort of magnetic surface as the floppy disks. But, since the disk is hard and inflexible, it can be made to finer tolerances, can spin faster, and store more information. Typical hard disk systems can store from 5 to 40 million characters on a disk. A hard disk system uses the same commands that the floppy systems use, so there is nothing new to learn.

THE DISK, THE FILES, AND THE DOS

The information on your floppy disk is organized into FILES. A disk file is a named place on the disk that is prepared to hold information. Information is stored in the form of tiny magnetic marks. The computer can read and write the magnetic marks and decode their message. The DISK OPERATING SYSTEM, or DOS for short, is a set of programs, stored in files, that operates the disk and manages the files.



DOS operates the disk

A DOS will:

- print a directory of all disk file names
- copy files from one place to another
- erase a file
- make a copy of a disk

The floppy disk labeled DOS contains the disk-operating-system programs and other utility and demonstration files.

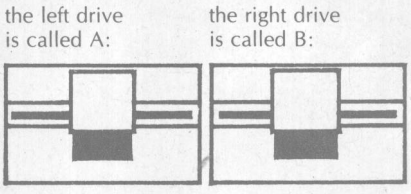
TIME TO START

Is everything hooked up? Make sure that:

- the keyboard cable is plugged into the back of the computer
- the monitor is plugged into the back of the computer
- the power cord for the monitor is plugged into the computer or the wall socket
- the computer is plugged into the wall socket

You are ready to go.

- Put the floppy disk labeled DOS into the left-hand disk drive.



- Turn on the big red switch at the right side of the computer.

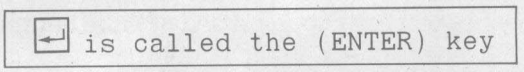
A short blinking line, called the CURSOR, will appear on the screen. Nothing else will happen for half a minute while the computer checks out its circuits. When the checkout is complete, you will hear a beep, the light on disk drive A: will turn on and the disk will spin. The computer reads the disk-operating-system files from the DOS disk. This prompt appears on the screen:

```
Current date is Tue 1-01-1980
Enter new date:_
```

Type the month, day, and year of the date, like this:

```
9-12-84
```

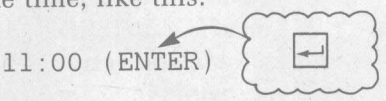
Now press the ↵ key.



The (ENTER) key tells the computer to accept the line you have typed. You use the (ENTER) key to send lines to the computer. You see something like this:

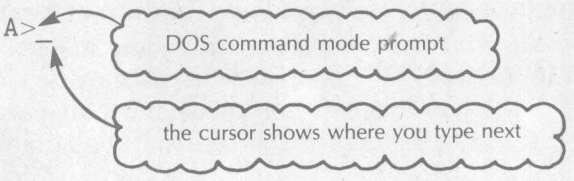
```
Current time is 0:00:54.98
Enter new time:_
```

Type the time, like this:



You see something like this:

```
The IBM Personal Computer DOS
Version 1.10 (C)Copyright IBM Corp 1981,1982
```



DOS Command Mode

The prompt symbol

```
A>
```

shows you two things:

- The computer is in DOS *command mode.*
- The disk drive A: is the active or DEFAULT disk drive.

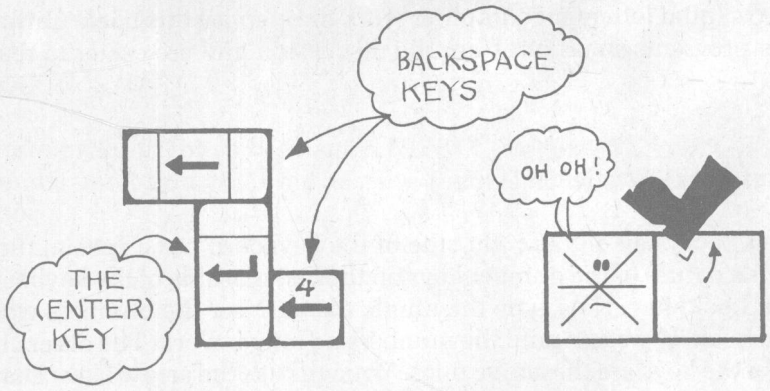
When the computer is in DOS *command mode,* it understands the commands that operate the disk drives. The computer will use drive A: for its work, until you specify another drive. Drive A: is presently the DEFAULT drive. The default drive is used if you don't specify a drive.

Your computer can be in other modes besides DOS command mode. For example, the computer may be busy doing a program. When the computer is doing a program, it can't take your DOS commands.

The Backspace Key (←)

You probably never make mistrakes but, if you do, then the *backspace key* is just what you need. The backspace key is so useful that there are two backspace keys

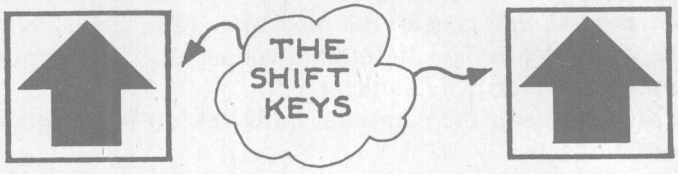
on the right side of the keyboard. They both do the same job. The backspace key jumps the cursor back one space and erases the character on which it lands.



▶ Type ABCDEF. Now use the backspace key to erase all the letters.*

The Shift Keys (↑)

There are two SHIFT keys, one at the bottom right and one at the bottom left of the keyboard. The shift keys are marked with an arrow:



When either shift key is held down, the letter keys will type capital letters. The other keys will type the upper symbol on the key.

▶ Use the shift key to type these symbols:

$ % ^ * ( ) _+ : < >

▶ Use the backspace key to erase the characters you just typed.

The (Caps Lock) Toggle

To the right of the space bar is the key labeled (Caps Lock). This key locks the capital letters on. If you press the (Caps Lock) key once, all letters will now type in capital letters. If you press (Caps Lock) again, the letters return to lowercase.

*The ▶ symbol in the left margin indicates something for you to do.

▶ Experiment with the (Caps Lock) key. Press it and try some letters. Press it again and try some letters.

We use capital letters for computer work throughout this book. Capital letters make the programs stand out from the discussion and are easier to read on the screen.

The (Num Lock) Toggle

The (Num Lock) key on the right side of the keyboard has a special function. It changes the nature of the number keys on the far right side of the keyboard. Press the (Num Lock) key. Now type the number keys. Now the numbers work. Press the (Num Lock) key again, and the numbers no longer work. The other characters written on the keys are the active ones. You will use the arrow keys. Leave (Num Lock) off so that the arrows will work.

The (Ctrl) Key

The CONTROL key (Ctrl) is near the bottom right side of the keyboard. The (Ctrl) key is held down to give the other keys special meanings.

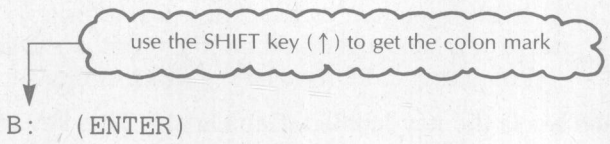
(Ctrl)(C) Key. Hold down the (Ctrl) key, and type the (C) key. The computer immediately types ^C, and goes to the next line. The (Ctrl)(C) combination is used to get the computer to pay attention to you again. The computer is always on the lookout for the (Ctrl)(C) character.

Type XXXX(Ctrl)(C) and the computer quits what it is doing and returns to DOS command mode.

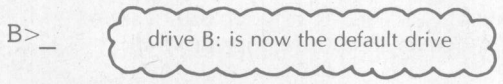
(Ctrl)(Z) Key. Hold down the (Ctrl) key, type the (Z) key, and press the (RETURN) key. The computer prints ^Z. The (Ctrl)(Z) key is used by the computer to mark the end of files.

Changing the Default Drive

You can make drive B: the default drive, like this:



You see this new prompt:



There is no disk in drive B:. What do you suppose happens if the computer tries to use drive B:?

▶ Type a few letters, like this:

```
XXXXX  (ENTER)
```

The computer tries to find a file named XXXX.COM, or XXXX.EXE on drive B:. The computer can't find anything because there is no disk in drive B:. It prints this message:

```
Not ready error reading drive B
Abort, Retry, or Ignore
```

Let's Abort the mission by typing an A. The computer immediately returns to DOS command mode and you see

```
B>_
```

▶ Change the active drive back to A:. Type

```
A: (ENTER)
```

You see the prompt

```
A>_
```

Now A is the active drive again.

▶ Type XXXX (ENTER) again. There is a disk in drive A:, but no file XXXX.COM, or XXXX.EXE. The computer types this message:

```
Bad command or file name
```

THE DIRECTORY

One of the commands that the computer understands in the DOS command mode is the directory command, DIR. The directory command DIR causes the computer to display the names of all the files stored on the disk drive. Type this:

```
DIR A: (ENTER)
```

or, since drive A: is the active drive, type this shorter form:

```
DIR (ENTER)
```

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